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Public acceptance of insects as food in the Netherlands

Jonas House

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Department of Geography

University of Sheffield

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Abstract

In the context of efforts to increase the sustainability of the current agri-food system, a particular focus has been meat consumption, which is associated with public health problems and environmental damage. One proposed means of reducing meat consumption in Europe and the US (the 'West') is the use of insects as a high protein, resource-efficient alternative to conventional meat. Western interest in the area has increased in recent years and various insect-based foods are now available, yet uptake remains low. The issue of public acceptance of insects as food remains problematic. However, what exactly public acceptance involves, and how it may be achieved, have been unclear.

Academic research investigating the topic typically propounds a highly individualistic notion of public acceptance. Further, little has engaged with consumption of insect-based foods in a 'real life' context. This thesis addresses these limitations, investigating the public acceptance of commercially-available insect-based foods in the Netherlands (the foremost Western country in the research, production, sale and advocacy of insects as food). Drawing on theories of practice and actor-network theory, it advances an account of public acceptance as geographically and socially embedded, rather than deriving from individual attitudes and beliefs. The thesis is based on empirical research into both consumption of insect-based foods (using interviews, food diaries, and accompanied shopping, cooking and eating) and their production (using interviews).

Key themes include an expanded notion of 'acceptance' of foods, in which successful novel foods are conceptualised as being embedded within a coherent framework of culinary practices; the highlighting of 'edibility' as something that is achieved relationally by both producers and consumers; insects' uncertain ontological position, and the implications of this for 'ethical' consumption; and the introduction of two new practice-theoretic concepts for social-scientific research on food consumption. Key contributions are identified for academic debates, business, advocacy and policy.

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Contents

Chapter 1 – Introduction

1.1 – INTRODUCTION

This thesis is submitted under the University of Sheffield's 'alternative format' rubric as a combination of published papers and contextualizing material, linking these outputs into a single coherent argument. It investigates public acceptance of insects as food in the Netherlands. Based on research with consumers of a range of insect-based 'convenience' foods, it provides the first systematic study of insect consumption in the contemporary context of 'real life' European foodways.[1] It also draws on research with individuals associated with the development and production of insect-based foods in the Netherlands, providing the first systematic account of this area. Synthesising material from these two empirical areas the thesis elaborates an 'integrative' account of public acceptance of insects as food, in which acceptance is conceptualised as arising out of complex geographies of production and consumption rather than individual attitudes or beliefs. This provides a significant extension to current debates in the area, which tend to conceptualise public acceptance of insects as primarily a psychological issue. It also contributes to broader debates around food within geography and cognate disciplines, particularly in relation to the production-consumption interface and the ways in which the 'edibility' of foods is established and maintained.

The thesis also provides one of the first applications of theories of practice to the study of how novel foods become established, comparing contemporary insect-based foods and the historical example of the introduction of sushi to the United States. This theoretical approach, it is argued, provides critical insight into the process by which new foods do or do not become successfully established. Application of theories of practice to this area develops not just substantive but also theoretical knowledge. The thesis introduces two new concepts – modes of eating and phased routinisation – which I argue are useful conceptual resources for research into food and eating within geography and cognate disciplines.

The present chapter frames the thesis. It first details the general social and intellectual context for the research (Section 1.2), prior to the more specific elaboration of disciplinary context and theoretical orientation in Chapter 2. The present chapter explains recent efforts to develop insects as a human food source in Europe and the US (the 'West'), outlining the proposed benefits and potential obstacles (Section 1.3).[2] In this context, it critically reviews literature on the use of insects as food ('entomophagy') (Section 1.4). This discussion focuses, in particular, on research into Western 'consumer acceptance' of insects as food, and some of the key limitations of current research. It clarifies how 'consumer acceptance' is understood, and explains the

[1] 'Convenience food' is a contested and problematic term, which escapes easy definition and is used in numerous different ways. It may, for example, include such diverse things as full meals, pineapple chunks, or frozen pizzas (for a detailed discussion see Jackson and Viehoff, 2016). The term is used here to denote a range of pre-made processed foods (e.g. burgers, nuggets) intended as a meal component. While these foods do not accord with some definitions of convenience food (e.g. as a complete 'fast meal' - see Daniels and Glorieux, 2015), they are conceptualised as such in this thesis because – beyond heating or frying – they are essentially ready-to-eat, and because they correspond with notions of 'convenience' relating to acquisition and storage (cf. Jackson and Viehoff, 2016: 4).

[2] Alongside efforts to promote insects as human food there is interest in the use of insects as a source of animal feed. Doing so could help to reduce European reliance on imported plant-based feed, which is associated with deforestation (e.g. van Huis et al., 2013). Although insect-fed meat raises important questions about public acceptance, such issues are beyond the scope of the present thesis.

alternative conception of 'public acceptance' used in the thesis. In the light of these contextualising discussions, the following section of the chapter (Section 1.5) then explains the conceptual and empirical orientation of the study, developed to investigate key aspects of public acceptance that have not previously been addressed. The central research objectives are then explained, and an overview of the thesis is provided, in which its 'alternative format' is discussed and the chapters are outlined. The chapter closes with a summary of the key arguments of the thesis (Section 1.6) and a brief conclusion (Section 1.7).

1.2 – SOCIAL AND INTELLECTUAL CONTEXT

Food security and the 'meat crisis'

In the context of profound anthropogenic climate change (IPCC, 2014) and a global population predicted to reach almost 10bn by 2050 (United Nations, 2017), an urgent global issue is the achievement of food security (FAO, 2016). Food security is defined by the Food and Agriculture Organization of the United Nations (FAO) as a situation that exists "when all people, at all times, have physical, social, and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, 2006: 1). The FAO definition has four key dimensions: *availability* of food, either through production or imports; *accessibility* of food, whereby people have sufficient resources to acquire adequate nutritious food; *utilization* of food, specifying the adequacy of diets as well as related water, sanitation and healthcare infrastructure; and *stability* of food supply, so that it remains unaffected by shocks (e.g. economic or climatic) or seasonal fluctuations (FAO, 2006: 1).[3]

In global terms, food security is a 'wicked problem' (Candel, 2014), involving myriad social, political, technological, climatic and economic dimensions (Committee on Food Security, 2016). However, a key focal point has been the global livestock sector, which is among the top contributors to serious environmental problems at both local and global scales (Gerber et al., 2013; Steinfeld et al., 2006). Global livestock production is associated with greenhouse gas emissions, air pollution, reductions in biodiversity, deforestation, degradation of natural resources (such as land and water), and marginalization of smallholder farmers and pastoralists (Steinfeld et al., 2006). High levels of meat consumption – particularly in Western countries – has as such been connected with both food security and environmental issues.

Meat consumption is also associated with global public health problems such as heart disease, obesity and cancer (Bouvard et al., 2015; Springmann et al., 2016). A widespread switch towards plant-based diets in line with official dietary guidelines has been projected to reduce global mortality by 6-10%, in addition to significantly reducing greenhouse gas emissions (Springmann et al., 2016). In industrialised countries, demand for meat is not significantly increasing: however, average per capita meat consumption is already around twice the suggested healthy amount (or three times, in the USA) (Wellesley et al., 2015).

The role of meat in both environmental damage and public health problems has led to discussion of a 'meat crisis' in the West (D'Silva and Webster, 2010). Although the term is not in general use, the concerns it encapsulates inflect Western debates around eating, food security and public health. There are indications that public opinion in Western countries, at least among certain

[3] It is important to note that this definition is contested, and that others conceptualise food security differently: for example, as involving food that is culturally appropriate (Vahabi and Damba, 2013). Despite differences of opinion regarding how the notion of food security should be defined, its importance as a global issue is generally recognised.

groups, seems to be turning somewhat against historical levels of meat consumption (Dibb, 2017), and the rise of 'flexitarianism' – omnivorous diets in which meat consumption is deliberately reduced – has been reported in both popular discourse (e.g. BBC News, 2017; Dibb and Salazar de Llaguno, 2017; Sourry, 2016) and academic research (e.g. Dagevos and Voordouw, 2013; Derbyshire, 2017; Niva et al., 2014) in the West.

UK retailers have introduced or expanded vegan product ranges (Smithers, 2018a, 2018b), public figures and civil society organisations advocate for reduction or cessation of meat consumption (Kowitt, 2017; Laestadius et al., 2013; Pollan, 2008), and significant research funding is awarded to projects focusing on the relationship between meat consumption, public health and the environment (Oxford Martin School, 2018). Yet efforts to address the key aspects of the 'meat crisis' are not simply focused on reduction of meat: they also encompass the *replacement* of meat as well.

Alternative proteins

In this context, efforts are also intensifying to identify 'alternative proteins'. Following Sexton (2016: 66), alternative proteins can be defined as "proteins that aim to provide more sustainable, ethical, and healthful alternatives to conventional meat". [4] Although Sexton's definition refers specifically to plant-based proteins, I use the term here to encapsulate a slightly broader range of proteins – including some that are animal-based – which are being developed with a similar aim. These alternative proteins include plant-based proteins, hybrid meat, in vitro meat and insects.

Plant-based proteins

Since as least the late nineteenth century, plant-based 'meat substitutes' (defined as products intended to replace meat within meals) have been developed and sold in the West (Braun, 2017; Shurtleff and Aoyagi, 2014). More recent examples include products such as plant-based 'veggie burgers'. Historically, plant-based meat substitutes have been targeted at consumers who – whether for health, animal welfare or spiritual reasons – eat a vegetarian diet (Braun, 2017; Shurtleff and Aoyagi, 2014).

One aspect of more recent efforts in this area has been the development of 'meat analogues' (defined as meat substitute products intended to imitate their meat equivalents). A prominent example is Quorn, a range of foods based on mycoprotein (a form of textured fungal protein) that was introduced in the UK in 1985 and rolled out nationally in 1994 (Peregrin, 2002; Ujvary, 2009). This range includes products such as imitation burgers, chicken breasts and sausages. As well as being an option for vegetarians, these are explicitly intended to represent a direct replacement for meat. From the outset, they were sold as an alternative to meat for health-conscious consumers, rather than as a 'vegetarian option' (Trinci, 1992). In around 2009, a manager from Premier Foods – the company who owns Quorn – reported that although the number of UK vegetarians was around 5%, Quorn products were estimated to have "a penetration into UK households of more than 20%" (Ujvary, 2009: 31), suggesting uptake by non-vegetarians.

[4] 'Sustainability' is a contested term, and competing definitions abound (e.g. *Clean Products and Processes*, 2000). When using the term I follow the definition of the World Wildlife Fund for Nature (WWF), for whom sustainability is "economic activity that meets the needs of the present generation without compromising the ability of future generations to meet their needs" (Corsin et al., 2007). While acknowledging the potentially problematic nature of the term, in the interest of readability I do not continue to place it in inverted commas.

During the present historical conjuncture, the development of plant-based meat analogue products has been a significant focus. In the Netherlands, a company called de Vegetarische Slager ('the Vegetarian Butcher') produces plant-based meat analogues. The products have very quickly become popular, which may be associated with the frequent reports that they are indistinguishable from their meat-based equivalents (e.g. Marieke, 2017; Merel, 2015; Thole, 2015).

A central argument of this thesis is that alternative protein products must fulfil two central criteria if they are to become widely and routinely consumed. First, they must have a coherent place within a framework of established eating practices (which in the case of Vegetarische Slager products extends to a significant proportion of meat-based dishes typically consumed in the Netherlands). Second, they must be judged equivalent or superior to potential alternatives (for inclusion in those eating practices) on the key factors of price, taste and availability. Research has indicated that where a more sustainable version of food is to be selected, it must be essentially indistinguishable from conventional alternatives (Spaargaren et al., 2013). If this is achieved, rationalised considerations, such as those about health or sustainability, become operative; without such parity, rationalised considerations play a diminished role. Attempts to create other directly substitutable meat analogues are prominent elsewhere in the West as well.

The US is home to some of the most technologically advanced and globally prominent products in this area. A notable actor is the Californian company Beyond Meat, who have created a range of meat analogues intended to closely resemble meat and, somewhat more extravagantly, to actually *be* meat. Their founder, Ethan Brown, argues that his company is "literally trying to create a piece of meat from plant inputs" (Leschin-Hoar, 2015: n.p.). This argument is predicated on the idea that 'meat' is defined by its nutrient content, which the company are reportedly able to recreate from plants. Sexton (2018: 7) has observed that this is a strategy of "literally building edibility through a bottom-up approach" conducted at the molecular (but also discursive) scale. These companies' arguments that plant-based proteins are *technically* meat are used as the basis for efforts to attain public acceptance. Beyond Meat's products are intended to resemble 'real' meat so closely that they can simply be exchanged for meat in pre-existent food practices (Sexton, 2018), thus facilitating easier public acceptance, including among non-vegetarians (Kruzman, 2017).

Similar claims are made by the US company Impossible Foods. Their Impossible Burger contains 'plant blood' (or 'haem'), a substance synthesised from plant-based sources that resembles animal blood (Simon, 2017). The product is thus intended to look and taste like the 'real' version, which is intended to facilitate the products' smooth insertion into pre-existing food practices – including those of non-vegetarians (Kruzman, 2017; Sexton, 2016, 2018). In this way, the products are intended to 'become food' (Roe, 2006b). Efforts to position them as comparable to meat are a primary way in which their edibility is constructed (Sexton, 2018). Such efforts draw together the materiality of the products (e.g. incorporating plant-based 'blood'); the practices into which they are targeted for incorporation (e.g. they are suitable for meat-based dishes); and discursive efforts on the part of the producers (e.g. that Beyond Meat is *literally* meat).

Although these plant-based protein products are still at the early stages of production (the Impossible Burger is currently only available in a handful of restaurants), their reception seems to have been generally favourable (Kenji López-Alt, 2016; Simmons, 2017), indicating that they may be commercially successful. Other alternative proteins, such as hybrid meat, are more of an open question in this respect.

Hybrid meat

In addition to meat substitute products, plants have been used in the development of 'hybrid' meat products, or the ingredients with which to make them. For example, the Dutch company Meatless produces a plant-based substance designed to be mixed into meat products, to reduce the total meat content and thus to make the resulting products lower in fat than their conventional equivalents (Meatless, 2017).

However, as Vanhonacker et al. (2013) note, the market for such products is currently negligible. Thus, although both hybrid meat and novel plant-based meat analogues share an orientation to being smoothly incorporated into the framework of existing dietary practices, there are clearly other factors operative in shaping the products' relative fortunes. It is beyond the scope of this review to speculate what those might be, although comparative research into the consumption geographies of burger-shaped meat substitutes would no doubt prove instructive. Another typically burger-shaped product, in vitro meat, is likely to prove an even larger challenge for public acceptance.

In vitro meat

In vitro meat (IVM) is meat which is grown in laboratories using animal stem cells.[5] Also known as 'cultured meat' or 'clean meat', IVM reached public prominence in 2013 following the televised consumption of an IVM burger. The burger, produced at Maastricht University in the Netherlands in 2013, cost some €300,000 to produce: thus while not heralding the commercial introduction of IVM, the event – attended by 200 journalists and academics – was successful in bringing the topic of IVM to public attention (Post, 2012; Stephens and Ruivenkamp, 2016).

Although there are eight companies globally that reportedly aim to produce IVM it is not yet commercially available (Purdy, 2017). Estimates for its introduction range from between a matter of months (Ward, 2017) to 10-20 years (Mosa Meat, 2017). The absence of commercially-available products makes efforts to gauge their public acceptance necessarily rather speculative. In discussing public acceptance of IVM, van der Weele and Driessen (2013: 648) emphasise that

> the anticipation and adoption of new technologies tends to be a [...] complex process, especially if these technologies imply significant shifts in societal practices [...] The process of development and adoption [of IVM] is therefore likely to be a dynamic affair with wider cultural ramifications than merely shifting consumer attitudes towards meat.

[5] The concept of growing meat outside of animals has some lineage throughout twentieth century science fiction and public commentary – indeed, Winston Churchill ruminated on the concept during an essay published in the 1930s – yet it was not until 1999 that patents directly addressing the industrial production of in vitro meat (IVM) for human consumption began to appear (Bhat et al., 2017). IVM is produced by growing animal stem cells in a bioreactor, which are then processed through techniques such as tissue engineering or 3D printing in order to create a 'meatlike' texture (Bhat et al., 2017; van der Weele and Driessen, 2013). These cells can be obtained either from an embryonic stem cell line grown using in vitro fertilization, or by taking a biopsy from an adult animal. The former method has not yet been successfully mastered (Jones, 2010): nevertheless, the large-scale production of meat by the second method alone would involve numbers of livestock that are still orders of magnitude lower than conventional forms meat production (Stephens, 2013). Consequently, IVM is projected to entail significant reductions in the energy, land and water use of European beef production if it is widely adopted (Tuomisto and Teixeira de Mattos, 2011).

This argument is borne out by a number of insightful studies that foreground the area's philosophical, sociological and practical complexity (e.g. Driessen and Korthals, 2012; Milburn, 2016; O'Riordan et al., 2017; Schneider, 2012). However elsewhere within research on IVM 'consumer acceptance' is treated somewhat mechanistically. For example, the argument that "consumer acceptance is of utmost importance [to IVM]; without it there may be a product but no market" (Haagsman et al., 2009: 38) implies that 'consumer acceptance' exists independently of 'the product', underestimating the extent to which the former is heavily shaped by the qualities of the latter (see Chapters 5 and 9).

A related tendency is for research to treat public acceptance of IVM as principally – or entirely – a psychological issue (e.g. Bekker, Fischer, et al., 2017; Hocquette, 2016; Laestadius and Caldwell, 2015), and as something that may be "modified through rational analysis" and familiarization – although it is not made clear what the latter would involve (van der Weele, 2010: 509). Clearly there are important psychological dimensions to the public acceptance of what Stephens (2010: 400) has described as an "as-yet undefined ideological object," and much is at stake if current framings of IVM have the potential to shape debates, mobilise resources, and direct future activity (Chiles, 2013). Particularly salient is the association of IVM with 'unnaturalness' observed in current public opinion (e.g. Laestadius and Caldwell, 2015; Welin, 2013), given the role of such associations in precluding the sale of GM food (e.g. Whatmore, 2002).

Nevertheless it is a central contention of this thesis – and an argument expanded upon throughout the empirical chapters – that public acceptance of novel foods is not reducible to psychological factors, and that it is the emplacement of such foods within geographies of production, provisioning and consumption that determines the extent to which they are 'accepted'. 'Edibility' itself is a product of interactions between spatially and temporally dispersed actors, and is shaped by the physical and social geographies of key sites of production, provisioning and consumption (see Chapter 5). Stephens and Ruivenkamp (2016) argue that the public display of an IVM *burger* specifically, rather than a different product type, may perform important work in the social categorisation of IVM. This hints at the importance of social practice in achieving the positioning of new foods as edible and desirable – addressed in particular in Chapter 9 – and directs attention to the ways in which different 'sites of the social' (cf. Schatzki, 2002) bear upon the consumption and 'acceptance' of food.

A geographical and sociological approach to the introduction of new foods also helps to account for the fact that information provision (e.g. van der Weele, 2010) is alone generally ineffective in causing changes to diets or other behaviours (e.g. Lambert et al., 2002), and – as we will see in Chapter 2 – provides a set of useful theoretical resources with which to approach the issue empirically.

Similar points apply to the alternative protein source which is the focus of this thesis: efforts to introduce insects as an alternative to conventional meat for Western populations.

1.3 – INSECTS AS FOOD

Western interest in the use of insects as a human food source has been an enduring, if historically somewhat marginal, interest. An early proponent was Vincent Holt, an English eccentric whose pamphlet *Why not eat insects*? (1885) extolled the virtues of entomophagy, arguing that insects represent an abundant and under-utilised food source that are also delicious. By way of illustration, he appended his short volume with such classic recipes as Moths on Toast.

Throughout the twentieth century, there were flashes of interest in the subject. Initially, such interest appears to have been largely academic, with the 'primitive' consumption of insects fascinating anthropologists and entomologists (e.g. Bodenheimer, 1951; Bristowe, 1932). However since the 1970s, insect-based cookbooks have occasionally appeared (e.g. Gordon, 1998; Taylor 1975), and commentators have periodically argued that insects represent a potential Western food source (e.g. Meyer-Rochow, 1975).

Such calls intensified throughout the late 1980s and onwards as a result of prominent entomologists such as Julieta Ramos-Elorduy (Ramos-Elorduy, 1990, 1997a, 1997b, 2002; Ramos-Elorduy et al., 1984; Ramos-Elorduy and Menzel, 1998), Gene DeFoliart (e.g. DeFoliart, 1989; 1992; 1995; 1999), Arnold van Huis (e.g. Dicke and Van Huis, 2011; van Huis, 2003, 2005; van Huis et al., 2012) and Alan Yen (e.g. Yen, 2009a, 2009b, 2014, 2015; Yen et al., 2012). Yet, it was not until the publication of a landmark report by the FAO in 2013 (van Huis et al., 2013) that the subject of Western entomophagy reached sustained public attention.

The FAO report represented a 'state of the art' review of research relating to the use of insects for animal feed and human food and was essentially an advocacy document for the subject. The main argument that insects should be used as a food source in Western countries was predicated on a number of points associated with insects' ethical benefits as food, broadly conceived (e.g. for the environment, as well as human and animal health and welfare). These have been sustained and explored in subsequent literature, and are discussed in more depth below. The report itself has played a significant role in the development of research and commercial activity around entomophagy in the West, and its genealogy and influence are explored further in Chapter 5.

Recent Western efforts to commercialise insects for human food have chiefly focused on four main species. Before discussing the central arguments for Western entomophagy, I introduce these species, and outline their main applications as food. As discussions of the advantages or disadvantages of insect consumption are species-specific, it is important to first clarify which insects are the focus of Western efforts to encourage and commercialise entomophagy.

Insect-based foods and the Big Four

The four main insect species reared for human consumption in the West are mealworms, buffalo worms, crickets and grasshoppers. I refer to these species throughout the thesis as the 'Big Four'. Mealworms (*Tenebrio molitor*) and lesser mealworms (or 'buffalo worms') (*Alphitobius diaperinus*) are not technically worms, but rather are the larvae of two species of darkling beetle. The 'grasshopper' is, in fact, the migratory locust (*Locusta migratoria*), a species which is taxonomically sufficiently proximate to grasshoppers to warrant the more 'user-friendly' designation. The most common cricket species used is the house cricket (*Acheta domesticus*). The derivation of these species has important ramifications for the extent to which they are 'accepted' as food. The genealogy of these species, and the influence this has on their use as food, are explored in detail in Chapter 5.

The insect-based food products that are currently available in the West fall into two main categories: products in which insects are incorporated into conventional foods, and packages of whole, dried insects. Examples of the former type include insect-based convenience foods, potato chips, pre-made bolognaise sauces, protein bars, brownies, and pasta (e.g. Bugsolutely, 2017; Engström, 2018), and in November 2017 a range of bread including ground-up crickets was launched in a Finnish bakery chain (Forsell, 2017). Examples of the latter type include the Big Four insect species sold in Europe, dried *chapulin* grasshoppers (part of Oaxacan cuisine) sold in the US, and a wide variety of dried species (including scorpions and tarantulas) sold via the

internet by a Thailand-based company (e.g. Eat Grub, 2018; Entomarket, 2018; Thailand Unique, 2018).

I now turn to a more detailed explanation of the arguments for Western entomophagy. This discussion contextualises the research, explaining the derivation of the commercial framing of insects as healthy, ethical and sustainable.

Arguments for Western entomophagy

Global precedent

There are numerous arguments for the use of insects as food in the West. Firstly, there is the fact that insect eating is – in both global and historical terms – rather commonplace. Insects have been eaten all over the world since time immemorial. A recent literature review puts the total number of recorded edible insect species at 2,111 (Jongema, 2017). Human consumption of insects has been recorded on all continents other than Antarctica; it is particularly prevalent in tropical and sub-tropical regions, particularly the Americas, but also sub-Saharan Africa, Asia, and Australasia (Raubenheimer and Rothman, 2013). Thus, recent Western entomophagy is arguably a revival of historical human behaviour. Advocates point out that until relatively recently, insects were eaten in Europe: an example being cockchafer soup, which was reportedly eaten in various European countries until the mid-twentieth century (van Huis et al., 2013).

Environmental credentials

Perhaps the most important argument for the Western adoption of insects as food is the purported sustainability of their production compared to conventional animal-based protein sources. Insect species for which data exist are generally argued to be considerably less resource intensive than cows, pigs and chickens in terms of resource use (i.e. comparative reductions in use of water, land, and to a lesser extent energy); to emit lower levels of greenhouse gases during their rearing; and to have a feed conversion ratio that is comparable to conventional food animals (Oonincx et al., 2015; Oonincx and de Boer, 2012; Shockley and Dossey, 2014; van Huis et al., 2013). The latter points are somewhat contested, as insects' energy use may be comparable to some conventional vertebrate food species, and their feed conversion rate may be overstated (Lundy and Parrella, 2015; Oonincx and de Boer, 2012). Indeed, a review of life cycle analyses of insect production facilities concluded that "it is difficult to draw general conclusions about the overall environmental impact of insect production systems" (Halloran, Roos, Eilenberg, et al., 2016: 10–11). Nevertheless, insects are still considered to be a significant improvement on conventional food animals, with meat being the primary reference category (van Huis and Oonincx, 2017).

At this stage it is important to emphasise this comparison between conventional meat animals and insects, which is a defining characteristic of pro-entomophagy discourse (e.g. Bosler, 2014). As I show during the empirical chapters of this thesis, there is little evidence that insects are actually being eaten instead of meat: rather, where eaten at all, they are mostly being consumed instead of plants or as an addition to existing diets. Consequently insects' environmental credentials – and thus their raison d'etre – are called into question (Tan and House, 2018).

Protein and nutrients

In addition to insects' purported sustainability, another prominent argument for Western entomophagy is insects' relatively high levels of protein and nutrients, and low levels of saturated fat (e.g. Dobermann et al., 2017; Rumpold and Schlüter, 2013). Clearly the exact levels differ between species, and it may be problematic to argue that 'insects' in general are uniformly 'better'

than vertebrate food species in these terms (e.g. Dobermann et al., 2017; Payne, Scarborough, et al., 2016). The Big Four species typically reared for human food applications in the West are commonly argued to have levels of protein and nutrients that are demonstrably comparable with – or 'better' than – those found in conventional meat animals (e.g. van Huis et al., 2013). However such arguments are predicated on a limited number of studies (Halloran, Roos, Eilenberg, et al., 2016), and high levels of protein and nutrients appear to be dependent on the use of certain substrates and rearing conditions (Lundy and Parrella, 2015; Rumpold and Schlüter, 2013).

Valorisation of waste streams

Another common argument regarding the favourability of using insects as food is the idea that it would enable waste streams to be utilised in the food system, thus reducing waste directly and lessening the environmental impact of feed production (e.g. Oonincx et al., 2015; van Huis et al., 2013). Insects can feed off substrate that would be inedible to humans or mammalian food species – such as wood shavings, plastic or abattoir waste – yet at the same time have a very low risk of transmitting zoonotic infections to humans (Lähteenmäki-Uutela and Grmelová, 2016; van Huis et al., 2013). Thus, it is often argued, to rear insects on such streams and then use them as food would represent a significant step towards a 'circular economy' of food production (e.g. Jurgilevich et al., 2016).

While in principle this sounds like a good idea, there are – as with many other aspects of efforts to encourage Western entomophagy – a number of significant practical difficulties. One is that legislation is unlikely to permit 'waste' anywhere in the food chain, particularly in the EU (A. van Huis, personal communication, 3rd October 2016; see also Lähteenmäki-Uutela and Grmelová, 2016). Another is that the favourable nutritional profile of insects appears to be strongly related to the conditions of their production, most significant of which is the quality of the substrate on which they were reared. Therefore, in order to produce insects that are tasty and high in protein, it appears they will need to be reared on similar food to that currently fed to chickens (Lundy and Parrella, 2015). To do so, of course, would require the continued production of such (typically soy-based) feed, which in turn is implicated in environmental problems such as deforestation (Nepstad et al., 2006). The survival rate of reared insect populations is also dependent upon the quality of their substrate. Lundy and Parella (2015) found that when crickets were reared on a large scale using minimally-processed waste streams (including food waste), their mortality rate was more than 99%.

At a meeting of insect producers and advocates in 2016, it was confirmed that most European insect producers are using commercial-grade feed (Hubert and Arsiwalla, 2016). This manoeuvre is highly favourable from the perspectives of food safety, insect quality, and the perception of publics and policymakers: in effect, however, it weakens the environmental grounds for selecting insects as a food. Of course it could be argued that to rear insects on chicken feed is still better for the environment than to rear chickens on similar, but one might point to vegetarianism as a somewhat simpler solution to the environmental problems at which insect production is nominally targeted.

Animal welfare

Although somewhat less emphasised than the foregoing points, it is a feature of entomophagy discourse that in animal welfare terms insects may represent a fundamentally more ethical food source than conventional meat animals (e.g. Proti-Farm, 2017; van Huis et al., 2013).

The principal basis of this argument is the idea that insects do not experience suffering in the same way as conventional mammalian food species. In academic terms this is a matter of debate,

with some researchers arguing that insects can feel pain and some arguing they cannot (see Gjerris et al., 2016). Similarly, there is debate about the extent to which insects are sentient (e.g. Barron and Klein, 2016; Klein and Barron, 2016).

The ethical status of insects vis-à-vis human diets is discussed in relation to the general account of public acceptance of insect-based convenience foods presented in Chapter 6, and addressed in more depth in Chapter 7.

Challenges facing Western entomophagy

Despite the potential advantages of using insects as a novel Western food source, problems remain. In addition to the points of debate noted in the preceding discussion, a number of commonly identified 'barriers' to Western entomophagy are evident.[6]

For example, the extent to which the Big Four species are allergenic is still unclear, but there is evidence that they will cause allergic reactions in those with shellfish allergies (Hustinx-Broekman, 2017). Insects' nutritional properties are debated, and there are indications that they may contain 'anti-nutrients' and transmit certain pathogens (Dobermann et al., 2017). Indeed, many of insects' proposed benefits are debatable given the plethora of species and the relatively small, inconsistent literature on Western food insects (Halloran, Roos, Eilenberg, et al., 2016).

There are also practical difficulties with rearing insects on a large enough scale to make them feasible as a foodstuff (i.e. sufficiently cheap), namely that insects require regular attention by their human farmers and, as a result of their often unpredictable behaviour, 'resist' integration into automated and rationalised production systems (e.g. Chapter 5; see also Rumpold and Schlüter, 2013). A significant obstacle is represented by legislation, which relates not just to the use of waste streams discussed above but also insects' uncertain status as food, in more general terms, in the eyes of food regulators (e.g. Belluco et al., 2017; see also Chapter 5)

One of the most significant questions that remains is the extent to which Western publics will accept insects as a food source. This question is the central point of investigation for the present thesis, whose conceptual and empirical orientation was developed to address key questions regarding public acceptance.

1.4 – WESTERN ACCEPTANCE OF INSECTS AS FOOD

It does not require systematic research to surmise that insects, for a substantial proportion of Westerners, are likely to be a rather unusual food. Similarly, the discursive positioning of insect consumption as unappealing seems clear (with entomophagy featuring, for example, as a forfeit or survival tactic on popular television programmes in the UK).

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[6] Within the entomophagy literature, terms such as 'barriers' and 'drivers' are often employed (e.g. Cicatiello et al., 2016). However, in the present thesis, these problematic terms are avoided. The terms oversimplify the social world, implying that constraining or enabling factors are discrete and easily identifiable. As I show in Chapter 5, for example, particular things (such as the design of insect-based foods) may both 'drive' Western entomophagy while simultaneously 'constraining' it (although I do not use these terms in that chapter). Similarly, the terms suggest that 'drivers' and 'barriers' are absolute, rather than relative. For some vegetarians, insects' uncertain position as 'animals' may 'drive' consumption (see Chapter 7); for others, it may be a 'barrier'. Indeed, as Shove (2010: 1275) observes during a critical discussion of these terms in the context of sustainable consumption, "there is no obvious limit to the number of possible determinants and no method of establishing their history, their dynamic qualities, their interdependence or their precise role in promoting or preventing different behaviours".

How then to determine the extent and central dimensions of what is generally termed 'consumer acceptance' (e.g. van Huis et al., 2013)? Although the FAO report which sparked widespread interest was generally lacking in social scientific data on the subject, efforts have proceeded apace in the intervening years. Research into Western 'consumer acceptance' of insects as food is now becoming a field in itself, albeit one with a partial focus.

Before turning to a detailed discussion of the literature on Western acceptance of insects as food – in the context of which this thesis is situated – I first explain the terminological distinction employed here, between 'consumer acceptance' and 'public acceptance'.

'Consumer' or 'public' acceptance?

The term 'consumer acceptance' is in general usage in the current literature, which has a predominantly psychological orientation (e.g. Caparros Megido et al., 2016; Lensvelt and Steenbekkers, 2014). The term reflects the individualistic focus of the literature, in which acceptance is largely conceptualised as an individual, cognitive matter (an issue explored in greater depth below). It also indicates the overwhelming focus on consumption as the most relevant site for the uptake and establishment of new foods.

Both of these foci are problematic. The figure of the 'consumer' (much like the 'citizen') has been constructed and mobilised differently at different historical conjunctures (Trentmann, 2007, 2016). The consumer has no timeless, 'objective' reality: it is a form of political rationality 'assembled' in particular ways under particular social and historical conditions, and which emphasises a relationship to the market as a key feature of human subjectivity (D Evans et al., 2017; Miller and Rose, 1997). Even if we accept that 'consumer acceptance' refers to the prevailing notion of the 'consumer' at the present historical conjuncture, the term presents a further difficulty. That is, in emphasising individual cognition and final consumption (defined in terms of specific moments of purchasing and eating food), it precludes acknowledgement of the point – to which the historical record attests – that the uptake and diffusion of new foods, to a large extent, involves myriad factors outside the individual. These relate as much to production and supply as they do to consumption (Ellis et al., 2015; House, 2018; Mintz, 1985).

This thesis adopts an alternative, broader notion of 'public acceptance'. This is intended to denote a more expansive idea of the acceptance of insects as food, in which relevant factors are not just psychological but also social, practical and contextual. The idea of public acceptance is one in which factors relating to production and supply, rather than just consumption, are also seen as relevant for the uptake and routinisation of new foods. Public acceptance conceptualises the ways in which the successful establishment of new foods is fundamentally social, geographical, and relationally achieved.

Of course, just as there is no single, fixed and universal 'consumer', there is no single, undifferentiated 'public'. Warner (2002: 50) suggests that a public may be a general population, a specific, concrete audience, or a discursively-oriented agglomeration "that comes into being only in relation to texts and their circulation". The conceptualisation of multiple publics produced in relation to a specific locus of activity reflects a broader notion, originating in the work of Walter Lippman and John Dewey, in which the "public is not something that exists, but something that *emerges* around a problem" (Stengers, 2005: 160, my emphasis; Marres, 2005). Such "emergent publics", for Whatmore (2009: 592), "are induced by generative events" such as knowledge controversies associated with environmental risks or food scares; Marres (2005) imputes a similarly generative role to issues such as genetically modified food or the AIDS crisis.

The notion of publics as emergent in relation to particular issues is, I argue, applicable beyond crises, scares and controversies. I apply this conceptualisation of publics in the present thesis. Consequently, my notion of 'public acceptance' of insects as food in the Netherlands does not entail a view – as in Warner's (2002) first definition – of the 'public' in question as equivalent to 'the inhabitants of the Netherlands'. Indeed, one of the arguments developed within the thesis is that it is the very specific group of 'early adopters' of a novel food that is the most analytically relevant. The 'public' in question is produced in relation to a specific, new food source in the Netherlands; it is not the Dutch population at large.

The issue of the appropriate target population for consumer/public acceptance research is returned to in more depth below. For now it is sufficient to clarify that the term 'consumer acceptance' is used throughout the thesis to refer to the individualistic conceptualisation of acceptance and its attendant literature, whereas 'public acceptance' denotes a concept of acceptance that is distinct in two key ways. It is in a certain sense more *expansive* than 'consumer acceptance', encompassing myriad extra-individual factors, yet at the same time also more *tightly delimited*, conceiving of its analytically relevant population as emergent and specific rather than a priori and general.

Here it is also important to highlight one significant exception to the distinction in usage between consumer/public acceptance adopted in this thesis. This is Chapter 6, which contains 'consumer acceptance' in its title and uses the term throughout. The reason for this discrepancy relates to the objectives of the chapter vis-à-vis its publication: the chapter was aimed at the broad interdisciplinary audience who generally conceptualise 'acceptance' in terms of the consumer. It sought to provoke debate around how 'consumer acceptance' is understood, and thus adopted the same terminology in order to demonstrate that it was targeted at a particular literature.[7]

I now discuss the current literature on Western acceptance of insects as food in more detail. I identify three key limitations of this research, and argue that these are associated with an 'epistemological blind spot'.

Current literature

The issue of Western consumer acceptance of insects as food has been principally framed as a psychological one, in which traits such as disgust sensitivity or 'food neophobia' (the extent to which one is averse to eating new foods) are taken to be of central relevance (e.g. La Barbera et al., 2018; Menozzi et al., 2017). The operative assumption in work of this type is that food consumption derives, for the most part, from individual attitudes and beliefs. Some studies argue for the role of *un*conscious processes, such as emotional responses, in determining acceptance. Nevertheless, the prevailing epistemological orientation in the field is one in which food consumption – and thus the acceptance or rejection of insects – is held to derive from individual cognition. Consequently the extent to which food consumption is socially and contextually shaped tends to be somewhat underemphasised (e.g. Cicatiello et al., 2016; Gere et al., 2017; Hartmann and Siegrist, 2017; Piha et al., 2018; Wendin et al., 2017; for a review of earlier research see Chapter 6).

Although this trend in the current entomophagy literature has helped to develop a basis of relevant psychological research, the relative homogeneity of studies (both epistemologically and

[7] I have continued to use 'consumer acceptance' as a keyword in published papers, in order that they are identified in relevant literature searches alongside more individually-focused work.

methodologically) has also led to some limitations. In the following sections I outline three of these: a reliance on decontextualized or imaginary consumption, a conflation of trial consumption and repeat consumption, and the notion that whole populations are the relevant target group for insect-based foods. In a subsequent fourth section, I provide an example of how each of these points work together to create an 'epistemological blind spot'.

Decontextualized or imaginary consumption

Many consumer acceptance studies are based on research in which people are asked to consume insect products in a decontextualized environment, such as a university building or 'insectarium' (e.g. Barsics et al., 2017; Caparros Megido et al., 2014). Other studies do not involve 'real life' consumption of insects at all: instead, they ask people to imagine consuming insects (e.g. Baker et al., 2016; Gmuer et al., 2016). Central to the epistemology of this approach is the assumption that decontextualized or imaginary consumption of food is of sufficient equivalence to 'real life' consumption to enable inferences to be made about future behaviour. This is problematic, because there is little evidence to suggest such an equivalence. A study on GM food, for example, found that survey participants reported being heavily opposed to GM foods; yet a subsequent analysis of shopping behaviour found that the same participants bought GM foods regardless (Sleenhoff and Osseweijer, 2013). This is the 'attitude-behaviour gap' that has motivated much discussion and debate in studies of consumption (e.g. Padel and Foster, 2005; cf. Shove, 2010).

Trial consumption equals routine consumption

Another limitation of the current literature is the widespread assumption that trial consumption (which itself is often imaginary or decontextualised) will reflect future consumption behaviour. One-time consumption events are used as the basis for inferences about consumer acceptance in a broader sense, in 'real life' contexts at an unspecified time in the future (e.g. Caparros Megido et al., 2016). This assumption is not universal, and the likely disjuncture between trial and repeat consumption is acknowledged by some working in the area (e.g. Tan et al., 2017). It is, nevertheless, relatively prominent (e.g. Gere et al., 2017; Gmuer et al., 2016; Hartmann et al., 2015). The findings of the present thesis (see in particular Chapter 6) indicate that the factors affecting trial consumption and those affecting routine integration into diets are quite different. Trial consumption is motivated by curiosity or cognitive factors regarding health and sustainability; repeat consumption is affected by more conventional considerations, such as price, taste and availability.

Target population

The current entomophagy literature tends to consider the question of 'consumer acceptance' of insects as food in relation to whole populations. Studies investigate, for example, who the most amenable segments of a given population might be, attempting to ascertain if there is a connection between demographic variables, attitudes or psychological traits, and greater levels of acceptance (e.g. Gere et al., 2017; Piha et al., 2018; Verbeke, 2015). Such studies are useful because they provide insight into who the most likely 'early adopters' of insects as food in a given country are likely to be.[8] However, continuing the conceptual focus on whole populations a number of studies go somewhat 'further', seeking to establish the most *widely acceptable* form of

[8] I use the term 'early adopters' here to refer to the segment of a given population who are immediately willing to begin eating a novel food. My usage thus differs from that in the diffusion of innovations literature (e.g. Rogers, 1983), in which 'early adopters' are the *second* stage of innovation diffusion after the first stage of 'innovators'.

insect-based food, which is generally argued to be that which causes the least 'neophobic' or disgusted response (e.g. Gmuer et al., 2016; Hartmann et al., 2015).

This latter tendency is problematic. This is because novel foods are not generally taken up by whole populations at broadly the same time: rather, they are eaten by a small group of 'early adopters' first, and only if they meet certain criteria (i.e. they are sufficiently appealing, available and affordable, and have a coherent place within culinary practices) do they gradually diffuse throughout the broader population (cf. Rogers, 1983). Such an assessment is borne out by research into older examples of novel foods that have become successfully established (e.g. Ellis et al., 2015; House, 2018; Mintz, 1985).

What this means, I argue, is that studies with a general focus (rather than those focusing particularly on early adopters) are likely to be returning 'mixed' results. The kind of insect-based foods that highly reluctant segments of a population may be willing to eat are not necessarily those that a much more willing group would necessarily find acceptable, but it is the latter group who are of key relevance in attempts to introduce novel foods. Thus to consider both groups together in discussing what might be best for consumer acceptance in *general* (e.g. Hartmann et al., 2015: 154) is to obscure crucial differences between them. This may, as I suggest below, have significant implications. It is also worth noting that this point relates to the discussion of 'consumers' vs. 'publics' above: the tendency in the literature is towards a generalised conception of 'consumers', rather than a specific 'public'.

The 'hidden is best' hypothesis

The three limitations outlined above are all operative in what I term the 'hidden is best' hypothesis. This denotes the view that if insects are invisibly incorporated into food products, they will be better 'accepted' by consumers. This is the prevailing view in commercial efforts to introduce insects as food (e.g. Reverberi, 2018). It is also one of the most common arguments in literature on consumer acceptance of insects as food (e.g. Caparros Megido et al., 2016; Gere et al., 2017; Gmuer et al., 2016; Hartmann et al., 2015; Hartmann and Siegrist, 2016, 2017; Lensvelt and Steenbekkers, 2014; Ruby et al., 2015; Schösler et al., 2012). The two points, I would suggest, are probably not unrelated.

The reason why 'hidden is best' is so often found in research is – perhaps somewhat obviously – because when participants are questioned about whether they would prefer a hidden or visible insect product, they tend to opt for the hidden version. While on the face of it this seems like a reasonable basis for the conclusion that 'hidden is best', it is somewhat problematic.

The problems arise from the epistemological orientation of the research from which the argument is derived. 'Hidden is best' studies are usually limited in the three ways discussed above: they are based on imaginary or decontextualized consumption, they are based on single consumption trials, and they approach consumer acceptance as a general issue. These points limit the extent to which the finding that 'hidden is best' can be generalised.

An important point to emphasise here is that extrapolations from decontextualized and/or trial consumption cannot acknowledge the rather conventional factors which demonstrably affect acceptance in 'real life'. For example, when deciding between products in which insects are either visible or invisible participants are choosing between the one that is most acceptable *at the time*, given a choice between a limited range of insect-based foods. Yet in future 'real life' consumption contexts, the comparison would not be salient. In such contexts, insect-based foods will be selected from a range of potential alternatives of the *same product type*. Thus, although it may be

useful to confirm that people would rather eat potato chips containing processed insects than a bag of potato chips and whole insects mixed together (Gmuer et al., 2016), a more pertinent question is why people do or do not select insect-based potato chips rather than standard ones.

Further, studies with general populations (rather than willing 'early adopters') entail the inclusion of data from participants who are very unlikely to be willing to consume insects. For such participants – who, if other innovations are any guide, are likely to represent a substantial majority (cf. Rogers, 1983) – the only way that insect consumption is likely to be at all bearable is if the insects are imperceptible in whichever food they have been incorporated in. As noted above, a methodological consequence is a 'mixing' of data: both willing and unwilling participants, whose views about an acceptable mode of introduction may differ, are analysed together.

The 'hidden is best' hypothesis, therefore, is a product of epistemology and method: it is not an unproblematic reflection of an underlying 'truth' regarding the best way to ensure acceptance (unless 'acceptance' is conceptualised as equivalent to decontextualized trial consumption). However, the large degree of epistemological homogeneity in consumer acceptance research leads to a frequent repetition of the argument, which becomes reified and is increasingly treated as axiomatic. It is also abstracted, and used as the basis for generalisation across product categories (e.g. Barsics et al., 2017; Caparros Megido et al., 2016): in such studies, one insect stands in for all insects. An evident difficulty is that not all insects (or indeed all products) are the same (e.g. Evans et al., 2015).

Of course, this critique of 'hidden is best' does not automatically imply that the reverse is true. Indeed, as the thesis shows, uptake of whole insects is considerably lower than that of products in which insects are invisibly incorporated. My point is that 'hidden is best' should be seriously questioned because it does not acknowledge the extent to which the uptake of new, unusual foods is shaped by the social and culinary context in which consumption is situated. Foods which were once considered disgusting may become repositioned as delicious: however, this is because they are incorporated within a framework of culinary practice in which they become 'culturally intelligible' (House, 2018), not because they are hidden in foods.

My purpose here in discussing 'hidden is best' in some detail has been twofold. Firstly, the phenomenon provides a useful illustration of the extent to which a large degree of homogeneity in the consumer acceptance literature is leading to an 'epistemological blind spot', in which the effect of research on its own findings is occluded. It is necessary, I would suggest, for social research into any substantive area of food and eating to have at least some degree of heterogeneity; the disjuncture between 'hidden is best' research and the findings of the present thesis indicates the current relevance of this point.

Secondly, I discuss 'hidden is best' because it is this approach which characterises the insect-based foods under study in the present thesis. It is useful to understand the logic behind the products' form, particularly in light of the evidence I present that this approach to attaining public acceptance is largely unsuccessful.

Summary

Efforts to understand Western acceptance of insects as food have motivated a large number of studies over the last five years. These have advanced our understanding in certain areas, such as the psychological attributes associated with a higher reported willingness to consume insects. However, the literature has tended towards epistemological and methodological homogeneity, and little has engaged with 'real life' consumption of insect-based food in the West. Thus, there

is a paucity of research which accounts *conceptually* for the role of extra-individual factors in (novel) food consumption, uptake and acceptance, or which accounts *empirically* for the practical reality of the consumption of insect-based foods in a contemporary Western context.

The present thesis addresses these points directly. To do so brings to light a number of important findings regarding Western public acceptance of insects as food that have, so far, been largely unacknowledged. These include the role of production and supply in achieving public acceptance; the ways in which novel foods' 'fit' with established eating practices affects their uptake; and the distinction between product trial and repeat consumption, the latter of which is substantially affected by conventional food-related criteria. The key findings are outlined at the end of the present chapter, and are discussed more fully, in the light of empirical material, in Chapter 10.

I now turn to an outline of the thesis itself, explaining its approach and organisation. I discuss the conceptual and empirical orientation of the thesis, developed to address the limitations of the current literature. I then clarify the key research objectives of the thesis, prior to the full development of specific research questions in Chapter 3. Finally, I discuss the 'alternative format' of the thesis and provide an overview of the remaining chapters.

1.5 – THESIS OUTLINE

Conceptual orientation

Much like the literature discussed above, the present thesis also addresses the question of Western acceptance of insects as food. However, in doing so it employs a different epistemological approach: one in which the individual is 'de-centred' (Giddens, 1984) in theoretical accounts of food consumption. This, I argue, can help to overcome some of the limitations of current work in the area: most significantly, the way in which the role of extra-individual factors in shaping food consumption is underemphasised.

Drawing on theories of practice (e.g. Reckwitz, 2002; Schatzki, 2002; Shove et al., 2012) and actor-network theory (e.g. Latour, 2005) the thesis approaches Western acceptance of insects as food as something which is socially embedded, contextually shaped, and relationally achieved.[9] It argues for an expanded conception of public acceptance, which can account for the role of extra-individual factors in food consumption as well as the role of *production* (broadly conceived) in shaping foodways. In doing so the thesis draws on established debates within the geographies of food – and cognate disciplines – regarding the production-consumption relationship and the socially-embedded nature of food consumption (see Chapter 2).

Through the adoption of this conceptual approach, the thesis sheds light on key areas affecting Western acceptance of insects as food that have so far been largely unrecognised (e.g. Chapter 6). It also demonstrates how the example of insect-based foods may extend and enrich the established debates it draws upon. It illustrates, for example, the continuing relevance of efforts to analytically integrate production and consumption in the study of food and eating (e.g. Chapter 5), and the advantages of theories of practice for understanding the acceptance of novel foods relative to individualistic accounts (e.g. Chapter 9). At the same time, however, it also introduces new conceptual resources for practice-theoretic research on food (Chapter 8), and

[9] The theoretical basis of the thesis is explored in Chapter 2. Here it is worth noting that the two main theories drawn on are not completely unified, but – despite adherence to certain shared principles – exhibit considerable internal difference. This point is elaborated upon in Chapter 2.

indicates how the acceptance of insect-based foods is entwined with a complex ethics relating to the relatively uncertain ontological position of insects (Chapter 7).

In general terms the thesis is motivated – as with the consumer acceptance research discussed above – by a broad desire to understand Western acceptance of insects as food. However, its principal objective is a deep understanding of the 'real life' consumption of commercially available insect-based foods in a particular Western social context. This objective informs the empirical approach taken in the thesis, which I now explain.

Empirical orientation

The thesis investigates public acceptance of insects as food in the Netherlands, a study site selected for two principal reasons.

Firstly, because – at the time of research – the Netherlands was the only Western country in which a range of insect-based foods was available in all branches of a national supermarket chain. It thus provided an opportunity to research how 'actually existing' insect-based foods were fitting into established food *consumption* practices in a Western population. This empirical focus mitigated the problems inherent in research based on speculative accounts of future insect consumption, and offered insights into practices of Western entomophagy that were congruent with an epistemology in which the individual is 'de-centred'.

Secondly, the Netherlands is also the European (and indeed Western) 'hub' of research, commercial activity and advocacy around insect-based foods. An empirical focus on this area also enabled research into the *production* of the insect-based foods under study, facilitating an integrative account of the production-consumption nexus in shaping public acceptance.

Empirically the principal focus is consumption, which is addressed to some extent in all of the empirical chapters. Empirical work on consumption was conducted with consumers of a range of insect-based convenience foods. It is comprised of 40 preliminary interviews; from that group of participants, 20 follow-up interviews were conducted; from that group, 17 food diaries were collected, each of which concluded with a further interview; and from that group, a number of accompanied shopping trips (12), cook-alongs (13) and shared meals (10) were completed. Detailed discussion of the research design and methodology is provided in Chapter 3.

Research into production forms a smaller part of the data, and is a primary emphasis in only two of the five empirical chapters. Nevertheless, as will become evident, the empirical work on production inflects and informs the other empirical chapters even where it is not foregrounded to the same extent. Empirical work on production took into account the diverse actors that were influential in the development of the insect-based foods (as well as broader commercial activity, policy and advocacy in the country). It is comprised of interviews with seven people involved with retail, food production, insect breeding, policy, advocacy, and academia.

Although focusing on the Netherlands, the thesis seeks to elucidate key principles affecting public acceptance of insects as food in a more general sense. These, I argue, may be logically generalizable to other Western contexts. Indeed, as the findings resonate with historical work on changing public tastes, it is suggested that the specific area of substantive study can inform broader, established debates in geography and elsewhere. Further, I argue that the findings can inform and extend conceptual and theoretical resources used in the broader understanding of food and society.

Building on the conceptual and empirical orientation of the thesis a number of research objectives were developed, which I now explain.

Research objectives

In the context of the preliminary discussions that constitute this chapter, this section outlines the key research objectives around which the thesis is organised. (The formulation of distinct research questions was undertaken following extensive literature reviewing, the remainder of which is undertaken in Chapter 2). The research objectives were developed in order to address the conceptual and empirical 'gap' in the current literature on Western consumer acceptance of insects as food, and to draw on and extend theory and debates regarding the geographies of food and eating. The key research objectives are as follows:

1) To investigate public acceptance of insects as food in the Netherlands.
2) To explore the ways in and extent to which insect-based foods are becoming incorporated into established diets in the Netherlands.
3) To investigate how the production of current insect-based foods (broadly conceived) impacts upon their consumption and 'acceptance'.
4) To elaborate an understanding of public acceptance that accounts for extra-individual factors and the role of production.
5) To explore how theories of practice and actor-network theory may aid understanding of public acceptance, as well as how the study of public acceptance may further contribute to these theories.
6) To explore how established debates within food geographies may aid understanding of public acceptance, as well as how the study of public acceptance may further contribute to debates within food geographies.

These research objectives are stated here to indicate the orientation of the developing thesis. They are clarified into distinct research questions at the beginning of the methodology chapter (Chapter 3), taking into account the theory and debates discussed in Chapter 2. I now provide details of the 'alternative format' of the thesis.

Thesis format

The thesis is not formatted in the 'traditional' style, but has instead been prepared as an 'alternative format' thesis. An alternative format thesis is defined as

> a thesis which contains sections which are in a format suitable for submission for publication in a peer-reviewed journal or other appropriate outlet for academic research, alongside more traditional thesis chapters. Those sections will be presented in the format of 'scientific' (in the widest possible sense of the word) papers, book chapters or other appropriate published formats. The papers or chapters may have been published, be accepted for publication, or planned for submission for publication where a specific format is expected.
>
> University of Sheffield, 2018: n.p.

The five empirical chapters contained within the thesis have all been prepared for publication. All five have been published: four of them as journal articles (Chapters 5, 6, 8 and 9) and one of them as a chapter in an edited book (Chapter 7).

Although the 'alternative format' guidelines indicate that published material may be included in the thesis in its final, published form (University of Sheffield, 2018), for the sake of consistency I

have elected to format all empirical chapters in the same manner throughout. This also ensures consistency between chapters in the referencing system used. In some cases, the stylistic unification of the thesis has necessitated substantial modification of the referencing system used (for example, Chapter 7 was initially prepared with the footnote-based Chicago system, rather than using in-text Harvard citations). In others, self-citations have been replaced with the relevant chapter designations where they refer to work included in the thesis. However, beyond these relatively superficial amendments, the substantive content of chapters has remained the same as the versions that were submitted for publication.

A requirement of the 'alternative format' thesis that it should be "demonstrably a coherent body of work" (University of Sheffield, 2018). The five empirical chapters all relate to the key research objectives outlined above, and taken together they form a systematic account of public acceptance of insects as food in the Netherlands. To provide an initial demonstration of this, I provide an outline of the chapter overviews in the following section. However, Chapter 4 has been prepared as a formal introduction to the empirical sections of the thesis, providing a more detailed overview of the empirical chapters and explaining how together they form a coherent body of work.

In accordance with the further requirements of the 'alternative format', the thesis contains a number of more 'traditional' chapters. In addition to the present introductory chapter, the thesis also includes an extensive review of relevant literature, theory and debates; a detailed account of the research methodology; an overview of empirical chapters; introductory sections for each empirical chapter; and a concluding discussion. The placing of these chapters is also indicated in the following section.

Chapter overviews

Chapter 2 provides an extensive review of literature, theory and debates within the geographies of food and cognate disciplines, which the thesis both draws on and seeks to contribute towards. The chapter identifies the geographies of *novel* food as a necessary and productive area of investigation, noting the current lack of focus in this area compared with other social scientific disciplines and proposing a research agenda for future scholarship. It also includes a discussion of relevant social theory, focusing in particular on the two theories most heavily drawn upon in the present thesis, theories of practice and actor-network theory.

Chapter 3 provides an account of the research design and methodology used in the thesis. In the light of the literature review undertaken in Chapter 2, the chapter begins with a reconsideration of the study's key research objectives (see above), clarifying the research questions which the thesis investigates. It then provides a detailed discussion of the research design and methods used, drawing on relevant debates to justify and contextualise the decisions made. It also includes a schematic explanation of which sections of empirical work relate to which empirical chapters, as the empirical chapters are not presented in the order in which they were researched or written.

Chapter 4 is an introduction to the empirical section of the thesis. It provides detailed outlines of the empirical chapters, showing how they relate to each other. It also highlights key themes and arguments developed throughout the empirical material.

Chapter 5 (published in *Geoforum*) focuses on the production of insect-based foods in the Netherlands. 'Production' is broadly conceived as activity on the 'supply-side' of such foods, including academic research and policy decisions. The chapter also draws on consumer research,

indicating how the 'edibility' of insect-based foods is achieved relationally through the production-consumption nexus.

Chapter 6 (published in *Appetite*) shifts the analytic focus to consumption, providing a broad overview of the main aspects of public acceptance of insects as food in the Netherlands. It highlights the disjuncture between trial consumption and repeat purchase, and identifies a number of key factors as highly relevant to routine consumption of the foods: price, taste, availability and 'fit' with established eating practices.

Chapter 7 (published in the edited volume *Ethical Vegetarianism and Veganism*) investigates the ethical dimension of insect-based foods. It elaborates upon the finding, introduced in Chapter 6, that many consumers of insect-based foods self-define as vegetarian. It explores the constitution of ethical diets in relation to ontological apprehensions of animal life, highlighting the fluidity of 'vegetarian' diets and the relation between ontology and ethics in the acceptance of insects as food.

Chapter 8 (published in *Sociology*) deepens the study's engagement with theories of practice, focusing on one aspect of the dietary 'fit' which was identified in Chapter 6 as important for public acceptance. Drawing on theories of practice, the chapter introduces two new concepts: modes of eating and phased routinisation. These theorise the ways in which diets are established, maintained, interdepend and change, and are argued both to help clarify the extent of public acceptance of insects as food in the Netherlands and to contribute to the conceptual resources of practice-theoretic work on food and eating.

Chapter 9 (published in *Social & Cultural Geography*) returns to production, addressing the popular claim that insects are 'the new sushi' and drawing on theories of practice to provide a comparative analysis of the two foods. The chapter examines production and consumption practices for each of the foods, arguing that sushi became popular in the US because relevant practices already existed, the necessary elements of those practices were available, and there was a population of experienced practitioners to 'recruit' newcomers to the relevant practices. Insect-based foods, by contrast, lack these key ingredients. The chapter argues that theories of practice can provide a valuable addition to the conceptual resources of food geographies, offering an integrative epistemology which can account for interaction between production and consumption in the successful establishment of new foods.

Chapter 10 is a concluding discussion. It draws out the key findings of the thesis, in relation to each of which the relevant contributions of the empirical chapters are presented and discussed. Connections with established theory and debates are identified, and productive avenues for future research are indicated. The chapter then discusses key implications of the thesis for various areas: for food geographies, entomophagy research, business and policy. The chapter concludes with a brief synoptic discussion, restating the central findings and connecting these back to the discussion of global food security with which the thesis opened.

1.6 – KEY ARGUMENTS

A number of central arguments are developed throughout the empirical portion of the thesis. As the empirical section comprises five articles each with separate emphases, these arguments are not continually and equally emphasised across each. Therefore I presage them here, and return to them in the Discussion chapter (Chapter 10) for elaboration and further discussion.

One of the central arguments I advance – and one which is of significant importance in both a scholarly and more applied sense – is that public 'acceptance' of insect-based (and other novel) foods is more than just a question of consumer attitudes, values or beliefs. I argue, therefore, for an **expanded notion of public or consumer acceptance**: one which goes beyond the rather narrow version that prevails in the recent entomophagy literature. Public acceptance of food, in my account, refers to its successful emplacement within established culinary routines. These, in turn, are not just those pertaining directly to the consumption of food, but rather are the web of practices which constitute the 'compound practice' of eating (Warde, 2016). Acceptance, therefore, should be understood as much as the responsibility of food producers, manufacturers, suppliers and retailers as it is of consumers.

Another central argument developed throughout the empirical chapters is that attention to both **production and consumption** is crucial if we are to understand the acceptance, uptake and diffusion of novel foods (or of their failure in these respects). Although it is certainly possible to focus on either 'side' of the production-consumption nexus for the purposes of analysis and explication, ultimately both are important considerations if we are to approach a more complete account of the success or failure of novel foods.

Emphasised to a greater or lesser extent throughout the chapters, and related to the above points, is an **epistemological argument**. That is, in essence, that research into novel foods (and indeed foods, or consumption, more broadly) must be attentive to social, geographical, political-economic and historical factors rather than just psychological ones; and consequently, that relevant factors for analysis of 'acceptance' of novel foods are to be found elsewhere that in consumers' minds (e.g. among the diverse elements on the 'supply-side'). Naturally such an argument is open to criticism in the vein of the 'blind men and the elephant' parable, where the partial view of each leads them to argue that their object of shared enquiry is exclusively characterised by the limited area to which they each have access (see Mela, 1999). However, I would argue that social and cultural factors are important for reasons other than my disciplinary position as a social and cultural geographer.

As the empirical chapters attempt to show, there is a lot more 'going on' in the acceptance of insect-based foods than much of the existing consumer acceptance literature acknowledges (see Chapter 2). Such literature is limited by an 'epistemological blindspot' which it cannot adequately account for theoretically (as in the collapsing of extra-individual factors into the rather nebulous category of 'culture', e.g. Verneau et al., 2016). To emphasise extra-individual factors is not to dismiss psychological ones as irrelevant. However, while the current literature has particular epistemological purchase regarding the understanding of relevant attitudes, it is much weaker in addressing (the collective dimensions of) social practice.

Finally, the empirical chapters are intended to demonstrate the **utility of theories of practice** for investigation of the acceptance of novel foods. This point too could be subject to the 'blind men and the elephant' critique; certainly, there are studies in the entomophagy literature arguing for the veracity of particular theories based on research designed to prove the veracity of those theories (Menozzi et al., 2017). Yet I would argue that the evidence presented in the empirical chapters indicates the utility of theories of practice for the analysis of novel foods, for reasons that go beyond 'confirmation bias'.

One of the most convincing reasons, I would suggest, is the way in which historical accounts of the successful introduction of novel foods reflect practice-theoretic analysis. One does not need to fully re-analyse other people's data – for example, on the successful introduction of tea to

Western Europe (Ellis et al., 2015) – to note that novel foods seem to rely on a coherent place within eating practices for their success. The presence of the necessary constituent elements of eating practices, along with a population of experienced practitioners who may 'recruit' others, are demonstrably necessary for the establishment of novel foods. That insect-based foods in the Netherlands are evidently deficient in a number of these respects does not diminish the analytic capacity of theories of practice in this context. Rather, I would suggest, it serves to emphasise it. Theories of practice can help novel food researchers overcome the 'epistemological blindspot', and offer a convincing account of the relations between production and consumption in shaping the establishment of novel foods.

1.7 – CONCLUSION

This chapter has set out the general social and intellectual context for the thesis, explaining efforts to develop alternative proteins in the context of the problems associated with Western meat consumption. It discussed efforts to develop insects as a feasible food source for Western populations, highlighting the proposed benefits as well as the more problematic areas. It discussed current literature on Western consumer acceptance of insects as food, in the context of which the present thesis was situated. The conceptual and empirical focus of the thesis were explained, and key research objectives identified. The 'alternative format' of the thesis was discussed, and chapter overviews provided. Finally, the key arguments of the thesis, developed throughout the empirical chapters, were outlined. The following chapter, 'Geographies of (novel) food', provides a detailed review of theory and debates from geography and cognate disciplines. The thesis both draws on these literatures and seeks to contribute towards them.

Chapter 2 – Geographies of (novel) food

2.1 – INTRODUCTION

The previous chapter set out the general social and intellectual context for the thesis, highlighting in particular the limitations of existing literature that investigates public acceptance of insects as food in Western countries. This chapter builds on the previous one, reviewing key scholarship within human geography and cognate disciplines. It provides more specific context for the empirical approach taken in the thesis, and explains the theory and debates which the thesis aims to both draw upon and contribute towards.

The chapter is divided into two main sections. The first section, **Food geographies** (Section 2.2), works through key debates in the geographies of food, highlighting where the present thesis relates to and extends these established literatures. Beginning with a discussion of long-standing debates regarding the relevance of both production and consumption to the geographies of food, it identifies a more recent tendency towards more integrative accounts of production-consumption.

Situating the thesis in relation to this broad literature, the section then elaborates four key integrative perspectives in more depth. Two of these (actor-network theory and theories of practice) are the theoretical frameworks drawn upon in the present thesis; the other two (commodity biographies and 'follow the thing' research) are approaches that are particularly resonant with the substantive and theoretical orientation of the present work. These four perspectives are situated in the context of food geographies more broadly, and I provide an account of their main principles and existing applications to the study of food. This section provides the foundation of my argument, developed more fully later in the thesis (Chapter 9), that theories of practice represent a fruitful means of integrating production and consumption in the geographic study of novel foods. This section also explores three key areas that are of demonstrable relevance to the topic of novel foods: more-than-human geographies; taste, disgust and the visceral; and geographies of the exotic and the mundane.

The second section, **Geographies of novel food** (Section 2.3), moves on to a discussion of the geographies of *novel* food more specifically. I argue that while scholarship in this substantive area is, in certain senses, already widespread, it would benefit from clear articulation as an area of study. In the interest of advancing this agenda, and situating the thesis as a preliminary contribution, I discuss different conceptualisations of what 'novelty' might entail, highlighting relevant geographic work throughout. I discuss the distinction between the geographies of novel food, and novel food geographies. I then outline where the geographies of novel food represent an extension of established debates, and where they may necessitate fresh conceptual approaches.

The chapter concludes by briefly contextualising the thesis in the light of the discussions presented here and in the preceding chapter (Section 2.4). This final section provides the context for the study's methodology, which is explained in the following chapter.

2.2 – FOOD GEOGRAPHIES

Geographical investigation of food offers a conceptually and empirically rich tapestry of intersecting ideas and debates (e.g. Cook et al., 2006, 2008, 2011; Goodman, 2016). Nevertheless, within food geographies there are a number of prominent themes, which cross disciplinary boundaries and are reflected in food-related research in sociology, anthropology, history, and cultural studies. (Indeed, much of the work which might be subsumed within the geographies of food is – explicitly or otherwise – manifestly rather trans-disciplinary in its aims and approach). A number of these debates are demonstrably relevant to the question of Western public acceptance of insects as food, and are discussed here before I turn to consider the geographies of novel food more specifically.

Perhaps one of the defining debates within the geographies of food is that regarding the relative influence of (and thus analytic weight accorded to) production and consumption. The interaction between these two poles – termed here the 'production-consumption nexus' – is a subject of perennial debate within relevant scholarship. It is in relation to such debates that the present thesis is situated.

This section begins with a historical overview of debates regarding production and consumption in the geographies of food. I trace a shift in analytic emphasis (from production to consumption), noting that by the millennium the field had seen a turn towards more integrative approaches. I indicate some of these, noting how the thesis is situated in relation to them, before turning to a more detailed elaboration of four key integrative approaches: actor-network theory, 'follow the thing' research, commodity biographies, and theories of practice. The sections on actor-network theory and theories of practice introduce the theoretical basis of the thesis; the discussions of 'follow the thing' and commodity biographies situate the thesis among relevant geographic debates.

Following the discussion of integrative approaches, I discuss three other key literatures within food geographies research. These are more-than-human geographies; taste, disgust and the visceral; and geographies of the exotic and the mundane. These areas of theory and debate are also of key relevance to the present thesis, whose substantive focus raises questions about human-animal relations, issues of disgust and the 'yuck factor', notionally exotic or authentic food, and also more mundane considerations: namely, how domestic food practices are shaped and achieved, and how these may accommodate novel foods.

This section concludes with a brief summary. The following section – **Geographies of novel food** – explores questions of novelty, considers how established debates may be brought to bear on this burgeoning substantive area, and sets out a research agenda for the geographical study of novel foods.

The production-consumption debate

Within geographical debates around food, broadly conceived (i.e. including scholarship in rural sociology and the broader agri-food literature), the production-consumption debate has proved an enduring subject of discussion, and attempts to arrive at a broadly accepted account of the production-consumption nexus both conceptually and methodologically have proved somewhat elusive.[10] As Goodman and DuPuis (2002: 15) observe, "[s]uch an integrated perspective is a very

[10] The following discussion is necessarily a rather brief one, and as such simplifies large, complex literatures developed over the course of several decades. As such it does not pretend to completely or fully capture the

tall order indeed". In this section I trace the contours of the production-consumption debate, and indicate how this has led to the development of integrated perspectives.

During the 1980s, the broad tenor of food geographies was one in which production and trade issues predominated (see Bell and Valentine, 1997; Fine, 1994), and which was focused primarily on agriculture (Cox, 2012). This was reflected in agri-food studies by what Goodman (2002: 271) calls "the filiere-commodity systems-agroindustrial complex tradition of the 1980s", the conceptual roots of which, he suggests, "lie in the 'agrarian question' of classical Marxism" (2002: 271; cf. Goodman and Watts, 1997). Reflecting wider changes within the social sciences, the focus on production as the locus of power and the primary site for analysis gave way, in the early 1990s, to a 'cultural turn' within geographies of consumption (Barnett, 1998; Cox, 2012).

Situated against earlier production-centred accounts, research on the geographies of consumption during the cultural turn emphasised the agency and creativity of the consumer, and foregrounded the role of consumption in the co-constitution of society and space (Jackson and Thrift, 1995). Applied to food and eating, for example, such an approach highlighted the role of 'imaginative geographies' in consumption, and the role of 'exotic' foodstuffs as a means of social distinction (May, 1996); the complexity of consumer knowledges about food, and their variegated relations to food provisioning and preparation (Cook et al., 1998); and how food is deeply implicated within the articulation of identity, and of particular forms of global and familial citizenship (Probyn, 1998; Valentine, 1999).

Although work of this nature sought to develop an expansive notion of consumption, beginning "to trace the process of consumption back into the social relations of production and forward into cycles of use and re-use" (Jackson and Thrift, 1995: 204; see also; Crewe, 2000), such research was criticised for – inter alia – having gone 'too far' away from analysis of production. Gregson (1995), for example, asked "And now it's all consumption?" (see also Barnett, 2004; Goss, 2004; Hartwick, 2000).

Although Goodman's (1999: 18) critique of agri-food studies and "Wageningen actor-oriented rural sociology" suggests that a 'cultural turn' of sorts was also evident in those disciplines at around the same time (e.g. Arce and Marsden, 1993; Long, 1996; van der Ploeg, 1993), agri-food studies was still being criticised three years later for not having gone far enough to bring consumers 'back in': "the 'turn' to consumption in this field", wrote Goodman and DuPuis (2002: 9), "is illusory". Across these related disciplines there was much still at stake in accounting for production and consumption in the geographies of food. Such debates provided fertile ground for efforts, accelerating around the turn of the century, towards the integrated analysis of the production-consumption nexus.

Integrative approaches

It would be an oversimplification to suggest that any of the previous accounts emphasised either production or consumption at the expense of the other; analytic differences tended to be in emphasis, rather than absolute (e.g. Glennie and Thrift, 1993). Nevertheless explicit attempts to analytically integrate production and consumption within the discipline of geography were arguably relatively scarce until around the year 2000. An early example, according to Bell and Valentine (1997), was a special issue of *Political Geography* published in 1993 that attempted to account for the interaction of circuits of production and consumption in relation to agriculture

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intellectual currents in question, but rather seeks to point out general themes for the purpose of contextualisation (cf. Barnett, 1998).

(e.g. Ufkes, 1993). Guthman (2002) also identifies the work of Friedland (1984) and Fine and colleagues (Fine, 1994; Fine et al., 1996; Fine and Leopold, 1993) as notable early attempts: although not explicitly located within the discipline of geography, the work of these authors has a clearly geographic dimension.

Friedland's (1984) work on 'commodity systems analysis' sought to analytically integrate diverse areas pertaining to the production, supply and consumption of agricultural commodities into a coherent account. In what is arguably an extension of Friedland's work (Guthman, 2002), Fine and colleagues (Fine, 1994; Fine et al., 1996; Fine and Leopold, 1993) theorised the production-consumption nexus in terms of a 'system of provision' (SOP). A SOP is defined as a vertically-integrated "chain of activities connecting initial production to final consumption" (Fine, 1994: 520), predicated conceptually on

> the notion that the passage of a food from farm to mouth comprises a sequence of distinct activities that are, nonetheless, structurally bound into a unified whole that is integrated with other economic activity, such as transport, shopping and domestic labour.
>
> Fine, 1994: 522

However, the SOP approach has come under criticism for its assumption that 'vertical' relations of production-consumption should be focused upon instead of 'horizontal' ones (i.e. between different sectors or commodities), given the historical and sociological evidence of interactions in this manner (Glennie and Thrift, 1993; cf. Shove and Walker, 2010). SOP has also been criticised for its tendency to treat 'Nature' as an undifferentiated 'input' which is acted upon unilaterally by human agents in the agri-food network (Goodman, 1999), and to inadequately account for the cultural politics of food (Watts, 1994).

Comparable criticisms were extended to more consumption-centred accounts in both agri-food studies and human geography, which arguably did little to engage with the conditions of production and supply on which consumption depends (e.g. Goodman, 1999; Gregson, 1995). As Whatmore (2002: 123, original emphasis) argued:

> The staple concepts of agri-food studies, such as *commodity chains* (Friedland et al., 1981); *filières agro-alimentaires* (Allaire and Boyar, 1989) [*sic*][11] and *systems of provision* (Fine et al., 1996), share a tendency to configure the geographies of food as a unilateral translation of socio-material value from field to plate, in which food is little more than the terminus of the crop. If 'consumption' has been something of an afterthought in these studies, cultural approaches have been just as circumscribed in their attentions. While they have succeeded in animating food consumption as a socially complex and consequential process, their focus on shopping, cooking and eating identities and the bodily register of these cultural practices (Lupton, 1996; Bell and Valentine, 1997) rarely strays much beyond the supermarket aisles, restaurant tables and take-away menus where food, it appears, is replicated at will.[12]

[11] The correct reference is Allaire and Boyer (1995).
[12] In making these remarks, Whatmore's broader objective was to critique the absence of materiality within agri-food analysis. This point is discussed further below.

Within geography and agri-food studies more broadly, efforts to overcome the limitations of such approaches led to renewed attempts towards theoretical integration of production and consumption (although it must once again be emphasised that such efforts were by no means absent in earlier work: for a discussion see Goodman and DuPuis, 2002). Studies sought to forge 'reconnections' in the production-consumption relationship (Winter, 2003b), conceptualising it, for example, in terms of circuits or networks (Cook and Crang, 1996; Jackson, 2002; Lockie and Kitto, 2000) and through the lenses of 'quality' and 'conventions' (Parrott et al., 2002; Thévenot et al., 2000).

Geographers sought to explicitly analyse the cultural and political-economic aspects of food alongside each other, highlighting their mutual implication (Freidberg, 2003). Examples include Mansfield's (2003) work on the material culture of surimi production; Hollander's (2003) investigation of sugar; Guthman's (2003) study of organic salad mixes; and Redclift's (2002) analysis of the 'parallel histories' of chewing gum production and consumption.

Such efforts have continued since this point, with the need to account for both production and consumption remaining a key issue in food geographies research. Efforts to account for both production and consumption are evident, for example, in work on 'possible food economies' (Holloway et al., 2007), the spatiality and 'embeddedness' of food networks, both 'alternative' and more conventional (Goodman, 2009; Morris and Kirwan, 2010; Sonnino and Marsden, 2005; Watts et al., 2005; Winter, 2003a), and the operation of gastronomy (Richards, 2003), pleasure (Sassatelli and Davolio, 2010), quality (Parrott et al., 2002), locality (Blake et al., 2010; Sims, 2010) or ethics (Goodman et al., 2010; Popke, 2006) as organising principles in connecting production and consumption.

The present thesis is situated in relation to this prominent theme within food geographies research, aiming to bring a new substantive focus into dialogue with established debates in the field. Although the thesis ultimately focuses in more detail on the consumption of insect-based foods, production is also a key part of the analysis (in particular, Chapters 5 and 9). The aim is to demonstrate, as these earlier studies have, that production and consumption are inextricably linked. Understanding of one is necessary if we are to understand the other.

I now turn in slightly more depth to a number of key literatures which have sought to integrate production and consumption. These are by no means exhaustive, but are the most directly relevant to the present thesis. Two of these sections – those reviewing literatures on actor-network theory and theories of practice – introduce the main theories on which the thesis is based. This is noted during the relevant sections, and clarified at the end of this chapter.

Actor-network theory

Attempts at integrative production-consumption analysis have frequently employed actor-network theory (ANT) and related approaches as a conceptual framework (e.g. Callon, 1984; Callon and Law, 1995; Latour, 2005; Law, 1992). ANT is not so much a clearly defined theoretical approach as an orientation to sociological analysis, whose proponents share a number of core philosophical and epistemological principles in their theorising and empirical approaches. These include the adoption of a 'flat' ontology, in which primacy is not accorded to particular (human) actors in the unfolding of social life but rather expanded to include the relational, agentic capacity of nonhuman actors as well: actors, both human and otherwise, are connected to each other in mutually-constitutive relations as part of expansive heterogeneous networks. The extent of such networks allows entities within them to 'act at a distance' on entities that are geographically dispersed.

ANT's philosophical orientation is sometimes referred to as the 'principle of symmetry', as it treats humans and nonhumans as symmetrical – relationally ordered within a 'flat' ontology – rather than hierarchically arranged. As Goodman (1999) notes, the idea of symmetry may be applied to an understanding of the more abstract ideas of 'nature' and 'society' as well. ANT does not recognise such abstractions, but rather helps to conceptualise how they are constructed out of the interactions between myriad actors, and indeed may be mutually constitutive (see also FitzSimmons and Goodman, 1998).[13] Such symmetry leads to the conceptualisation of networks as fundamentally hybrid, as they are constituted out of human/nonhuman actors and entail the collapse of conventional analytic dualisms – such as micro/macro, structure/agency, nature/society – onto one ontological plane (e.g. Latour, 1993). ANT and related approaches are also referred to as the 'sociology of translation', a designation that refers to the way in which the interests of particular actors are 'translated' as they are mobilised or 'enrolled' into particular networks by particular actors in the service of particular ends (e.g. Callon, 1984; Latour, 1996).

The objectives of ANT are not, therefore, limited to an integration of production and consumption. One of the approach's principal tasks is the (re-)introduction of nonhuman agency to sociological analysis. These 'missing masses' (Latour, 1992) include animals (Callon, 1984), technological artefacts (Callon, 1986; Latour, 1990), aspects of the built environment (Johnson, 1988; Winner, 1980) and foodstuffs (Star, 1990). ANT explores the complex ways in which the material relates to, and acts back upon, human actors (e.g. Law, 2009). Such ideas have influenced later debates within 'new materialism' (e.g. Coole and Frost, 2010; van der Tuin and Dolphijn, 2012), such as Bennett's arguments regarding 'vibrant matter' (Bennett, 2010) – including food (Bennett, 2007) – that exerts agentic force on human affairs (see also Abrahamsson et al., 2015). These ideas are explored further during a discussion of 'more-than-human' geographies below.

Although ANT is not without its detractors (e.g. Fine, 2005), the approach's emphasis on relationality and the mutual implication of geographically dispersed actors (both human and nonhuman) provides a fruitful analytic resource for the study of food. Research into the geographies of food using ANT has illustrated the relational nature of power in the food system, the role of nonhuman actants (including nature and technology) in shaping global food networks, the ways in which production-consumption networks 'mobilise' particular forms of consumer, and the co-constitution of nature and society (FitzSimmons and Goodman, 1998; Lockie, 2002; Murdoch et al., 2000; Whatmore and Thorne, 1997).

ANT is one of the two main theories drawn upon in the present thesis, and is used to frame Chapter 5. The chapter uses ANT to explore the production networks from which insect-based foods have emerged in the Netherlands, and elucidates their relational connection to consumption practices. In this endeavour, I share Jarosz's (2000: 279) view that elaboration of production-consumption networks can "yield an understanding of the opportunities and

[13] The principle of symmetry, as applied to research in the agro-food literature, has met with justifiable criticism. In a paper which critiques ANT, for example, Marsden (2000) reminds us that power in global food governance is fundamentally *a*symmetrical, thus calling into question the applicability of the approach. However, in relation to ANT's application in this thesis (Chapter 5), I would argue that the stakes in this respect are somewhat lower: as I demonstrate, the production networks from which contemporary Western insect-based foods have arisen are mostly Dutch in origin. Nevertheless it should be acknowledged that the *idea* to use insects as food is one which has been motivated by issues in the Global South (e.g. van Huis et al., 2013); and, further, that efforts to introduce European-designed insect production systems to the Global South have demonstrably been somewhat culturally insensitive (Yates-Doerr, 2015b).

obstacles for participants in the network". ANT also provides a less explicit influence on the thesis by way of Chapter 9: that chapter is partially based on a historical account of the establishment of sushi in the United States (House, 2018), which although not explicitly framed in terms of ANT – and mostly framed in terms of human actors – nonetheless draws heavily on its theoretical account of the social.

Follow the thing

A distinct mode of analysis, albeit one which exhibits a degree of 'family resemblance' with ANT-inspired accounts, is the 'follow the thing' approach. Drawing on Appadurai's (Appadurai, 1986: 5) injunction to "follow the things" – global commodities – in order to understand their cultural and political dynamics, as well as Marcus' (1995) argument that globalised and transnational processes could no longer be studied in a single place, these type of studies focus on a particular commodity, 'following' it to uncover relevant areas of analysis and to avoid disciplinary 'boxing' of research (Cook et al., 2006). The follow the thing approach has been explicitly applied to foods such as papaya, soybeans and 'West Indian Hot Pepper Sauce' (Cook et al., 2004; Cook and Harrison, 2007; de Sousa and Busch, 1998), and is reflected in other work that traces foods across the sites implicated in their production, supply, consumption and disposal (Bestor, 2001; Evans, 2017; Freidberg, 2004). It has also been used in the investigation of other, non-edible things, such as money (Christophers, 2011), tourist souvenirs (Ramsay, 2009) and electronic waste (Lepawsky and Mather, 2011).

As a result of not privileging particular actors, and typically operating with an analytic open-endedness, follow the thing studies reflect the relational nature of ANT-based work (e.g. Whatmore and Thorne, 1997). Follow the thing studies also draw on and extend Marxist ideas, such as Harvey's (1990) injunction to 'defetishise' commodities by revealing their hidden relations of production. Although some studies are more explicitly Marxist (e.g. Hartwick, 2000), others seek to distance themselves from 'behind the veil' Marxism and indicate the complexities and contingencies of global commodity relations (e.g. Cook et al., 2004). While follow the thing studies of both varieties generally exhibit an at-least-implicit commitment to social justice, they are nevertheless susceptible to some of the criticisms levelled at ANT; namely, that elaborating the diverse array of actors involved with the production and consumption of this or that commodity does not, in itself, constitute a political act or operate as a basis for identifying the locus of moral responsibility (e.g. Barnett and Land, 2007; Saldanha, 2003). Cook et al. (2006: 659), however, "couldn't agree less", arguing that the approach helps to engender an empathic dimension to research, that it may directly aid participants and politically sensitise researchers, and that it offers affordances for the integration of theoretical and methodological approaches – such as ANT and Marxism – that some have suggested will be difficult (Goss, 2004).

In any case, follow the thing studies have provided rich and incisive analyses of foodstuffs, and can help to work past the culture-political economy duality haunting earlier research in the discipline. They represent a useful opportunity to achieve "analyses of the nature, culture and political economy of food … on the same page", which Freidberg (2003: 6) argued have – or had – been relatively scarce within geography.

Commodity biographies

A related analytic endeavour, including comparable research from cognate disciplines, is what might be termed the 'commodity biography'. Although often not explicitly conducted under the same theoretical auspices as follow the thing studies, commodity biographies are a genre of research in which a commodity – or group of commodities – are focused upon, and in which the whole 'social life' of the commodity is explored (e.g. Lind and Barham, 2004). These are

predominantly intended to provide a detailed account of the development of those particular commodities, and/or to shed light on 'bigger' questions and broader social processes through the lens of those products.[14] As with follow the thing studies, commodity biographies offer a useful lens through which to view the complex and multi-actor interactions that constitute food and eating, as well as wider social and historical forces.

Within interdisciplinary studies of food, such studies are innumerable. Perhaps the most well-known example is Mintz's (1985) remarkable historical-anthropological account of the sugar industry, but this was by no means the first; Mintz (2008) himself identifies Salaman's (1949) *The History and Social Influence of the Potato* as a defining example. In a discussion of the genre, Bentley (2008: 115–6) lists a wide range of works, which explore such diverse foods as beans, chocolate, curry, corn, bananas, cod, salt and tomatoes. One publisher has an entire series dedicated to the genre (Reaktion Books, 2017).

Such studies often provide an excellent illustration of the co-constitution of culture and political economy in the geographies of consumption: for example, the European spice trade during the Middle Ages, which connected the culinary tastes of the medieval ruling classes with global economic enterprise (e.g. Schivelbusch, 1992), or the introduction of the 'colonial drinks' of coffee, tea and chocolate during the seventeenth century, which connected imperial political-economic power with domestic consumption practices (e.g. Ellis et al., 2015; Pinkard, 2009).

Although the present thesis is not a commodity biography in the strictest sense it is resonant with that approach, in that it takes a particular foodstuff as the locus of analysis from which to approach broader questions about changing public tastes, edibility, and the acceptance of novel foods. It also critically explores the production-consumption nexus in relation to these themes.

Theories of practice [15]

The 'practice turn' in contemporary theory, heralded by a book of that title published at the turn of the century (Schatzki et al., 2001), has also yielded a number of insightful studies of food. Among other important contributions these offer a lens with which to view the production-consumption nexus in a convincing and enlightening way, by directing attention to the way in which human activity unfolds as a socially embedded process.

The philosophical antecedents of theories of practice are Heidegger and the later Wittgenstein, which became clarified into a practice-theoretic approach in the work of – inter alia – Bourdieu, Giddens and Charles Taylor. Among the most influential recent practice theorists are Schatzki (1996, 2002), who offers the most thorough and philosophically trenchant theory of practice; Reckwitz (2002), whose synthetic account situates theories of practice within the intellectual context of other social theory; and Shove et al. (2012), whose deliberately 'slim line' version of practice theory has proven useful for diverse empirical applications.

Theories of practice, like ANT, are not a unified approach: instead, they are an agglomeration of related approaches which share a philosophical perspective on the social. Theories of practice share a 'flat' ontology, conceiving of 'the social' as existing on a single ontological plane: thus, divisions such as micro/macro are not recognised. The locus of the social is conceptualised as social practices (e.g. driving, banking, playing golf), rather than individual cognition or a

[14] Sidney Mintz's (1985) *Sweetness and Power*, for example, takes sugar as its principal focus: however, as Mintz (2008: 154) explains, "I saw sugar in this work as the one concrete substance that I knew well enough to make use of, so that I might think in a more integrated manner about the history of capitalism."
[15] This section is based on the literature review in Chapter 8.

superordinate social structure. Typically – but not exclusively – this means that it is practices themselves that are taken to be the most relevant site for social analysis (Nicolini, 2016). Consequently, theories of practice 'de-centre' the individual in accounts of the social; individual agency is recognised, but not taken to be the absolute locus of human activity (e.g. Giddens, 1984).

Practices are conceptualised as consisting of certain key elements. Although there is a degree of variation between different theorisations, practices are typically held to involve particular types of bodily and practical activity, materials and settings of a particular kind, and general rules – whether they be explicit, or more tacit 'understandings' – regarding appropriate conduct when undertaking a specific practice.

Theories of practice share a number of key principles. As practices themselves are generally the focus of analysis, attention is paid to the ways in which practices are constituted – for example, through 'doings and sayings' (e.g. Schatzki, 2002) or a set of constitutive socio-material elements (e.g. Shove et al., 2012). As part of this is the notion of how practices are related, and how they interact. Practices are conceptualised as shaping and being shaped by proximate practices, sharing particular constitutive elements (e.g. Warde, 2016). These interactions shape particular practices, as well as, in their aggregate, the general flow of social conduct. Social life may be understood as a web or 'mesh' (Schatzki, 2002) of interrelated, interdependent practices.

The routine and repetitive nature of much human activity is also emphasised, with stability in social affairs conceived of as a recurrent achievement, an emergent effect of repeatedly performed social practices. These are not, as Shove et al. (2012) note, exact replications of each other. Rather, each performance of a practice is a distinct occurrence, which may or may not involve the same elements as previous performances. While the recurrent performance of a particular practice using the same constituent elements leads to a degree of social stability, such stability is essentially provisional. This is how practices afford modification and change over time. Gradual changes in the constituent elements of a practice lead to their mutual reshaping in and through the reconfiguration of practices as they are recurrently performed.

Theories of practice also view social practices as recursive. Practices are constitutive of 'the social', but 'the social' so constituted also shapes the performance of practices. A supermarket trip, for example, may be shaped by adjacent practices (e.g. work, social commitments) and contextual factors (e.g. the weather); in turn, the shopping trip shapes subsequent eating practices. This shaping, or 'prefiguration' – rather than determination – qualifies potential courses of action in manifold ways such as harder or easier, or more or less appealing (Schatzki, 2002: xxii; 210–233). For example, while one may not habitually eat ice cream for breakfast, this may nevertheless become plausible in the context of a sunny birthday weekend. Individual values – such as 'attitudes towards appropriate breakfast foods' – are not the sole determinant of food choice, and are not applied evenly across all eating events (cf. Schatzki, 2002: 230–232). This is an important consideration in the present context, as much research regarding 'consumer acceptance' of insects as food ascribes causal priority to individual attitudes.

Within social scientific research on sustainable consumption, the use of theories of practice has now become commonplace. This is attributable, I would suggest, to the analytic affordances of the approach compared to less sophisticated accounts of behavioural 'drivers' and 'barriers' (see Shove, 2010). Yet this widespread application, Evans (2018) suggests, has led to a plethora of studies which offer little in the way of analytic insight beyond a reiteration of the central

principles of the practice-theoretic approach: in particular, the 'de-centring' of the individual from social analysis.[16]

Despite the validity of such criticisms in relation to sustainable consumption research in general, the application of theories of practice to the study of food has nevertheless yielded a number of insightful analyses. Warde's (2016) work is perhaps the most prominent in this respect, providing as it does a full theorisation of eating as a 'compound practice' and elaborating both the central elements of eating practices and the principles underlying their organisation (see also Warde, 2005, 2013). Central aspects of the practice-theoretic appraisal of eating are that it is not an exclusively individual behaviour, but rather shaped by social, practical and contextual factors; and relatedly, that eating is fundamentally habitual and routine, rather than being the outcome of a series of conscious decisions (e.g. Delormier et al., 2009; Kjaernes and Holm, 2007; Paddock, 2017; Warde, 2016).

Researchers have contributed further to the analytic resources of practice theory vis-à-vis eating by elaborating new concepts that help to explain how diets are organised and routinely conducted (Halkier, 2009; Molander, 2011), an endeavour to which this thesis also aspires (see Chapter 8). Others have elaborated the ways in which agency and responsibility in food consumption are distributed, drawing attention to the policy implications that this entails (Evans, 2011; Meah, 2014b) and demonstrating the agentic capacity of nonhumans in shaping diets (Truninger, 2011). The ways in which food provisioning and consumption practices are entangled within broader webs of practices (e.g. work, childcare) have also been well-illustrated (e.g. Delormier et al., 2009; Paddock, 2017). This point in particular has significant implications both for the epistemology of food research (Halkier and Jensen, 2011), as well as the foundational philosophical appraisal of what eating 'is': i.e. as something that is socially and contextually achieved, rather than unilaterally deriving from individual attitudes, motivations and beliefs (Kjaernes and Holm, 2007).[17]

Related to the above insights, practice-theoretic work on eating has engaged to some extent with the notion of dietary *change*. Interventions targeted at encouraging shifts to more sustainable foodways have highlighted the need to target multiple aspects of food practices – such as production, provisioning, consumption and disposal – that go beyond efforts to change individual attitudes (e.g. Devaney and Davies, 2017; Laakso, 2017; Sahakian and Wilhite, 2014). The imbrication of eating and related practices has been identified as a conservative factor in diets (Paddock, 2017), as has the constraint represented by the routine practical and material constitution of eating practices (Spaargaren et al., 2013). Conversely, however, the availability of meat-free products that can be incorporated in practices in a similar way to meat-based ones has been identified as aiding the 'transition' to animal-free diets (Twine, 2018). This point illustrates the connection between production and consumption in relation to dietary change, an issue

[16] As Evans (2018: 11) puts it, much of this literature purports to offer "an empirically rich account of what is really going on in [insert environmentally significant domain] to show that it is more complex than behavioural economics and social psychology would have it".

[17] There is also a growing tendency for studies of food and eating to use theories of practice – particularly the work of Shove et al. (2012) – as an ordering principle for analysis, while arguably refraining from a full engagement with the ontological and epistemological principles of the approach (e.g. Nelson et al., 2017). I have bracketed such work off from the present review. Also excluded are studies which use the term 'practice' in a sense other than that associated with theories of practice (e.g. Bugge and Almås, 2006), as well as those which lay claim to a practice-theoretic approach but then proceed, regardless, along the timeworn lines of methodological individualism (e.g. Bekker, Tobi, et al., 2017).

which, I will argue, is central to the poor uptake of insect-based foods in the Netherlands (see, in particular, Chapter 5).

Practice-theoretic studies of food have seldom engaged with the adoption, diffusion and acceptance of new foods. A rare exception is the study by Micheelsen et al. (2014), which investigated a dietary intervention to encourage consumption of the 'New Nordic Diet'[18] (involving unfamiliar ingredients) and indicated the problems inherent in attempts to effect a sudden and relatively drastic shift in configurations of dietary practice. The application of theories of practice to the study of new foods is an area which the present thesis seeks to make a significant contribution towards, in two main ways.

Firstly, it aims to use theories of practice to understand and explain the poor uptake of contemporary insect-based foods, seeking to make both a substantive contribution (to our understanding of novel foods and the food security agenda) and a general theoretical one (to our understanding of the geographies of novel foods). As part of this, theories of practice are mobilised in order to illuminate the ways in which production and consumption are both implicated in the public acceptance of new foods.

Secondly, it aims to use its empirical material as a basis to contribute 'back' to theories of practice. Two new concepts are developed (see Chapter 8), which not only help to explain the low uptake of insects as food in the Netherlands, but also add to the practice-theoretic resources developed to understand the establishment, maintenance and change of diets more generally.

Summary

In some respects all of the integrative approaches discussed above are being drawn upon, or 'spoken to', in this thesis, although the engagements with ANT and theories of practice are more explicit. ANT is used as the principal theoretical framing of Chapter 5; theories of practice are the primary theoretical resource used throughout, and are drawn upon in all the empirical chapters to a greater or lesser extent.

A number of other currents within geography are also engaged with throughout, and it is in the context of these theories and debates that the thesis is intellectually situated. I now discuss each of these key literatures in turn: more-than-human geographies; taste, disgust and the visceral; and the exotic and the mundane. Following these sections, I address the issue of the geographies of novel food more specifically.

More-than-human geographies

The integrative approaches discussed above hint at the importance of considering nonhuman actors in the unfolding of human life generally, and in relation to food consumption more specifically. For example, among human labour and consumption practices, Cook et al.'s (2004) research indicates the agentic capacity of fruits, viruses, technologies and the weather as relevant to consumption of papaya in the UK.

[18] Initially proposed in 2009, the New Nordic Diet was developed by the Danish Research Centre as a "healthy, regional and sustainable" diet for the Nordic countries (Micheelsen et al., 2014: 1247). It draws on Nordic *terroir*, current dietary recommendations, and considerations regarding the sustainability and climate-friendliness of ingredients. It also "seeks to promote the social aspects of household meals" (Micheelsen et al., 2014: 1250). Although it incorporates foods regarded as quintessentially Nordic (e.g. wild game), many such foods are relatively unfamiliar to contemporary consumers.

In recent years the agentic 'nonhuman' of ANT-inspired analyses has been further theorised as the 'more-than-human', a category defined not by its absence of humanity but by the way that it *exceeds* humanity, as classically conceptualised (e.g. Bourke, 2011), in a number of respects.

For Whatmore (2006), cognisance of the more-than-human involves acknowledgement of the way in which nonhuman bodies or materialities constitute human life, an interrogation of 'the human' as itself an assemblage, and consideration of subjectivity as dispersed beyond human bodies (cf. Braun, 2005; Seaman, 2007). Thinking with and through the more-than-human enables the interrogation of human-animal relations and of the production of abstractions such as 'nature' (Bear and Eden, 2011; Panelli, 2010), and may encourage an expansion of ideas about sociality beyond our own species (Tsing, 2014).

Scholarship on the more-than-human – and work which may not name itself as such, but is motivated and organised by similar ontological and epistemological principles – has opened productive avenues of enquiry within the geographies of food. Such work indicates how more-than-human assemblages are implicated within food production-consumption networks in complex ways: Tsing (2015), for example, shows how a certain type of mushroom and particular human populations are drawn together in globalised production networks operating at the interstices of capitalism. Through their analyses, more-than-human food geographies also often seek to open up spaces for new ways of 'doing food' and the formation of a relational, interspecies ethics (Bennett, 2007; Probyn, 2014a, 2014b; Whatmore, 2002). Questions of ethics and the consumption of insects are the focus of Chapter 7, which engages with the relationship between ontology and ethics in the constitution of vegetarian (but insect-inclusive) diets.

Some researchers attempt to account directly for the ways in which the more-than-human has been mobilised in food production: for example, as both material resource and discursive strategy (Stassart and Whatmore, 2003). Lien (2015) considers the multiple ways in which Norwegian salmon 'become food' (cf. Roe, 2006b), explaining how the materiality and ethology of the fish both afford and complicate their integration into global food networks and highlighting "the friction that occurs during translations from lively flesh to numerical figures" (Lien, 2015: 92). The 'liveliness' of edible material is also central to Bennett's (2007) account of food, in which food's 'material agency' problematizes the eater-eaten relationship, allowing for "the active power" of the latter "to exert forces and create effects" (2007: 133; cf. Mol, 2008; Probyn, 1998).

More-than-human studies of food insects are scarce, although Phillips (2014) explores multispecies engagements between humans and bees, identifying an ethics of care among beekeepers that exceeds an instrumental desire to ensure "more bees [are] capable of returning to work quickly" (2014: 155). Indeed, the preferences, requirements and affective capacities of food animal species are a central concern both for analysts and for the humans they investigate. Although the apparent dominance of humans over some food species is well-established – such as the chickens whose biology has been affected by incorporation into industrial agri-food networks (e.g. Paxton et al., 2013) – animals have fostered specific attunements in their human managers.

I explore some of these ideas in Chapter 5, when I argue that certain insect species 'resist' integration into the food system and that the preferences of certain species – namely, 'exotic pets' and zoo animals – have shaped unfolding efforts to produce insects as human food. I also note that the materiality of particular insects entails negative affective responses from humans, which are not conducive to their acceptance as a food source.

Taste, disgust and the visceral

It is commonplace to assert that public acceptance of insects, or of other culturally novel alternative protein sources, is likely to entail aversive responses – the 'yuck factor', as it is often put (e.g. Ramaswamy, 2015; van der Weele, 2010). However, the connection between visceral responses and the acceptance of new foods tends to be rather crudely drawn. For example, Dobermann et al. (2017) suggest that "[t]here are two distinct psychological reactions to insects as a food source for humans", one of which – "visceral negative reactions" – is the 'Western' view (2017: 305). Theory and debates around taste, disgust and viscerality within human geography and cognate areas can help us to think through these kinds of issues without recourse to such reductive generalisations.

Prompted by the prominence of discussions regarding the insect 'yuck factor', I first discuss visceral aspects of eating, including disgust. I then move on to a discussion of geographic work on taste more broadly. In concluding I emphasise that the positioning of certain things as disgusting or appealing – including mundane food items as well as unusual ones – is shaped by complex social, cultural and physical geographies.

A rich seam of geographic scholarship engages with the visceral, bodily and affective dimensions of life (e.g. Anderson, 2006; Grosz, 1994; McCormack, 2007; Obrador-Pons, 2007; Probyn, 2000). Food has been a prominent part of such work, particularly in relation to the notion of 'visceral geographies' (e.g. Hayes-Conroy and Hayes-Conroy, 2008; J Hayes-Conroy and Hayes-Conroy, 2010). Visceral geographies theorise human activity (including the social, political and economic) as deeply implicated with the bodily and sensuous, with the visceral both affecting and being affected by other aspects of sociality. Indeed, one of the defining attributes of this approach is to dissolve binary oppositions between bodies and the social or representational, bodies and minds (emphasising instead the 'minded-body', e.g. Hayes-Conroy and Martin, 2010), and materiality and culture, conceiving of these poles as fundamentally and inextricably relational (Hayes-Conroy, 2017). A central precept of visceral geographies is that political subjectivity should be understood "from the body out" (Hayes-Conroy, 2017: 51), an explicitly feminist approach which resonates with broader debates in geography and elsewhere (e.g. Grosz, 1994, 1995; Longhurst and Johnston, 2014).

Visceral geographies have formed the basis for the investigation of a number of food-related topics. These include migrants' experiences of remaining connected with home through food (Abdel-Malek Neil, 2017; Longhurst et al., 2009); the production of multicultural place (Abdel-Malek Neil, 2017; Johnston and Longhurst, 2012); the means and extent of 'mobilisation' and participation in alternative food movements (A Hayes-Conroy and Hayes-Conroy, 2010; Hayes-Conroy and Martin, 2010); motivations to eat particular types of food (Hayes-Conroy and Hayes-Conroy, 2013); and the ways in which food becomes waste (Waitt and Phillips, 2016). Such studies do much to highlight the role of the bodily and sensuous in broader social and political relations, and productively complicate the notion of 'choice' implicit in predominantly nutritional or psychological accounts of eating.

Of particular relevance to the present thesis is a strand of research dealing with the extent to which the visceral is implicated in people's acceptance or rejection of new or unusual foods. Sexton (2016) discusses how efforts to ensure public acceptance of plant-based products as an alternative to meat are predicated on a visceral equivalence between the two. Longhurst et al. (2008) detail their own negative visceral reactions to culturally unusual dishes during a research project, identifying the epistemological and political implications for future social investigation.

Disgust also features prominently in Waitt's (2014) investigation of public acceptance of kangaroo as food in Australia, and Modlik and Johnston's (2017) account of food festivals in New Zealand. In both cases, visceral responses to foods are shown to be relevant to those foods' consumption. For potential consumers of kangaroo meat, such responses combine with economic and social forces to situate consumption within specific, sharply delineated geographies, and frequently to preclude routine consumption (Waitt, 2014). For those eating insects or bull testicles at a food festival, negative visceral reactions are bound up within the bacchanalian geographies of the event, and are constitutive both of an 'exotic' experience and the positioning of eater as possessing a 'feral factor' (Modlik and Johnston, 2017).

Current entomophagy research (see Chapter 1) tends to position the 'yuck factor' as a causal element in the rejection of insects as food. However, it tends to do so in a highly reductive, unidirectional fashion. The debates opened up by visceral geographies indicate that disgust and new foods are related in complex and ambiguous ways. As Hayes-Conroy and Hayes-Conroy (2013: 81) argue, "bodily motivation to eat certain foods (and not others) … [is] something that is variously and contextually produced through a wide array of social relationships, intellectual engagements, and material attachments."

Indeed, this line of thinking prompts us to ask how prevailing social, political and economic forces are themselves *constitutive* of the visceral: how are taste, appetite and disgust relationally shaped by extra-individual factors? Hayes-Conroy and Hayes-Conroy (2008) assert how acquired taste for industrially-produced jam, rather than its homemade equivalent, indicates how in the context of prevailing social and political relations bodies may become attuned in specific ways. While their specific example is an arguable one – how to account for this assertion empirically, rather than an alternative explanation, is not elaborated – research from geography and elsewhere on the establishment and maintenance of taste for foods offers useful insight into how the social, political and economic recursively shape the embodied, individual experience of eating (Caldwell, 2017).

Germov and Williams' (2004) concept of the 'social appetite' is useful in this respect, conceptualising individual taste as the product of historical, cultural, structural and critical factors. Korsmeyer's (2005) collection on 'taste culture' illustrates the complex ways in which taste is at once both social and physiological, and elucidates the social and physical geographies underlying the taste preferences in particular regions (e.g. Rozin and Rozin, 2005). Western tastes for spices and the 'drug foods' of chocolate, coffee and tea are a prominent feature of related literature, with authors identifying a recursive relationship between colonial trade and preferences – both 'courtly' and mass-cultural – for particular foods (Ellis et al., 2015; Fraser and Rimas, 2011; Mennell, 1996; Schivelbusch, 1992). Similarly, research has shown that development of a Japanese 'national cuisine' in the latter half of the twentieth century – and an attendant homogenisation of national taste preferences – is attributable to explicit government policy, as well as the collaborative activities of a range of public and private institutions (Cwiertka, 2014; Rath, 2016). The popularisation of orange juice, first in the US and then across the world, is demonstrably the result of similar social processes (Fraser and Rimas, 2011).

On a smaller scale, taste is also recursively associated with the social circumstances of its development. Among the clearest expressions of this is Bourdieu's (2010) work on taste and the embodied dispositions of the 'habitus', under which taste judgements both reflect and reproduce class positions. Bourdieu explicitly connects food preferences with the maintenance of a gendered domestic economy, suggesting that tastes for time-consuming casseroles, for example, are associated with a traditional conception of gender roles. In a similar vein, Caldwell (2017:

390) argues that taste as a form of 'embodied practice' operates "to discipline and evaluate cultural practice", positioning individuals in manifold ways as such (non-)normative, (ir)responsible or (un)ethical.

Taste, and its constitution through and among social and spatial relations, is a prominent theme of food geographies research. A particular focus has been the association between taste and place. This relates to different conceptualisations of 'place': both in a more abstract sense, as a particular articulation of social and material relations associated with a particular spatiality, or in a more common sense fashion, as "bounded, as in various ways a site of authenticity, as singular, fixed and unproblematic" (Massey, 2007: 5).

For example, while taste is shaped by place (Trubek, 2005) it also shapes our embodied relationships *with* place (Delind, 2006). The close association of taste and place is articulated in a variety of ways, such as provenance (Meah and Watson, 2013; Reid and Rout, 2016), *terroir* (Trubek, 2008), tradition and identity (Montanari, 2002), tourism (Long, 2004), and designations of regional protection (Parrott et al., 2002). Indeed, to a certain extent, taste and place are inseparable: as Edensor and Falconer (2015) argue, tastes experienced out of context become 'displaced', qualitatively altered and reconfigured. Space and place are not a 'backdrop' to eating; they are active constituents of the practice (Edensor and Falconer, 2015; Jayne et al., 2012). Such considerations are crucial, I would suggest, for our understanding of how novel foods become established in new places. Notions of provenance are an important part of novel foods' positioning as desirable (House, 2018). Further, attention to the 'site of the social' (Schatzki, 2002) directs attention to how contexts of food provisioning and consumption are fundamental to the enactment of new culinary practices, or the incorporation of new foods into existing practices (see Chapters 8 and 9).

Taste both shapes and is shaped by complex social and physical geographies. Visceral and aversive responses to particular ingredients, as well as taste for more mundane foods – such as bread (Mennell, 1996; Montanari, 1994) – are therefore never solely properties of the individual: rather, they are both shaped by extra-individual forces, whether economic, social, political, technological, and so on. Further, both disgust and deliciousness are related: they are two sides of the same coin. "[T]he sense of repugnance", Mennell (1996: 316) argues, "is inseparable from the sense of delicacy or refinement". Mennell (1996) suggests that the maintenance and change of prevailing tastes – for example, regarding the use of spices or the consumption of offal – are in large part connected with broader social forces, such as those relating to social competition, contemporary trade arrangements, political relations, and the changing nature of sites of provisioning and consumption (such as butcher's shops and restaurants.)

In a similar vein, I have argued that the relatively 'sudden' development of a taste for raw fish among the American public during the mid-twentieth century can be understood in comparable terms (House, 2018). One of the arguments propounded in the present thesis (see also House, 2016), is that the 'yuck factor' – the go-to causal explanation of the rejection of insect-based foods found within the current entomophagy literature – can be understood as a *symptom* of insects' place outside the 'edible', rather than a cause. It could thus, as I argue throughout the empirical chapters, be affected by the production of insect-based foods that were tasty, distinctive, affordable and available, and which had a coherent place within culinary practice: i.e., foods that people might actually want to eat. As Harris (1986: 154) argues,

> The European and American rejection of insects as food has little to do with insects as disease carriers or their association with dirt and filth. The reason we

> don't eat them is not that they are dirty and loathsome; rather, they are dirty and loathsome because we don't eat them.

To adopt this line is not to engage in a simplistic analysis along the lines of 'people eat what is available'. As Mennell (1996) notes, such an analysis is likely to be rather superficial, given the widespread human tendency to avoid large quantities of technically edible food. It is also not to suggest a simple reversal of the prevailing view in current entomophagy research, or to conceive of a unidirectional relationship between a reified 'society' and the materiality of the human body (cf. Hayes-Conroy, 2017). What I *do* wish to demonstrate is that there is a relational connection between disgust and new foods, but that it is a complicated one. As I argue in Chapter 6, most people will reject culturally unusual new foods, so the key population worth investigating initially is the small group of 'early adopters' who are already willing eaters. Further, as I indicate in Chapters 8 and 9, the creation of a public appetite for new foods is reliant upon wide range of extra-individual factors, as well as the foods having a coherent place within a framework of culinary practice, so that they may become embedded within established routines. Efforts to move something from 'non-food' to 'food' involve both producers and consumers, but is not a case of one convincing the other: rather, they are both part of an unfolding system of dietary change (Chapter 5; cf. Shove and Walker, 2010).

The exotic and the mundane

The subject of novel, culturally unusual food raises important questions about novelty, exoticism, and the connection of such themes with the rather mundane contexts in which – for most Western Europeans – food is typically eaten.

Notions of 'exoticism' are a prominent aspect of contemporary Western foodways (e.g. Breeze Harper, 2011; Cook and Crang, 1996; Cook et al., 2008; Heldke, 2003; Johnston and Baumann, 2014; Lu and Fine, 1995). Construction of foods as 'exotic' – that is, as "excitingly unusual" (Heldke, 2003: 18) – is principally associated with their positioning as desirable (Johnston and Baumann, 2014). Consumption of exotic foods serves to enact both culinary cosmopolitanism and social distinction (Heldke, 2003; Øygard, 2000). Of particular relevance to debates on alternative proteins – and their sustainable objectives – are observations that exoticism may also be operationalised as part of a 'moral cosmopolitanism', in which environmental concerns about food are foregrounded (Emontspool and Georgi, 2017).

Exoticism – like the related concept of 'authenticity' – is not a fixed property of foods, but rather something that is constructed, relational, and negotiated (Heldke, 2003; Jackson, 2013; Lu and Fine, 1995).[19] To suggest that something is exotic is to suggest that something else isn't (Johnston and Baumann, 2014). Further, what is exotic at a particular time and place may not be in others: compare Chinese food in the West during the 1960s (van Otterloo, 2001) and more recently (Johnston and Baumann, 2014). Claims regarding exoticism are strategic, aiming to achieve a particular effect: typically, it appears, this is the valorisation or social distinction of the eater (e.g. Jackson, 1999; Johnston and Baumann, 2014), although arguably exoticism may also foster more positive cross-cultural understandings (Oleschuk, 2017).

[19] Johnston and Baumann (2014) argue that despite the conceptual similarities of (and frequent conflation between) exoticism and authenticity, they should be treated as distinct. For example, it is possible for something to be considered both 'exotic' and 'inauthentic' (e.g. fish sauce mass-produced in China, rather than from a Vietnamese fishing village).

However, the positioning of food as exotic is highly problematic. As May (1996: 59) argues, "the consumption of such food might be both dependent upon, and helping to reproduce, a set of racist imaginative geographies". To position foods as exotic has been argued to involve the crude simplification of 'ethnic' cultures while simultaneously using them as a resource (Cook et al., 2008; Heldke, 2003), and to obscure the problematic commodity relations which make consumption of notionally exotic foods possible (Cook and Crang, 1996). It also positions white/European food (and culture more broadly) as an unmarked, unacknowledged norm (Breeze Harper, 2011). Scholars have pointed to the ways in which the exotic serves to reinforce particular notions of ethnicity (Oleschuk, 2017) and gender (Bell and Hollows, 2007), or to preclude a fully inclusive politics of food justice (Breeze Harper, 2011).

Despite the problematic nature of exoticism, it remains – as noted above – a highly prominent feature of contemporary Western foodways. Nevertheless, Warde's (1997) research – which analysed food-related magazine articles in the UK over the 1960s-1990s – found that explicit appeals to the exotic had actually decreased over time. The reason for this, Warde (1997: 61) suggests, is that more recent decades have seen a "routinization of the exotic": whereas once the introduction of new, international dishes once warranted remark, by the 1990s "there had developed a routine acceptance of ethnic variety, so that truly exotic and strange recipes could be introduced without much comment or reflection" (1997: 61). Evidence from the US suggests this process endures: while the exotic may not be explicitly mentioned in food-related discourse, it remains a central principle, reflecting a "larger cultural esteem for exotic experiences" (Johnston and Baumann, 2014: 87).

Although 'exotic' dining experiences are often sought in the relatively occasional contexts of restaurant dining (Heldke, 2003) or tourism (Long, 2004), exoticism has also become a fixture of mundane eating practices (Johnston and Baumann, 2014; May, 1996; Warde, 1997). An example given by Cook et al. (2008) – in which, after seeing an advert for Uncle Ben's cooking sauces in a copy of *Woman's Weekly*, he is prompted to consider the problematic cultural geographies of the exotic – illustrates this connection well. In relation to the introduction of potentially 'exotic' novel foods, it prompts us to consider the relation between such foods and the mundane contexts of their consumption: principally, the domestic sphere (e.g. Chapter 8).

The domestic sphere has long been a focus of food geographies research. A particular focus has been on gender relations in relation to 'foodwork', highlighting the ways in which mundane eating practices are implicated in the operation of power and the subjugation of women (DeVault, 1991; Meah, 2014a). Research has also highlighted connections between domestic foodwork and questions of care (DeVault, 1991; Szabo, 2014), 'responsible' consumption (Evans, 2011; Meah, 2014b), and authenticity, identity and belonging (Bell and Hollows, 2007; Longhurst et al., 2009). Related research has also cast light on the practicalities of how, in the domestic context, eating is sociologically achieved: for example, what a 'proper' meal involves (Murcott, 1982), how different 'styles' of cooking may be enacted (Halkier, 2009), and the ways in which food is used in the maintenance of friendships and social distinction (Mellor et al., 2010).

Research on novel foods resonates with these literatures. It must consider the ways in which the 'exotic' may become a constitutive part of the domestic sphere (cf. Bell and Hollows, 2007), and account for the ways in which relatively abstract ideas of 'ethical' or 'sustainable' eating are produced through and amongst the mundane, practical contexts of food provisioning and consumption. Indeed, as I show throughout the empirical chapters, it such mundane and practical conditions which in large measure shape the acceptance and uptake of insect-based foods. Considerations of novelty and exoticism, while present, are significantly attenuated in

comparison with the influence of domestic arrangements on food consumption. Research on the integration of novel foods into established diets reflects work on the 'domestication' of particular technologies (e.g. Cowan, 1983); the integration of novel foods in domestic contexts reflects a process of ongoing negotiation (e.g. Weiner and Will, 2015), in which both novel foods/technologies and the domestic sphere itself are affected (e.g. Chapter 8).

Summary

A number of established currents within geography (and related disciplines) are demonstrably relevant to the study of public acceptance of insects as food. These areas – including production-consumption, more-than-human geographies, distributed agency, taste, disgust and viscerality, and connections between the exotic and the mundane – furnish the general intellectual context for the development of the present thesis, and indicate points of continuity between the present, heretofore largely unexplored subject, and established debates in the field.

A geographic approach to food and eating, exemplified by the above literatures and extended in this thesis, emphasises the relational connections between spatially and temporally dispersed sites of production, provisioning and consumption. It also highlights the ways in which physical geographies (e.g. the material contexts of eating and the materialities of food) and social geographies (broadly conceived, including aspects such as the cultural, economic or political) are both implicated in food consumption, and are inextricably interrelated.

In addition to examining relevant work on food geographies in general, it is necessary to explore the geographies of *novel* food more specifically. It is to this subject that the following section turns.

2.3 – GEOGRAPHIES OF NOVEL FOOD

The geographies of novel food are both nowhere and everywhere. As a distinct research agenda, they do not, as yet, exist – although the principal argument of the following review is that geographic scholarship stands to profit from their articulation as an explicit focus of study. However, in more substantive terms, the geographies of novel food are an immanent and abiding concern within a broad and rich body of literature.

Defining novelty

A substantial proportion of work on food geographies in general – which includes work in cognate disciplines, such as anthropology – could justifiably be seen as concerning novel foods. As Gosden (1999: 4) observes, "[t]he question of the acceptance of novel and foreign resources is not a trivial one, as much of the world's food grown over the past 5,000 years has been introduced from other areas." Even sugar and tea were of course novel at one point in the United Kingdom (Ellis et al., 2015; Mintz, 1985); more recent examples of food geographic research examining commodities such as papaya and avocado also deal in large measure with those foods' initial establishment in new locations (Charles, 2002; Cook et al., 2004). Pinkard's (2009) history of French cuisine explores the relatively recent arrival of staple European foodstuffs such as carrots, potatoes and brandy, noting the constitutive ecological, cultural and economic geographies at work in their establishment in new locations.

This understanding of 'novel' food refers to those which, although already established in particular places, are newly introduced elsewhere. However, it is profitable to further parse the 'novelty' of foods, as such novelty is multifaceted. Although insect-based foods are 'novel' in

particular ways, an attempt to sketch out the possible senses in which foods may be novel is an analytically useful endeavour.

For example, 'novel' foods may also include repositioned or remodelled versions of foods that are either relatively familiar or culturally unusual. In Western Europe an example of the former might be kale, a relatively standard vegetable repositioned as a 'superfood'[20] and thus resituated discursively and within social practice (Sightdish, 2013); a comparable example in the Netherlands is the 'rediscovery' of 'forgotten vegetables' (*vergeten groenten*) such as parsnip (Jansen and Visser, 2007; Poot and Janse, 2007). The repositioning of culturally more unusual foods is illustrated by the trend for eating 'nose to tail' (i.e. consuming what for contemporary publics are likely to be typically uneaten animal parts such as viscera) as part of a nostalgic, socially-distinguishing and (at least notionally) environmentally-oriented manner of high-end dining (Rayner, 2007).

Novel foods may be literally new, in the sense that they have not previously been used as food. This may hold, I would suggest, in three different senses. Firstly, their constitutive materials may be combined in new ways. Examples of this are 'Europeanised' versions of foods or dishes which exist elsewhere, or dishes whose origin is at the point of cultural 'mixing' (Cook et al., 2008) engendered by – inter alia – human migration, the adaptation of foods to diverse tastes, and the (un)availability of particular ingredients (cf. Lu and Fine, 1995). Specific examples include the German *currywurst* (a sausage served with curry sauce), the Dutch *bamischijf* (a disc of spiced noodles covered in breadcrumbs and deep-fried) or the British chicken tikka masala.

Secondly, novel foods may be literally new in the sense that their constitutive materials have never before been used as food. Although it is conceivable that most substances that are not immediately lethal have at some point been deliberately eaten by humans,[21] there are nevertheless examples of where this is not the case. Indeed, buffalo worms – one of the Big Four insect species – do not, it appears, have any recorded use as human food (e.g. Jongema, 2017). The recent inclusion of this species in a range of convenience foods therefore seems to be a global and historical novelty (see Chapters 5 and 9).

Thirdly, novel foods may be literally new in the sense that they have arisen out of the culinary application of biotechnological developments. Examples of these are furnished by a number of the examples of alternative proteins – such as 'bleeding' veggie burgers or in vitro meat – which were discussed in the previous chapter. This category could also include 'functional foods'[22] such

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[20] Loyer (2016: 236) defines 'superfoods' as "food products celebrated for their purported extraordinary nutritional and medicinal values, derived from indigenous culinary and healing traditions and inserted onto the shelves of wealthy Western marketplaces." She adds that "[t]hese products are presented as something between medicine and food, the very word 'superfood' indicating that these are superlative edibles."

[21] For example, tree bark (Mennell, 1996) or soil (MacClancy et al., 2009). The qualifier *immediately* is important: as Mintz (1996: 35) observes, "people are enculturated to eat just about anything, including numerous toxic substances". The recent example of apricot kernels being sold as a 'superfood' in the Netherlands illustrates this well: the kernels contain dangerously high quantities of cyanide, and were recently banned from sale following the near-death of a consumer (Blom, 2018).

[22] Despite their relative prominence in discussions of the future of the agri-food system, broad consensus about what 'functional foods' actually are has proven elusive. Doyon and Labrecque (2008) reviewed more than a hundred conceptualisations of the term, attempting to reach a universal definition of functional foods. For those authors, "[a] functional food is, or appears similar to, a conventional food. It is part of a standard diet and is consumed on a regular basis, in normal quantities. It has proven health benefits that reduce the risk of specific chronic diseases or beneficially affect target functions beyond its basic nutritional functions" (2008: 1144).

as the sweetener tagatose (Damhert Nutrition, 2017), or the culinary application of nanotechnology to create lower-fat or vitamin-enriched products (Sanderson, 2013).

The elaboration of what 'novel foods' are for geographic analysis both overlaps with and is distinct from definitions of 'novel foods' elsewhere. Perhaps the most prominent definition of 'novel foods' in Western Europe is that employed for regulatory purposes. The European Commission (2017: n.p.) defines a novel food as

> food that has not been consumed to a significant degree by humans in the EU prior to 1997, when the first Regulation on novel food came into force. 'Novel Food' can be newly developed, innovative food or food produced using new technologies and production processes as well as food traditionally eaten outside of the EU.

This legal definition largely accords with the schema I sketch out above – i.e., novel foods as either newly introduced or newly developed – excepting the cultural repositioning of foods which already have a significant history of consumption. Although not a regulatory matter, this is one which is certainly of interest to social and historical research. As I explore during the empirical sections of this thesis, insect-based foods (which contain a 'literally' novel ingredient) are demonstrably subordinate to plant-based foods, whose novelty and appeal lies in their new configurations of otherwise highly conventional ingredients.

Indeed, foods which may in a technical or regulatory sense be 'new' may not be regarded as such in a socio-cultural sense, thus indicating the need to address each of these modes of novelty. An example of this is the substitution of cod in fish fingers for more sustainable species, which appears to have gone largely unnoticed by the British public (e.g. Cloake, 2015). This indicates the disjuncture between different understandings of 'novel food', and highlights the need for geographic research into food to engage with the question of novelty.

Clearly, the different definitions I have sketched out are not necessarily mutually exclusive. Foods that are literally new, in the sense of just having been developed, necessarily correspond with most of the other definitions. Insects, the subject of this thesis, can be understood both as something from one place established in another and as something – in the case of the buffalo worm – literally 'new'. The boundaries between different definitions are also somewhat blurry. To what extent, for example, is monosodium glutamate 'new' if it is a synthetic version of a compound that naturally occurs in sea kelp (Sand, 2005)?

Such definitional issues are not dealt with here, although other questions generated by the above taxonomy of novelty form an analytic strand of the present thesis. This concerns the valorisation of particular foods, the ways in which they are brought within the sphere of 'edibility', and the rationale and constitutive geographies of these processes.

Novel food geographies

When considering the relationship between food geographies and novelty, a further distinction is necessary. This is between the geographies of novel food (as defined above), and the identification and analysis of *novel food geographies*: for example, those which constitute novel (or 'novel') modes of food production and provisioning, which may purport to enact new 'moral economies' or offer a path to more sustainable 'food futures'. These may be premised on a radically different logic to dominant modes of food supply, or purport to offer sustainable and innovative foods within existing market-based frameworks. Indeed, the question of whether particular novel food geographies are 'actually' alternative, or whether they represent a continuation of prevailing market logic, has been taken up in some quarters (Harris, 2009).

In this vein, Watts et al. (2005) propose a spectrum conceptualising stronger or weaker degrees of 'alternativeness' in alternative food networks (i.e. systems of food provisioning), rather than an either/or definition. 'Weaker' versions, which they conceptualise as "alternative *food* networks" (Watts et al., 2005: 27, original emphasis), include those focusing on things such as food quality or labelling; their 'weakness', therefore, refers to the limited extent to which they attempt to alter prevailing systems of food provisioning, seeking instead moderate changes principally related to the food itself. 'Stronger' versions, conceptualised as "alternative food *networks*" (Watts et al., 2005: 30, original emphasis) aspire to more significant change, addressing food supply chains themselves and seeking minimal involvement with dominant systems of provisioning.

Examples of 'stronger' versions include short food supply chains and community supported agriculture (e.g. Humphrey, 2017; Watts et al., 2005), as well as 'sharing' or 'salvage' economies and other non-capitalist systems of exchange (e.g. Foden, 2012; Holmes, 2018; Sharp et al., 2015, 2016). These are 'stronger' versions of 'alternativeness' in systems of food provisioning because they seek a meaningful break with the prevailing food system. Yet such alternatives have been critiqued on the grounds that they may do little to effect meaningful change (e.g. Bialski et al., 2015; although see Sharp et al., 2016). Even such 'stronger' alternative practices paradoxically tend to be reliant on the dominant capitalist system: for example, by redistributing or revalorising unwanted material produced under prevailing relations of commercial exchange (Foden, 2015), or by the production of commodities out of the ruins, both in ecological and social terms, of global capitalism (Tsing, 2015).

Examples of the 'weaker' variety of 'alternativeness' to dominant systems of food provisioning are the most relevant to the present thesis, whose focus is on efforts to introduce an alternative *food* rather than substantially alternative relations of provisioning. This 'weaker' variety is typified by the development of novel or alternative geographies of production-consumption, yet within the framework of existing commodity relations: for example, the sale of organic, fair trade or sustainably-certified produce in large retailers, or a politics of eating that involves a limited engagement with 'ethical' behaviour (e.g. meat-free Mondays) without a radical shift in the configuration of one's diet (e.g. veganism). In her analysis of the notionally 'disruptive technologies' involved in the production of alternative proteins in the contemporary US, Sexton (2017) argues that the 'disruption' chiefly extends to a reassignment of economic beneficiaries: the prevailing logic of capitalist accumulation remains unaffected.

The present thesis, indeed, supports a similar conclusion. To the extent that insect-based foods are actually eaten there is a partial shift of the locus of production – to insect breeders, rather than farmers – and a corresponding redirection of capital. However even in this case, dominant actors – a large food producer, a national retailer – are still the primary beneficiaries of this nominally 'green' dietary shift, and the supply and consumption of insect-based foods takes place within established frameworks of culinary and commercial practice. One might add that the exploitation of animals for human nutrition also continues, the species difference being in these terms arguably a superficial one. In any case, people are not eating insect-based foods in any meaningful numbers, a point which the thesis also seeks to explain.

Old wine, new bottles?

Efforts to understand, analyse and explain the geographies of novel food represent both the continuation of long-established debates and movement into terrain which requires new theoretical and methodological approaches. While in certain senses the geographies of novel food

are thus 'old wine in new bottles', in other respects they represent fresh conceptual and empirical challenges. Here I briefly explore each in turn.

Established debates

Research into the geographies of novel food has indicated that attention to both elements in the production-consumption nexus is important if we are to understand public acceptance, or changing public tastes (House, 2018). Indeed – and as noted above – much of the existing work on food and society generally can be understood in these terms (e.g. Ellis et al., 2015; Mennell, 1996; Mintz, 1985). The application and further development of integrative approaches, such as those using ANT or theories of practice, will be a useful undertaking in this respect.

The geographies of novel food will entail continued engagement with theory and debates regarding the more-than-human. Indeed, Whatmore's (2002) work on GM food represents a defining example of the confluence of the two areas, and work elsewhere on food and more-than-human networks of production-consumption have proven empirically and theoretically rich (e.g. Lien, 2015; Tsing, 2015).

Research into in vitro meat has suggested that the visceral and affective dimension is likely to be of significant importance for public acceptance of that culinary technology (e.g. van der Weele, 2010), and the visceral dimension of other novel food products has begun to receive attention (Sexton, 2016). What will be crucial in such research in future, however, is a thoroughgoing account of taste as socially and geographically situated. Taste and the visceral should be understood as both constituted by and constitutive of the social, political and economic, as is highlighted in the established debates discussed above.

Existing debates around the consumption of exotic foods are also relevant for research into novel, purportedly sustainable alternative proteins (e.g. Emontspool and Georgi, 2017). Given the prominence of the exotic in contemporary Western foodways (e.g. Johnston and Baumann, 2014), consideration of alternative proteins in relation to this cultural tendency indicates potential affordances for their positioning as feasible and desirable foods (cf. House, 2018), but also indicates potential problems (e.g. Oleschuk, 2017). Nevertheless, as I argue throughout this thesis, novel foods' 'acceptance' is in large part related to such foods' negotiated position within the mundane contexts of food provisioning and consumption. Therefore, I would suggest, established debates around the food geographies of the domestic sphere (e.g. Evans, 2012; Meah, 2014b) are also likely to be of enduring relevance when considering the novelty or exoticism of alternative proteins.

Novel foods will also require continued engagement with established debates around the 'alternativeness' of production, supply and consumption practices (e.g. Watts et al., 2005). Although current evidence suggests that they may represent limited 'disruption' to the established socio-economic order (e.g. Sexton, 2017), opportunities have been identified for novel food technologies to open new areas for debate around moral and societal issues (Driessen and Korthals, 2012).

New terrain

Exploration of the geographies of novel food may also open up many new areas for investigation, theory and debate. Perhaps the clearest path into uncharted analytic terrain is that afforded by foods which, as a result of biotechnological developments, can be understood as *literally* new.

For example, a developing strand of research is evident in which food is understood, marketed and made 'edible' at an atomized or molecular level (Watts et al., 2005), connecting to other

debates around the "molecularization of life" in more general terms (Braun, 2005: 644, emphasis removed). The molecular may operate as an analytic locus for the geographies of novel foods, connecting theoretical work on 'molecular affect' (McCormack, 2007) with empirical work on 'molecular gastronomy' (de Solier, 2010), or on the biotechnological engineering of food at the genetic level. Indeed GM food, and its attendant consumer distrust (e.g. Whatmore, 2002), connects the atomization of food geographies with issues of trust, risk and anxiety that are the focus of established debates within human geography (e.g. Abbots and Coles, 2013; Jackson, 2015a). The molecular level is one of the principal geographic scales operative in food scares (GM, rBST, CJD); yet it is also, as some have noted, a resource drawn upon in the positioning of foods as edible.

Sexton's (2018) work, for example, suggests that edibility is constructed through appeals to the 'meatness' of food at the molecular level, and Watts et al. (2005: 26) argue that the presentation of food as hygienic is part of ensuring its framing as safe. Ontological work done at the molecular scale has significant ramifications for how both the production and consumption of food are organised. Results presented in Chapter 5 indicate how the praxeological positioning of insect-based foods – placed among vegetarian products on supermarket shelves – might operate at the interface of the molecular and ontological, with consumers selecting insect-based foods on the assumption that their location in the contexts of mundane food provisioning implies a lack of pathological infectiousness.

Related to the above discussion is the opportunity that the geographies of novel food afford – and indeed, may necessitate – for the development of new theoretical approaches, or at least conceptual resources, for the study of food. Sexton's (2018) work on strategies of edibility construction as involving both molecular and discursive strategies is one such example. The ideas developed in this thesis (particularly Chapters 5 and 9) confirm that edibility may be fruitfully conceptualised as an achievement of social practice, connecting with anthropological conceptualisations of classification and social ontology (Douglas, 1966; Mol, 2002) and their application to the study of food (Yates-Doerr, 2015a; Yates-Doerr and Mol, 2012). I plan to explore this idea further in future theoretical work building on the present thesis.

A novel research agenda

As noted above, the geographies of novel foods are not, at present, a distinct research agenda. In my view they should be articulated as such, and I hope that this thesis offers a tentative step in that direction.

Within other disciplines – most notably, psychology – novel foods are a significant focus. Notwithstanding the fact that this may be due, at least in part, to the amenability and appeal of this topic for psychological research, I argue that novel foods should also be an area of prominent investigation in human geography. This is not to suggest an academic 'keeping up with the Joneses', or to propose that geographic scholarship should be more attentive to 'what's in'. Rather, in the context of massive anthropogenic environmental damage and dangerous levels of meat consumption (both for climate and public health) that affect us all, human geography should clarify and deepen its engagement with novel foods. This is both because geography's rich conceptual resources are uniquely positioned to offer fresh perspectives on issues relating to novel food, and also because – beyond the narrow instrumentalism of the 'impact agenda' (e.g. Back, 2015; Martin, 2011) – geography may correspondingly be able to meaningfully advance debates that ultimately have wider societal benefits, in helping to create a just, fair and sustainable food system (cf. Pain et al., 2010).

To engage with the latter objective is not to abdicate the responsibilities that critical geographers have to provide sustained critique and oppositional perspectives, and does not entail a shift towards uncritical elucidations of (un-)sustainable consumption which do not make reference to power, injustice or other social, economic and political issues (cf. Evans, 2018). It is still necessary, for example, to examine *who* benefits from novel foods, and where power and political agency resides (cf. Winter, 2005). Indeed, many of these foods may represent 'business as usual', and do little to substantively affect the dominant agri-food system (e.g. Sexton, 2017; cf. DuPuis, 2000); at worst, they may simply intensify a neoliberal approach to solving environmental problems (Sexton, 2017).

Critical engagement with the consumption of novel foods is also necessary. This will offer a useful corrective to the rather limited methodologically individualist accounts that currently dominate the area (see Chapter 1). Attention to this area may have substantive, societal benefits, but will also help to advance academic debates around food, eating, and the geographies of consumption more broadly.

2.4 – Conclusion

The above remarks provide the context for the present thesis's investigation of public acceptance of insects as food in the Netherlands. Situated within the general social and intellectual context of Chapter 1, the present chapter has outlined key debates and theoretical affordances for the study. Drawing on these theories and debates, the thesis's aim, as I have suggested, is not only to gauge public acceptance of insects and to contribute to food security research: rather, it also seeks to contribute to a developing research agenda for the geographies of novel food, to contribute to relevant theoretical work, and to inform broader and long-established debates within the geographies of food more generally.

A central objective of the thesis is to overcome the epistemological limitations of current entomophagy research (outlined in Chapter 1). In order to do this, the principal theoretical traditions drawn upon in the design of the research are actor-network theory (chiefly in analysis of the 'supply-side' of edible insects) and theories of practice (mobilised predominantly in relation to the 'demand-side' – that is, consumption – of edible insects). The following chapter turns to an explanation of the study's methodology, informed by these theoretical approaches.

Chapter 3 – Methodology

3.1 – INTRODUCTION

This chapter begins with an overview of the research design. This details its rationale, the selection of the research site, the research questions investigated, and an overview of the research methods. The chapter then discusses two 'scoping trips' to the Netherlands and their role in the development of the research (Section 3.2). After this, both of the main elements of the research are discussed in detail. The first of these (outlined in Section 3.3) investigates consumption of insect-based foods, using interviews, food diaries and participatory methods. The second (outlined in Section 3.4) investigates the production of insect-based foods, using interviews. For each of the two main elements, I discuss the research design, sampling, and methodology. After the sections on consumption and production, the chapter moves back to a methodological discussion of the research as a whole. Dedicated sections provide a discussion of data analysis (Section 3.5), issues regarding research-in-translation (Section 3.6), researcher positionality (Section 3.7), and ethics (Section 3.8). The chapter concludes with an outline of how the data are used in the following empirical chapters (Section 3.9), and a brief summary (Section 3.10).

Rationale of research

The **conceptual rationale** for the thesis is the idea that Western acceptance of insects as food is likely to involve factors that go beyond individual attitudes and beliefs. This conceptual orientation was partly derived from a critical examination of current consumer acceptance literature, which tends to conceptualise acceptance in rather narrow, individualistic terms (Chapter 1). It was also partly derived from literature reviewing around the geographies, history and sociology of food, which indicates both that food consumption is socially, practically and contextually shaped, and that the uptake and routinisation of novel foods tends to involve a wide range of extra-individual factors, including those broadly associated with their production (Chapter 2). Consequently the research required a methodology that drew on theoretical resources appropriate for the study of socially contextualised food consumption, and which could account for the role of production in shaping food consumption. To this end, the thesis is informed by theoretical debates – particularly those around theories of practice and actor-network theory – introduced in Chapter 2.

The **empirical rationale** for the thesis was in part the argument (also introduced in Chapter 1) that, in the light of the focus on decontextualized research in the current literature, it was important to engage with 'actual' consumption of insect-based foods. This objective had significant consequences for the empirical approach taken in the thesis, in that it required a research site in which insect-based foods are commercially available. Another aspect of the empirical rationale, following the conceptual orientation discussed above, was the contention that production (broadly conceived) is also a crucial consideration for efforts to understand public acceptance. This necessitated the empirical inclusion of actors on the supply-side of the insect-based foods whose consumption is the central focus of this thesis.

Both the conceptual and empirical aspects of the research design and methodology are explored further in the present chapter. Firstly, however, I provide details of the research site selected, as it was in the context of this choice that the research questions, research design and methodology were subsequently developed.

Research site

Informed by the objective to engage with the 'real life' consumption of insect-based foods in a Western context, as well as their production, the Netherlands was selected as a research site. The Netherlands has been a 'hub' of European efforts to investigate, develop and promote the use of insects as food since around 2008 (see Chapter 5 for historical detail). The FAO report discussed in Chapter 1 (van Huis et al., 2013) was primarily authored by academics based at Wageningen University, a large university in the central Netherlands which specialises in food and agricultural research. Academics at Wageningen organised the international 'Insects to Feed the World' conference in April 2014, following a number of smaller events in the previous five years. Intensive efforts around entomophagy in the Netherlands have also involved a number of insect producers, whose insects were being incorporated in various products by around 2010.

The Netherlands was a particularly appropriate site to investigate the **consumption** of insect-based foods in a Western context. In October 2014 a range of insect-based convenience foods was trialled in selected stores of the Dutch supermarket chain Jumbo; these were put on general sale in all (~550) branches in January 2015. Preliminary research had also identified a number of other stores selling insect products in the Netherlands. The extent to which insect-based foods were available in the Netherlands, in comparison with other Western countries, was very high: indeed, with the possible exception of Switzerland (whose Co-op supermarket chain began selling a range of insect-based convenience foods in 2017), the Netherlands has had the widest and most accessible selection of insect-based foods in the West.

The Netherlands was also a suitable site for investigating the **production** of insect-based foods. This was due in part to the concentration of academic research and commercial activity on the subject underway in the country, and in part because the insect-based products sold in the Netherlands were all produced there (or in nearby Belgium), and based on insects bred in the region. Indeed the Netherlands was – and, at the time of writing, still is – the European centre of food insect production. Informal discussion with various producers of insect-based foods in Europe also indicates that the Netherlands remains the principal source of insects used for such purposes. The reasons for the primacy of the Netherlands in this respect are explored in Chapter 5.[23]

As such the Netherlands offered an opportunity for an empirical engagement with 'actual' consumption of insect-based foods in 'real life' context, and also for the development of an integrative account of public acceptance that could accommodate the mutual influence of the production-consumption nexus. It was therefore selected as the research site.

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[23] It is worth noting some legislative factors that have played a role in the Netherlands' dominance in this area, and which may change in coming years. At the time of research (2015-2016), food insects were not properly accounted for in EU legislation, and thus fell into something of a legal grey area. This meant that national governments within the EU could permit or ban the sale of insects as food as they saw fit, and the Netherlands was one of the first to give the area at least tacit approval (see Chapter 5). As of January 1st 2018, new Novel Foods legislation came into force. This required each species sold for use as human food to have a dedicated Novel Foods application submitted to the European Food Safety Authority (EFSA) for approval. After a two year transition period (i.e. by 2020), any insects not approved as Novel Foods will be banned from sale in the EU. However, until that time, EU member states are still free to permit or ban the production and sale of food insects. Thus in November 2017, for example, the Finnish government permitted the cultivation and sale of insects as food (FinnishNews, 2017). Nevertheless, given the extent to which food insect production has advanced in the Netherlands, the country is likely to remain a dominant insect supplier in the immediate future. What will happen after the 2020 Novel Foods deadline remains to be seen.

The site selection was an important stage of the development of the research, building upon both the conceptual and empirical orientation of the thesis summarised above and elaborated in Chapters 1 and 2. In light of the site selection, the key research objectives (see Chapter 1) could be clarified into a series of distinct research questions. The research questions are explained in the following section. The research design and methodology were developed in the context of these questions, and are discussed in subsequent sections.

Research questions

As indicated in Chapter 1, the development of the thesis was oriented by a number of key research objectives. These were as follows:

1) To investigate public acceptance of insects as food in the Netherlands.
2) To explore the ways in and extent to which insect-based foods are becoming incorporated into established diets in the Netherlands.
3) To investigate how the production of current insect-based foods (broadly conceived) impacts upon their consumption and 'acceptance'.
4) To elaborate an understanding of public acceptance that accounts for extra-individual factors and the role of production.
5) To explore how theories of practice and actor-network theory may aid understanding of public acceptance, as well as how the study of public acceptance may further contribute to these theories.
6) To explore how established debates within food geographies may aid understanding of public acceptance, as well as how the study of public acceptance may further contribute to debates within food geographies.

Drawing on the theory and debates discussed in Chapters 1 and 2, some more specific research questions were developed. These are as follows:

> RQ1) How are insect-based foods being integrated into established practices of food and eating in the Netherlands?
>
> RQ2) How does the integration of insect-based foods into eating practices relate to other aspects of food and eating?
>
> RQ3) If insect-based foods are not being integrated into eating practices, why not?
>
> RQ4) How have the insect-based foods currently available in the Netherlands been developed?
>
> RQ5) What implications do the supply-side aspects of insect-based foods have for their consumption?

Research overview

The research focused on two key areas: the consumption and production of insect-based foods. Conceptually and theoretically these areas were unified, as they are both relevant aspects of the notion of 'public acceptance' that was elaborated in Chapter 1. However they are discussed separately in this chapter, as they each involved distinct research designs and methodological choices.

Before explaining the research design and methodology of studying consumption and then of production, I provide an account of two **'scoping trips'** conducted in early 2015. These provided initial contacts and some early findings that helped to shape the developing research.

I next discuss the research conducted into the **consumption** of insect-based foods in the Netherlands. This research involved interviews, food diaries, and participatory methods – accompanied shopping, cooking and eating – with consumers of a range of insect-based convenience foods in the Netherlands. These consumers were recruited through in-pack flyers included in a range of foods sold throughout the Netherlands during two months in autumn 2015. This section of the chapter involves an explanation of the research design, sampling and recruitment procedure, and the use of a research assistant. It also discusses the theoretical and practical rationale for the methods used, as well as an explanation of how they were employed.

I then move on to a discussion of the research into the **production** of insect-based foods in the Netherlands. This research involved interviews with individuals broadly associated with the supply-side of insect-based foods in the Netherlands. It included people involved with academia, regulation, business and advocacy. This section of the chapter explores key areas of research design, sampling and recruitment, and methodology.

After the discussions of the key elements of consumption and production research, the chapter moves on to discuss several points of **general methodological salience** to the research as a whole. These are data analysis, research-in-translation (as the research was conducted in Dutch and English), researcher positionality, and ethics.

3.2 – SCOPING TRIPS AND RESEARCH DEVELOPMENT

Over the course of two 'scoping' trips to the Netherlands (March 8-11 2015; April 1-13 2015) the research design was developed. These trips had three main objectives. The first was to meet with people who were in some way involved in, or knowledgeable about, the development of insects as food in the Netherlands. To this end, I arranged meetings with seven individuals (listed in Table 1) in order to discuss the area more generally, and their involvement more specifically. These meetings were arranged with the help of an existing contact, and as a result of correspondence following the identification of relevant individuals through desk research.

Table 1 – Individuals involved with insects as food

Role	Involvement
Insect breeder	Producer of insect-breeding equipment and larvae for animal feed
Academic psychologist	Conducted research on supermarket consumers' willingness-to-eat insect-based convenience foods
Anthropologist	Conducted ethnography of a large research project on edible insects in the Netherlands
Category manager	Facilitated sale of a range of insect-based convenience foods in a Dutch national supermarket chain
PhD student	Researching consumer acceptance of insects as food (consumer psychology)
Food producer	Developed a range of insect-based food. Also heavily involved with Dutch and European-level trade organisations for the insect sector
Food science lecturer	Involved with student projects on growth of insects for human food applications

The second objective was to gain a better understanding of the extent to which insect-based foods were available and were being sold in the country. In order to achieve this I travelled around

to retailers I had identified through desk research, and spoke with staff or – where possible – store managers (see Table 2). I asked them about sales levels, who was buying the products, and whether these sales were one-offs or repeat consumption.

Table 2 – Retailers of insect-based food visited

Name	Location	Type
Jumbo	Hillegom, Groningen, Haren, Utrecht	Supermarket
Albert Heijn	Rijskwijk, Utrecht, Amsterdam	Supermarket
Spar	Rotterdam	Supermarket
Plus	Rotterdam, Deventer	Supermarket
Lazuur Food Community	Wageningen	Independent shop
De NooTzaak	Apeldoorn	Independent shop
Peek en van Beurden	Utrecht	Independent shop
HANOS	Amsterdam	Wholesaler
Princess Hotel	Loosdrecht	Hotel chain

The third objective was to gain a better understanding of Dutch eating practices in a more general sense, to provide a broader understanding in which to contextualise the more insect-specific data. To this end I met with a number of people who I had been put in contact with through friends and colleagues, some of whom were Dutch and some of whom were expats (from the UK, US and Singapore) living in the Netherlands.

The scoping trips shaped the development of the research. The most notable aspect of this was the finding that people were not buying insect-based foods in significant numbers, despite the relatively large amount of contemporary 'hype' around the subject (e.g. Smith and Pryor, 2014a, 2014b). One branch manager, for example, told me that the insect-based foods available in her store averaged about one sale a day. However, independent retailers did report a small number of repeat customers, who reportedly used freeze-dried whole insects as an equivalent to pine nuts in pasta. This raised the question of to what extent insects were becoming *routinely* consumed, as opposed to the prevailing one-off purchase.

These scoping trips provided useful information and contacts for the development of the two main strands of research, focusing on consumption and production respectively. I first discuss the consumption part of the research design and methodology, and then the production part.

3.3 – CONSUMPTION

This section of the chapter explains the research design and methodology used to investigate consumption of insect-based foods in the Netherlands (henceforth 'the consumption research'). It first discusses the research design and recruitment procedure, explained in a manner which is intended to reflect the iterative, unfolding nature of the research. The use of a research assistant is discussed, and the methodology is explained.

Research design

The consumption research was informed by theories of practice. This entailed a focus on *practices* as the central unit of analysis, and more specifically on the eating practices into which insect-based foods were or were not becoming routinely consumed.

The analytic focus on eating practices placed insect-based foods at the empirical centre of the research. Sites where insect-based foods were sold were used to identify a participant sample, and a recruitment strategy was developed, including participant remuneration. Appropriate methods were selected, and subsequently applied in two phases of research (see Table 3).

Phase 1 consisted of 40 interviews with consumers of a range of insect-based convenience foods. This provided the empirical basis of the research and guided the development of the further fieldwork.

Phase 2 consisted of follow-up interviews with 20 of the original participants, and food diaries with 17 of these 20 participants. With some of the 17 food diary participants I conducted accompanied shopping (12 participants), cooking (13 participants) and eating (10 participants).

Table 3: Overview of consumption research design

Method	Research phases	
	Phase 1	Phase 2
Interviews	40	-
Follow-up interviews	-	20
Food diaries & interviews	-	17
Shopping	-	12
Cooking	-	13
Eating	-	10

The following sections deal with the research design. Although the research design and thus the relevant aspects indicated above (e.g. sampling, recruitment, methods) were developed iteratively, they are discussed separately in the following sections to aid clarity. However, the interconnections between the categories will become evident.

The research 'unfolded', rather than being fully specified beforehand (Punch, 2013). For Miles et al. (2013), the relevant distinction is between 'tight' and 'loose' research, the former being pre-specified and the latter unfolding during the research process itself. Although their designation maps principally onto the quantitative/qualitative divide, it may fruitfully be applied to different varieties of qualitative enquiry. The notion that one's research focus may develop and change during qualitative investigation is an established one (e.g. Denzin and Lincoln, 2017), but in the present thesis the *design* of the research itself was as much a product of the affordances presented by the social context and research collaborators as it was my own efforts (cf. Finlay, 2002). Indeed in this respect the research process itself reflects some of the arguments presented in Chapter 5 regarding distributed agency in processes of innovation (cf. Drakopoulou Dodd and

Anderson, 2007; Latour, 1996). As with the entrepreneurs discussed by Garud et al. (2010), I was able to influence the course of events, but not completely determine it.

In order to reflect the 'unfolding' nature of the research, and to provide an adequate account of its development, it is necessary to explain the research design in a narrative fashion. The organisation of the following sections thus, to a large extent, reflects their chronological development during the research process. For the sake of clarity it has been necessary to simplify the complexity and messiness of this story somewhat by compartmentalising parts of it under thematic subheadings. I have attempted to retain a sense of its iterative character while presenting it in a comprehensible fashion.

The consumption research began with a consideration of how to *access* participants. Consumers of insect-based foods are a small minority in Europe, which was also the case when the research was planned during 2015. Initial efforts to identify Dutch insect consumers via message boards and Twitter were relatively unsuccessful: it was only with the scoping trips in early 2015 that an opportunity presented itself to identify a participant sample. My account of the research design begins with my efforts to identify, and subsequently recruit, a group of research participants.

Sampling

Taking consumption of insect-based foods as the empirical focus, and duly 'sensitised' to the theoretical relevance of eating practices in a general sense (Shove, 2017), insect-based foods themselves were identified as an 'entry point' to the development of a participant sample. I decided to focus on sites where insect-based food were sold, as this appeared to be the most effective way to access people who had voluntarily consumed them in a 'real life' context. This approach was congruent with established principles of qualitative enquiry, such as Luborsky and Rubinstein's (1995) notion of 'qualitative clarity', involving both a strong theoretical grounding and a sensitivity to context.

An important consideration is that the research population was identified in relation to the theoretical and epistemological considerations highlighted in Chapters 1 and 2: that is, it was not a general and/or representative sample that was necessary, but rather a deep understanding of a minority practice embedded in social context. The identification of a research population and sampling method was consonant with other forms of situated, qualitative enquiry, whose aim is to generate understanding of a particular social phenomenon rather than the discovery of generalizable laws (Williams, 2002).

During my scoping trips to the Netherlands I identified two small deli-type stores where insect products were being sold (both sold whole, freeze-dried insects; one also sold products such as lollipops and fudge containing insects). Upon returning for the main fieldwork trip I attempted to organise research in these stores, asking the proprietors if I may be able to prepare recruitment flyers to leave by the insect products and suggesting I remunerated participants with store vouchers. One proprietor was enthusiastic about the idea, the other much less so. In any case, I subsequently arranged a much broader sampling method, so these initial leads were not followed.

During the scoping trips I had also made contact with a category manager at the Jumbo supermarket chain (who began selling a range of insect-based convenience foods in October 2014), whom I had interviewed for some early contextual information. During our first meeting the manager had provisionally agreed that I could conduct some consumer research in a limited number of Jumbo stores, and was generally very positive about co-operating with the 'science' around public acceptance of insects as food. The next stage was to develop a method of

participant recruitment. Although it was agreed that I would be able to conduct research in Jumbo stores, the manner in which this was to be conducted, and how participants were to be recruited, were not determined at the outset. Thus we entered into correspondence about how this might work.

Participant recruitment

Following email correspondence (between the last scoping trip and the beginning of fieldwork 'proper'), the provisional arrangement was that I would be able to recruit participants from three stores, aiming for a total of around 30 participants as an initial interview sample. During our correspondence I had suggested the following possible approaches:

1) Insertion of small flyers (business card or small postcard size) into the cardboard sleeve of insect-based foods sold, so that they were not visible during the initial purchase but easily visible when the food was unpacked.
2) Positioning a container of flyers by the insect-based foods, or near the checkouts. Some other form of display or poster elsewhere could possibly be developed.
3) Stationing a researcher near insect-based foods in order to speak directly with purchasers.
4) Asking cashiers to give flyers to customers purchasing insect-based foods.
5) A combination of these methods.

My contact had expressed a preference for options 2, 3 and 5, on the grounds that "[t]his way it is easy for a store to cooperate with you AND we don't scare the customer at home when he opens the package." (Anon, pers. comm., 15th July 2015). However, following my arrival in the Netherlands, we met at the headquarters of Jumbo to discuss the research further. I explained the planned methodology which, based on our correspondence until that point, would have involved the placing of recruitment flyers in 3-5 target stores and my personal presence in those stores on a rotational basis. I explained that inserting small recruitment cards into the cardboard sleeves of packs of Insecta products (see Box 1) in key stores would be preferable, because it would reduce the likelihood that people bought the products in order to be able to take part in the (remunerated) research, rather than as a result of having 'naturally' purchased the products.

> *Box 1: Insecta*
>
> Insecta was a range of insect-based convenience foods produced by the Belgian functional food company Damhert Nutrition. The range included burgers, nuggets, schnitzel, a meatball-style product, and *pittige punten* ('spicy points', a product similar in appearance to hash browns). The products were similar to vegetarian convenience foods in appearance, taste and mode of cooking; the crucial difference is that they contained 13-15% ground-up buffalo worms or mealworms. The range was introduced in October 2014, and sold in Jumbo stores throughout the Netherlands during 2015. At the time of writing, only the burger product remains in production. The development of the Insecta products forms part of the analysis in Chapter 5.

My contact explained that to obtain a suitable number of participants using that approach was likely to take a long time, given that the sales of Insecta were low. Instead, they suggested, it might be better to ask the manufacturer of the foods to insert recruitment cards into packs of the foods during the production process. Naturally, I agreed; Damhert, the manufacturer, also consented, and we arranged that recruitment cards would be added to all packs of Insecta sold

in branches of Jumbo during September and October 2015. Due to an exclusivity deal between the two companies, this meant that recruitment cards were added to all packs of Insecta sold in the Netherlands during that period.

Recruitment procedure

An important initial methodological issue was the remuneration of participants. Mindful of the low sales figures of the products, a relatively high interview payment was judged necessary. The figure settled on was €20, which was judged to be high enough to encourage responses without being coercive (Head, 2009). Another important consideration was the research budget, which was sufficient to cover the cost of 40 interviews at €20 each and interviewer travel (via public transport) to the interview sites (cf. Head, 2009).

Having established suitable participant payments, the next stage of the research was to develop recruitment materials. Damhert requested that I supply them with a template for the recruitment cards. I prepared text for the cards and received help translating it into Dutch from colleagues at Utrecht University, where I was based as a visiting researcher.[24] I also enlisted the help of a friend in designing the cards, which, it transpired, were somewhat unsatisfactory. Damhert redesigned the cards for me (Figure 1) and agreed to print them.

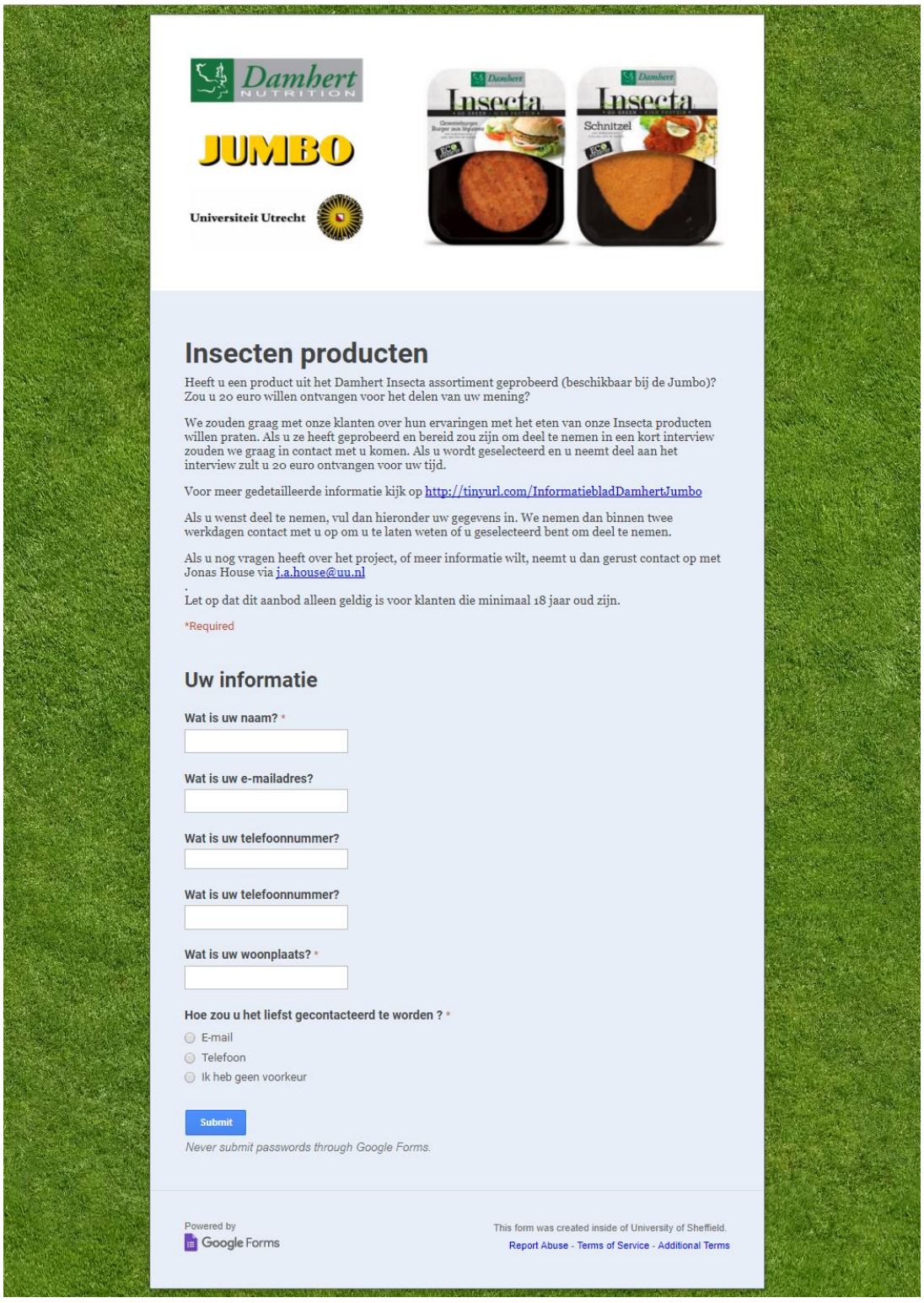
Figure 1 – Recruitment cards

I also prepared other research materials. One of these was a recruitment website, which I designed in English and then had help translating into Dutch from colleagues (Figure 2). As the URL for this page was rather long,[25] I used an online service called TinyURL in order to obtain a shortened version (http://tinyurl.com/DamhertJumbo) which would fit easily on to the recruitment cards. I also produced a QR code that redirected to the recruitment website, which was included on the recruitment cards as well.

[24] The participation of Jumbo was predicated on the involvement of Utrecht University in the research. Academics from Utrecht had previously conducted in-store research into consumer acceptance of insect-based foods for Jumbo, and my contact was keen for them to be involved again. I conducted the first phase of fieldwork under the auspices of an Overseas Institutional Visit to Utrecht University, where I was based in the Department of Clinical and Health Psychology.

[25] The original URL was https://docs.google.com/a/sheffield.ac.uk/forms/d/e/1FAIpQLSe8b1Dk2MzfGwe-LIq3kBqLa_DbDGvbtxq-z10ozmtYs6DAzw/viewform.

Figure 2 – Recruitment website



I also created an information sheet for prospective research participants, which was translated into Dutch by my research assistant (discussed further below). I created a PDF version of this, which I linked to through the recruitment website using a shortened URL (http://tinyurl.com/InformatiebladDamhertJumbo). Copies of this information sheet in both English and Dutch can be found in Appendix 1 and 3.

The recruitment website invited interested parties to leave their details, which were collected in a password-protected Google Docs file. The recruitment website did not guarantee that the leaving of details would result in an interview, due to the possibility of a high response rate. As it turned out, there were only 61 responses in total: thus, everyone who left details was contacted. Although recruitment cards were only added to packs during September and October 2015, responses continued into November.[26]

People registering their interest were contacted via email in Dutch. The email asked them if they would be happy to be interviewed, if they could suggest some possible dates and a suitable location, and if they would be comfortable being interviewed in English. If they responded that English was acceptable, I arranged to meet them. If they indicated that they would prefer Dutch, I passed their details on to my research assistant. Details of how the interviews proceeded are provided in the Methods section below.

The in-pack card method of recruitment offered an effective means of targeting a specific group of participants, i.e. people who had voluntarily purchased insect-based foods during the course of their daily lives. Although other studies have used recruitment cards to access specific hard-to-reach populations, either distributing them in key locations (e.g. Miller et al., 2014) or via previous participants (e.g. Jabs et al., 2000), I have been unable to find accounts of the in-pack recruitment method being used for academic food research.

Part of the reason for this may be the relative invasiveness and practical difficulty of the method, and corresponding lack of willingness on the part of retailers. The complexities and compromises inherent in academic-commercial collaboration and 'corporate ethnography' more broadly have elsewhere been well-documented (e.g. Cefkin, 2009; Jackson, 2015b). Yet I would suggest, in cases where it may be practically achievable, the method represents a valuable addition to the methodological resources of scholarly consumption research. It indicates an avenue for mutually beneficial academic-commercial collaboration (e.g. Evans, 2015) that may offer access to important data that would otherwise be unavailable (e.g. Truninger, 2015). An informal conversation with an individual involved in the production of insect-based food outside the Netherlands told me that they were planning research based on a similar approach to mine. Thus, in situations where a producer is particularly interested in the results of research, the method may be practically achievable: bearing in mind, of course, the tensions inherent in the 'power-geometry' of academic-commercial collaboration (Jackson, 2015c; see also Fisher, 2011).

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[26] The low response rate is likely to have influenced the research. The area in which this was most apparent was participants' generally high interest in environmental issues, food and eating, and the subject of insects as food: evidently, participants 'self-selected' in this respect. Only one participant, an undergraduate student, did not seem to have any particular interest in the research itself (indeed, he admitted that he regarded participation as a relatively easy way to make €20). Whereas the relative homogeneity of participants may have represented a problem in research of a different orientation – for example, investigating socio-demographic differences in attitudes towards entomophagy – I would argue that the present focus on eating practices helped to mitigate such difficulties. While interest in alternative proteins helped to prompt initial consumption of insect-based foods (e.g. Chapter 6), the integration of such foods into established eating practices was ultimately shaped by a range of social, practical and contextual factors which evidently apply to food consumption in a more general sense (e.g. Chapter 8). Thus, while the participants in this study are in one sense highly atypical (representing a minority of consumers interested in eating insect-based foods), in another sense (e.g. the social and practical constitution of eating) they provide good insight into more general considerations affecting the integration of novel foods into established diets.

Nevertheless, in the case of my research, it should be emphasised that the relative ease with which the recruitment method was approved and conducted was likely to be due to a confluence of propitious circumstances (cf. Truninger, 2015). Both participating companies were not making money on the products, which were argued to be helping to normalise the idea of insect-based food in a general sense (e.g. KRO-NCRV, 2016). It is possible, I would suggest, that they also operated as a means of establishing the 'green worth' of the companies (Thévenot et al., 2000; although see Truninger, 2015). In either case, there was arguably relatively little to lose by participating.

My positionality as a social science researcher may have helped matters further (cf. Truninger, 2015). Early-stage emails I was copied into between the two companies discussed the fact that I had "received funding from the English government" (30 July 2015, my translation), a framing which conceivably added a gloss of official credibility to my ESRC-funded project (cf. Jackson, 2015c). I was also, of course, simply in the right place at the right time: the period of fieldwork coincided with the widespread availability of insect-based foods in Dutch supermarkets during 2015. By early 2016, the products were sold in a reduced number of stores, which fortuitously enabled investigation of the extent to which participants were making a special effort to acquire them. By late 2017, the products had ceased to be sold. The precise date at which the products were removed from sale is unclear; the point remains that had I begun research even a year later, it is likely to have been significantly less successful in methodological terms.

Although the timing of my research was not completely accidental – being initially sparked, as with much other interest in the subject of entomophagy by the FAO report discussed earlier (van Huis et al., 2013) – the role of chance in the success of the research was a substantial one. In this way it reflects other geographic food research, in which access to key participants was also in large part a matter of chance (Hughes, 1999). Although for Fine and Deegan (1996: 3) the idea that chance plays a role in research is a "banal and well-recognized proposition", it remains that this thesis could quite easily have been substantially less successful.

Research assistance

I was awarded sufficient fieldwork funding to hire a research assistant for the duration of the first phase of fieldwork. The research assistant, Jantine van Soolingen, was a Dutch MSc student at Utrecht University. She helped with the translation of research materials, and arranged and conducted 10 of the 40 interviews during this phase of fieldwork. She transcribed the interviews in both Dutch and English. I discuss the practical and epistemological implications of research-in-translation in a dedicated section below (Section 3.6). First, however, I discuss the choice of research methods in more depth.

Methods

As noted above, the theoretical basis of the consumption research was theories of practice. This helped to define the focus of study – i.e. eating practices – but did not automatically entail the use of particular research methods. Indeed, Shove (2017: n.p.) argues that "practice theory methodologies do not exist". Instead, she suggests, theories of practice 'sensitise' one to particular aspects of social practice, whose mode of investigation should then be considered in relation to the objectives of the research: as, indeed, is the case with social research more generally. As Shove (2017: n.p.) argues,

> The choice of methods depends on which of these questions you want to take up and pursue. Using practice theory is thus not directly tied to certain methods, but

> the choice of methods is – as always – dependent upon your specific research question.

In accordance with these arguments, the choice of methods in the consumption research was developed in relation to the specific questions the thesis sought to answer. The initial stage of research sought to understand how Insecta products were 'fitting' with established eating practices. Following general practice-theoretic accounts of the social (Schatzki, 2002; Shove et al., 2012), the research sought to account for how relevant practices were established, maintained, interdepended and changed. Elaborations of how practice theory may inform consumption research were also drawn upon: in particular, Halkier and Jensen's (2011: 102) assessment that "practice theory enables us to understand consumption as on-going accomplishments that are situated in intersectings [*sic*] of multiple practices and social relations in everyday life" (see also Halkier et al., 2011), as well as Warde's (2005: 137) argument that consumption is "a moment in almost every practice".

Further oriented by practice-theoretic work on food and eating more specifically, the research was 'sensitised' to investigate a number of key areas. These included the various stages of eating vis-à-vis practices: for example, how food was planned and shopped for; prepared, consumed; stored; and (to a lesser extent) disposed of (e.g. Evans, 2012; Halkier and Jensen, 2011; Meah and Watson, 2013). Other key thematic areas identified were the material and social dimensions of food and eating (e.g. Warde, 2016), and the ways in which routines were achieved (e.g. Wahlen, 2011).

Particular attention was also paid to the 'web' or 'mesh' of interdependent practices which constitute eating (e.g. Warde, 2016). The research sought to account for food provisioning and consumption practices, as well as those with a less direct relation to eating: for example, work, childcare and leisure practices (e.g. Delormier et al., 2009; Molander, 2011). It was also oriented to what participants had actually *done*, rather than what they *thought* or *said* about the subject of insects as food in general. Other than attention to these areas, the research was also intended to be largely 'open'; given that there was no existing research in the specific area, the initial stage of research was to be inductive in orientation, allowing key themes to 'emerge' from the data (e.g. Bryman and Burgess, 1994). Processes of coding and data analysis, which were in keeping with this approach, are discussed in greater depth in later sections in this chapter; at present, the discussion remains focused on the research methods used.

The method selected for the initial stage of the research was qualitative interviews. This method was considered the most appropriate way to balance the theoretical demands of the practice approach – in which an emphasis is placed on practical activity, i.e. what people actually do – with the practical constraints of the context of data collection. The following section explains this methodological choice.

Phase 1

Interviews

Choice of method

Debates around the most appropriate methods for research into mundane practices, such as those associated with eating, exhibit some disagreement as to whether 'traditional' research methods – such as qualitative interviews – can provide adequate accounts of what is often largely unreflexive, habitual activity. For example, Hitchings (2012: 61) argues that "people can talk about their practices", whereas for Martens (2012) the use of visual methods shows a disjuncture between the lived reality of practices and the subsequent spoken accounts people make of them.

This methodological debate informs the present research, and was a guiding principle in the decision to use visual and participatory methods in the later stages of data collection, in the context of which it is discussed in more depth below. However, the practical constraints of the first stage of research obviated immediate use of such methods.

Although the in-pack recruitment approach provided excellent access to the specific population under study, this stage of research nevertheless entailed some practical constraints regarding the methods employed. Given the low sales figures for the products, and thus a substantial degree of uncertainty regarding the response rate, it seemed most appropriate to employ methods that potential participants would not consider to be off-puttingly intrusive. Interviewing offered the best method in this respect. It enabled a compromise between the practical need for a 'standard' research technique and the theoretical need to account for the practice-based aspects of social life under investigation.

Design and conducting of interviews

During the first phase of research, 40 interviews with consumers of Insecta were conducted. These were geographically dispersed around the Netherlands (see Figure 3). Due to the theoretical orientation towards the constitution of eating practices – rather than sociodemographic variables – the relative geographic location of participants was not accounted for within the analysis. However the more specific physical and social geographies evident within participants' accounts (e.g. proximity of homes to shops, influence of domestic and work routines, relationships with other people) were central to the analysis.

Figure 3 – Geographic location of interview participants [27]

[27] Thanks to Nora Blomaard for making this map.

The interviews were semi-structured, seeking to investigate a number of areas that had been identified as theoretically and substantively salient while allowing findings to 'emerge' from the discussion. The interview schedule was derived from literature reviewing on key substantive areas – consumption of insects and the geography, sociology and psychology of food – as well as theoretical literature on eating as a social practice or otherwise socially and geographically embedded (see above; also Chapters 1 and 2).

Interviews were conducted in a location of participants' own choosing, typically cafés and restaurants. A small number of interviews were conducted in participants' homes. Interviews were audio recorded and transcribed. Dutch-language interviews were first transcribed in Dutch and then translated into English. (Epistemological considerations regarding this point are discussed in Section 3.6 of this chapter.) Participants gave informed consent prior to interviews (consent forms are provided in Appendix 2 and 4).

Discussion of interviews as a research method

The use of interviews for the first phase of research necessarily involved some trade-offs. As noted above, there is debate within the literature on methodology and practice theory regarding the extent to which people are able to provide spoken accounts of practices they have engaged in. Considerations of the utility of interview methods are not, however, confined to practice-theoretic research. In a discussion of interview methods more generally, Jerolmack and Khan (2014) caution against the 'attitudinal fallacy' – "the error of inferring situated behaviour from verbal accounts" (2014: 179) – arguing that verbal accounts "cannot be taken as proxies for action without positive evidence of their predictive capacity" (2014: 180).

Further, interviews do not represent a means of direct access to an underlying social reality; rather, they provide accounts or representations of reality (Talmy, 2011). Interview data are *co-produced* between researcher and participant: they are always intersubjective (Kvale, 1996). Similar points have been highlighted in the literature on methods and theories of practice, in which a case is made for non-verbal methodologies that can overcome the 'attitudinal fallacy' (e.g. Martens, 2012; Pink, 2012). While the use of interview data to investigate social practices is thus not a perfect methodology, it can be justified along four main lines.

Firstly, the epistemological caveats relating to the use of interviews highlighted above do not represent a terminal weakness of qualitative enquiry. Indeed, as Rubin and Rubin (1995: 39) note, "[k]nowledge in qualitative interviewing is situational and conditional". This aspect, and the inherent partiality it entails, should be highlighted by researchers (Jerolmack and Khan, 2014). Doing so does not of course completely mitigate any potential problems, but it helps to enhance the validity of the research, enabling readers to understand and evaluate the research process (Shenton, 2004).

Secondly, the use of interviews represented – as noted above – the best way of balancing the competing demands of what was practically feasible and theoretically desirable.

Thirdly, the research was among the first in the substantive area to investigate what people had actually done, rather than what they thought they might do in future. As such it represented a significant epistemological break with existing work in the area, and – to the best of my knowledge – was the first in which a 'real life' population of insect-based food consumers was studied in Europe. Thus although there are epistemological drawbacks in analysing verbal accounts of past behaviour, such accounts are arguably a closer reflection of key aspects of public acceptance of insects as food than analyses of (for example) hypothetical behaviour.

Finally, and in line with the methodological debates discussed above, the further elements of the research (follow-up interviews, food diaries and accompanied shopping and cooking) sought greater insight into what participants were actually doing, by using different methods to approach an account of social practices 'in action'. These other methods are discussed in the section below, which begins with a discussion of the follow-up interviews which formed the basis of the second phase of research.

Phase 2

Following the initial phase of research, in which 40 consumers of insect-based foods were interviewed, a second phase of research was conducted. This phase drew on other practice-theoretic food research, adopting a 'toolkit' of methods to investigate domestic food practices (Evans, 2012; Meah and Watson, 2013) as a means of understanding the necessarily 'multi-sited' nature of food provisioning and consumption (Marcus, 1995; Warde, 2016). This phase included follow-up interviews, food diaries of 7-14 days, food diary interviews, and accompanied shopping trips, cooking and eating. Participants were asked to give consent before each interview / accompanied trip (see Appendix 2 and 4). The rationale for this second stage of research was threefold.

Firstly, there was a practical rationale. Further research enabled a longer-term view of the subject, and in particular cast light on the extent to which insect-based foods were still being eaten after the initial purchase which had led many participants to being interviewed. As Warde (2016) notes, sustained engagement with the routine nature of food practices in social research is still relatively rare; thus an opportunity to address this point during a study of novel foods was decided to be potentially fruitful. Studies which have taken a longer-term view of domestic food practices have indeed provided useful insight into how eating 'works' (e.g. Evans, 2012).

Secondly, there was a methodological rationale. In order to 'thicken' the accounts and thus to bolster the 'trustworthiness' of the research, the accretion of data was important (e.g. Lincoln and Guba, 1985; see also Denzin and Lincoln, 2017). Further data collection also enabled the fourfold means of triangulation proposed by O'Connell (2013), for whom a mixed methodology involving visual methods can "*confirm*, *complement*, *elaborate* and *contradict* data generated through other methods" (2013: 36, original emphasis).

Thirdly – and drawing on both of the above points – was a theoretical rationale. The focus on practices, as indicated above, meant that data which got as close to 'actual' practices as possible was desirable. This point in particular is discussed in more depth below, in relation to the particular methods employed during the second phase of research.

Clearly each of these points is related. The use of food diaries, for example, offered a means of 'serial engagement' with participants (Hitchings, 2012), which had a practical dimension (regarding the routine performance of practices), a methodological dimension (offering prolonged contact and deeper insight than one-off contact, as well as time for reflection) and a theoretical dimension (attempting to record practices as they unfolded in 'real time').

This section explains the research design and methodology of this phase of research, addressing each of the methods in turn and discussing key research and debates in relation to them. I begin with a discussion of the follow-up interviews, which followed on from the interviews conducted in Phase 1.

Follow-up interviews

Six months after the first phase of interviews, participants were contacted to enquire if they would be willing to take part in a follow-up interview. For practical reasons (time and cost), it was necessary to conduct the second stage of research with a smaller group of participants than the initial 40. After considering what would be the highest number that was practically feasible, a number of 20 was decided upon. This was considered a good balance between practical and methodological considerations: high enough to reach a reasonably comprehensive account of the phenomenon under study, but low enough to remain within the project funding. Payment for follow-up interviews was also set at €20.

Identification of participants was initially based upon academic judgement. Having identified differences among participants during the first stage of research – for example, regarding frequency of insect-based food consumption or ethical dietary orientations (see Chapter 6) – I attempted to achieve a good 'spread' of participants. Participants were invited in three waves, in May, June and July 2016. Not all participants responded or agreed to further research. In total, 25 people were asked, based on the judgement that they represented a potentially diverse group of participants. From the 25 people asked, the target of 20 was reached.

Attempting to define a necessary quantity of interviews in advance is potentially problematic. Indeed, figures arrived at which are not sensitive to the epistemological and methodological context of a study are likely to be somewhat arbitrary (Baker and Edwards, 2012). The most 'accurate' answer to the question "how many interviews is enough?" is likely, as Baker and Edwards (2012: 3) observe, to be "it depends". The present research sought the highest number of research participants (not just for follow-up interviews, but for subsequent research activities) that was practically achievable. The number arrived at, 20, was not a priori determined as 'enough'; rather, attention was paid to the extent to which 'saturation' had been achieved (Fusch and Ness, 2015). As it happened, after only around 8-10 participants some clear themes began to coalesce (see Section 3.5 on data analysis). This is a likely consequence of the fact that, despite superficial differences, the 'mechanics' of eating practices evident across participant accounts (in practice-theoretic terms) demonstrated a substantial degree of coherence. Indeed, it is precisely this more abstracted level of analysis that the research sought, and which finds perhaps its clearest expression in the present thesis in Chapter 8.

The follow-up interviews were similar in format to the first phase of interviews. They took place in a location of the participant's choosing and followed a similar semi-structured procedure, after which participants received a further payment of €20. One of the main differences between first and second interviews was that by the time of the second interviews I had much more clearly developed lines of enquiry. At the time the second interviews began, I was preparing Chapter 6 for publication. Thus I was able to target questioning in more depth at areas that were potentially analytically useful. In general, this meant omitting some of the speculative lines of enquiry that had been present in the first phase of interviewing (for example, around food that participants found unusual or disgusting), and a deeper engagement with the practical aspects of food practices (such as where people did their shopping, when, and how often).

Another key difference between the first and second interviews was that I was able to question participants about continuity and change in their consumption of insect-based products (and indeed, other aspects of their diets). This provided an immediate opportunity to compare data across time, to elaborate on previous discussions, and to clarify points. It also enabled the alignment of the subsequent parts of the research (diaries, accompanied

shopping/cooking/eating) to the current circumstances of participants – for example, notable changes in eating practices between first and second encounters could be further explored.

The follow-up interviews also served as a means of recruitment to the more in-depth, participatory parts of the research. It is perhaps unlikely that an email received 6-12 months after an interview, requesting participation in a two week food diary and kitchen-based interview, would be warmly received. The follow-up interview aided the establishment of rapport, and enabled me to explain the subsequent research, responding to any queries or concerns in 'real time'. It also, of course, could be seen in more negative terms, as making it harder for potential participants to say no (cf. Kvale, 2006). The power asymmetries inherent in social research are discussed in more depth in the section on researcher positionality below (Section 3.7).

During the follow-up interviews, the remaining planned research was introduced to participants. However, they were only asked if they would be willing to participate in a food diary, of between one and two weeks. The food diaries were in many respects the core of the second phase of fieldwork, and provided greater insight into participants' eating practices than expected. The following section discusses the food diaries in more depth, indicating why they were selected as a method and how they were designed.

Food diaries

Participants were asked to keep a food diary of between one and two weeks in length, in which they recorded their cooking and eating of main meals as well as their shopping. This section explains the design of the food diaries, and details the practical, methodological and theoretical rationale for their use in the present research.

The diary method

During the first round of interviews I found that participants had difficulty remembering what they had eaten over the last week. This phenomenon has been noted in the literature on the sociology of food consumption (Bennett et al., 2009; Warde, 2016) as well as in other cultural geographic research (Latham, 2003). These apparent problems with participant recall both support the central tenets of practice-based theorising and suggest an alternative methodology is necessary.

In seeking to investigate the "routine, noncognitive, embodied aspects" of the sociality of public spaces, Latham (2003: 2001) employed participant diaries in an effort to overcome the above methodological difficulties. He argues that when used in combination with established research forms such as the qualitative interview, diaries and photographs can "present the researcher with an interrelated mosaic of interpretive snapshots and vignettes of a particular social space and set of social practices *in the making*" (2003: 2005, original emphasis). Diaries do not serve as a proxy ethnographer but rather function as a performance of sorts (Latham, 2003). Nevertheless, when used as part of a quasi-ethnographic toolkit, diaries evidently provide a good deal of insight into the constitution of domestic food practices (Evans, 2012). A similar point is made by Pink (2012) in relation to the benefits of participatory or visual methods. Thus, it was decided to incorporate diaries into the present study. The design of the food diaries was shaped by debates around visual methodologies from within geography and cognate areas.

Visual methods

Following the 'turns' towards practice and embodiment within the social sciences over the last twenty years or so, a critique of the 'canonical' methods of interpretive social science has developed, and interest in methodological approaches with a visual element has grown (e.g.

Heath et al., 2010; Martens et al., 2014; Pink, 2012) as scholars question the applicability of established methods to work that proceeds from new theoretical approaches.

In human geography in particular the development of significant strands of work which question representation (Lorimer, 2005, 2008; Thrift, 2008) and seek to foreground the role of the more-than-human (Braun, 2005; Whatmore, 2002) has thrown into question the validity of methodological staples such as the qualitative interview and participant observation, leading Lorimer (2010: 238) to identify "a frequently diagnosed need for methodological innovation and experimentation". Visual methods such as photos and videos have been proposed as a means of overcoming difficulties posed by the disjuncture between theory and research practice in these areas (Lorimer, 2010; Pink, 2012; Simpson, 2011). Work with a practice-theoretic orientation is increasingly employing visual methods (Hindmarsh and Tutt, 2012), particularly in relation to domestic food or kitchen practices (Martens, 2012; Meah and Watson, 2013). However, 'traditional' methods have their defenders within practice theory, who maintain that established methods are perfectly adequate for the investigation of social practice (Hitchings, 2012).

Part of the exploration of non-traditional research methods in recent years has been the use of photographs in research, both as a form of data (O'Connell, 2013; Power, 2003) and a means of data collection by way of 'photo elicitation' (Harper, 2002; O'Connell, 2013; Sweetman, 2009). General methodological points in favour of the use of photographs include their provision of greater or additional insight beyond interview methods (Harper, 2002; Heath and Cleaver, 2004; O'Connell, 2013; Power, 2003; Sharma and Chapman, 2011; Sweetman, 2009), enabling participants to articulate things that may be more difficult via language-centric methods (Power, 2003; Sweetman, 2009), putting respondents at ease and making them feel more comfortable about explaining familiar subjects (Power, 2003), and the development of increased understanding (Harper, 2002; Heath and Cleaver, 2004) or familiarity (O'Connell, 2013) between researcher and participant.

Use of visual methods can thus 'de-centre' the researcher and foreground the experience of participants (Power, 2003; Sharma and Chapman, 2011): indeed, in Heath and Cleaver's (2004) study, participant photography enabled the identification of things in participants' homes which the researchers had initially noticed but misinterpreted.

The positive aspects of involving participants in the research by asking them to take photographs themselves have also been noted. O'Connell (2013: 36) argues that participant photography offered her respondents "an observer research role in contexts not accessible to researchers". This point is particularly salient for work grounded in practice theory, in which the commonplace or mundane is the explicit object of study. Indeed, Sweetman (2009) explicitly argues for the applicability of visual methods to Bourdieu-inspired social research which foregrounds embodied dispositions and seeks to provide insight into the 'mundane and taken-for granted'. Harper (2002) argues that photos can 'break the frame' of participants' daily lives, leading them to question and elaborate on their own taken-for-granted experiences and phenomenological assumptions. Drawing on these arguments, the decision was made to base the food diaries on photography, rather than written accounts.

Design of the food diaries

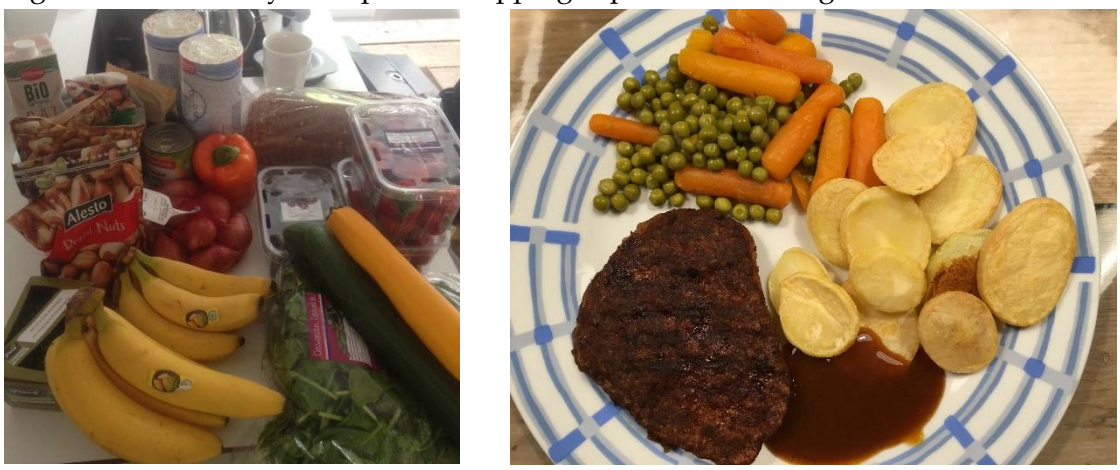
A period of two weeks was decided on for the diary research. This was for practical and theoretical reasons. Elsewhere, 7-14 days has been identified as the optimum period for participant research diaries, being neither too short to achieve analytic insight nor too long to induce participant fatigue and irritation (Jacelon and Imperio, 2005). In the present research,

two weeks was considered to be the most appropriate length. Comparison of two weeks was long enough to illuminate constancy and variation between weekly routines – for example, including two weekly shops, or a succession of smaller provisioning trips – while not being long enough to dissuade participants. It was important to investigate the repetitive nature of eating practices, which Warde (2016) suggests have heretofore been relatively under-researched. For participation in the diary and a subsequent interview (detailed below), participants were paid €30.

Participants were asked to record main meals (both the cooking process and the finished article), as well as any shopping conducted during the research period. These three foci were broadly intended to address shopping, cooking and eating. They were derived from theoretical considerations (discussed above) and the first stage of research, in which it was overwhelmingly the main, cooked daily meal that Insecta products had been consumed as part of. These meals were in most cases the evening meal, although I explained to participants that if this meal took place at another time (e.g. the afternoon) then that was the relevant meal to be studied. One participant had consumed Insecta both during her evening meal and as part of her lunch, so I asked her to record both.

The method of recording was photographs. This choice was oriented to the methodological debates discussed above, but was also informed by practical considerations. During 2016, smartphone ownership in the Netherlands was estimated at 87% (Deloitte, 2016), suggesting that the majority of participants would be effectively carrying a camera around and thus find it relatively easy to take pictures. It transpired that all but one participant had a smartphone they could use for the purpose. The other participant used their digital camera. Some examples of the food diary material are provided in Figure 4.

Figure 4 – Food diary examples: a shopping trip and an evening meal



A participant guidance sheet was prepared (see Appendix 5), detailing basic instructions for the diaries. This was deliberately kept quite simple. The rationale was to allow participants a degree of flexibility in interpreting the instructions, while ensuring the resulting data were broadly comparable. The guidance sheets explained the focus on shopping, cooking and eating, in order to direct photography to relevant areas. As Harper (2002) notes, photographs as a means of elicitation do not automatically result in useful interviews – they have to be of things that provoke relevant discussion.

Ultimately 17 food diaries were completed. Seven of these participants actually kept diaries for longer (between 15 and 26 days). Two participants completed only 12 days, and one participant

completed only 10, but these were nevertheless included in the analysis as they still provided a good level of insight into participants' eating practices. Of the 20 people who agreed to take part in the food diary research, three began the diary but did not keep a regular record, only making a handful of photos in a two week period. These participants were excluded from the analysis, as it was difficult to use these diaries as a means of examining routine food practices.

Following the completion of the food diaries, participants were interviewed again. These interviews took place in or around their kitchens, and involved systematically talking through each day's pictures. While 'solicited diaries' have been employed in some quarters as a means of enabling participants to reflect on their experiences and activities (Järvelä et al., 2006), in the present research their use was not principally motivated by reflective discourse, or by attitudes or values (Jacelon and Imperio, 2005). Instead, the diaries were principally used as a means of tracing the practical reality of mundane behaviour. However, as with other diary-based studies of routine practices, they also enabled a degree of reflection in the subsequent diary interview, which was taken into account in the analysis (Jackson et al., 2006). The food diary interviews are explained in the following section.

Food diary interviews

The food diary interviews were intended to provide elaboration of the data gathered during the diaries, which in themselves offered a partial record of participants' eating practices during the period studied. To be sure, subsequent verbal elaborations of the diaries did not 'complete' the data. Yet they did provide an opportunity to investigate how the visual evidence 'hung together', and acted as a means of elicitation.

The focus of the food diary interviews was on central aspects of eating practices, identified during the first phase of research and by considering other work in the field (as discussed above). The interviews proceeded day by day, and focused broadly on the key areas of acquisition, preparation, consumption, and if relevant, storage and disposal.[28] The discussions were deliberately relatively broad, following theoretical 'sensitisation' to the complexity and contingency of eating practices.

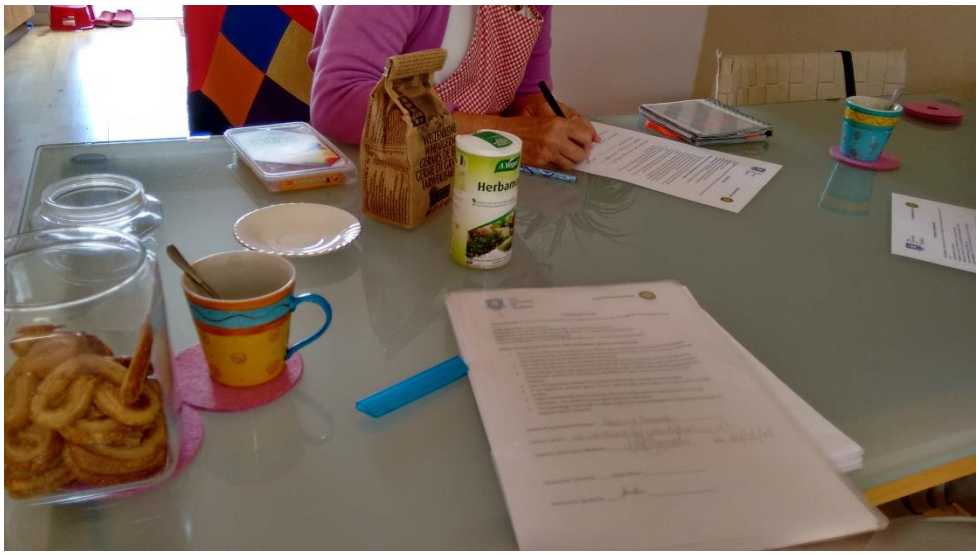
Interviews proceeded chronologically through the photographs. I would ask questions about each based on the key areas, but also follow any lines of enquiry that arose during the discussion. Typically, the first five or so photographs would generate lengthy discussion, but the interviews would proceed more quickly as we progressed through the images. Routine aspects of eating practices (which pertained to a substantial proportion of the diary material) meant that by later images, responses often indicated that the circumstances were 'the same as before'.

The food diary interviews took place largely in and around participants' kitchens (see Figure 5). In cases where participants' kitchens were too small to sit and talk in, we sat somewhere nearby. The focus on kitchens was a deliberate choice, derived in part from theoretical considerations about the contextual nature of practices (e.g. Pink, 2012) and in part from the first phase of research, in which interviews in participants' homes had often involved relevant foodstuffs or kitchen equipment being shown to me unprompted. Participants were not obliged to meet me in

[28] The interviews provided a significant amount of data on the storage and re-use of ingredients, and the consumption of ingredients and meals over several days. This focus 'emerged' from the discussions as fairly central to domestic food practices. As it transpired, this was not ultimately of central analytic relevance to the research questions. Nevertheless, I would argue that the generation of these data attests to the 'openness' of the research process, in which avenues of potential relevance were not left unexplored just because they did not appear to relate closely with the central topic of investigation.

or around their kitchens; I suggested it would be helpful for the research, but that they were free to meet me elsewhere if preferred. Ultimately all but one of the food diary interviews took place in proximity to participants' kitchens. In this one case – where the interview took place at the participant's workplace – I later visited their house to shop and cook, so was nevertheless able to gain some insight into their situated food practices.

Figure 5 – Interviewing in the kitchen



The food diary interviews were useful in a number of respects. They provided elaboration on the diary data, and operated as a means of gathering extra data – in particular, where particular products had come from, and what the social circumstances were of each meal.

They offered a 'jumping off' point for further discussion about aspects of participants' eating practices in a general sense, which may not have been arrived at during the primary interviews (which were 'unmoored' to specific visual evidence of participants' food practices). The subsequent verbal accounts were thus 'tied' to images that – although not reflecting pristine 'nature' (cf. Speer and Hutchby, 2003) – were generated in the course of daily activity.

The diaries also offered a means to triangulate data collected by other methods (O'Connell, 2013). Contradictions between spoken accounts of food practices and subsequent discussions of food stimulated by participant photography have elsewhere been identified (O'Connell, 2013; Sharma and Chapman, 2011). Triangulation in the present thesis largely operated in the sense of confirming and enriching previous accounts, although the food diary interviews did also bring to light inconsistencies. One participant in particular had not provided an entirely accurate portrayal of his eating practices during our follow-up interview (i.e. the second research encounter). When we met subsequently in his kitchen for the food diary interview, his wife was able to clarify the division of labour and the places where food 'actually' came from: it transpired he had slightly less to do with food provisioning than he had initially suggested.

Participatory methods: shopping, cooking and eating

In addition to the food diaries, participatory methods were employed: namely, accompanied shopping, cooking and eating with participants. This section explains the rationale for the use of these methods, and discusses the practical and theoretical considerations that shaped the way the methodology was designed and conducted.

Theoretical background

Some researchers have noted an apparent disjuncture between people's accounts and the lived reality of practices on which such accounts are based (Martens, 2012), suggesting that attempts to investigate routine practices must go beyond a reliance on spoken accounts (Pink, 2012).

The potential problems with the inaccessibility of mundane practices to spoken accounts can be mitigated somewhat by the use of methods focused on the 'real time' unfolding of practices in a mundane context. Martens' (2012) approach, in which CCTV cameras are placed in participants' homes and constantly record all activity, is clearly ideal from the point of view of a researcher. Regrettably such a set-up is not practically achievable for research which is either much more short-term or which, by virtue of dealing with a 'compound' practice constituted out of a range of temporally and geographically dispersed integrative practices (Warde, 2016), is fundamentally and necessarily multi-sited (Marcus, 1995).

Nevertheless alternative opportunities for research are evident. Inspired by earlier practice-theoretic work around food and eating (e.g. Evans, 2012; Halkier and Jensen, 2011; Meah and Watson, 2013), a range of quasi-ethnographic participatory methods was employed, to further understand the practical reality of eating practices for my participants.

These methods were accompanied shopping, cooking and eating. Methodologically these drew on the concept of the 'go-along' developed by Kusenbach (2003) and used in a number of other practice-theoretic studies on food consumption (e.g. Evans, 2012; Meah, 2014b; Meah and Watson, 2013). Kusenbach (2003: 463) explains the go-along method as a "more limited and more focused" relative of "the generic ethnographic practice of 'hanging out'". She explains further:

> When conducting go-alongs, fieldworkers accompany individual informants on their 'natural' outings, and – through asking questions, listening and observing – actively explore their subjects' stream of experiences and practices as they move through, and interact with, their physical and social environment. A hybrid between participant observation and interviewing, go-alongs carry certain advantages when it comes to exploring the role of place in everyday lived experience. Go-alongs are a more modest, but also a more systematic and outcome-oriented version of 'hanging out' with key informants – an ethnographic practice that is highly recommended in virtually all fieldwork manuals and textbooks.
>
> Kusenbach, 2003: 463

The 'go-along' method was employed here in order to provide the sort of targeted but nevertheless relatively 'open' form of data collection that Kusenbach advocates. The approach's focus on observing participants' "spatial practices *in situ* while accessing their experiences and interpretations at the same time" (2003: 463, original emphasis) is particularly well-suited to a theoretical orientation towards social practice, in which both practical activity and meaning-making are salient, and indeed, considered to be largely inextricable (cf. the notion of 'practical intelligibility' bound up with social conduct: see Schatzki, 1996). This justifies their application in the present thesis, and indicates why go-alongs have proved apposite and fruitful for other practice-theoretic research.

Design of the go-alongs

In accordance with the food diary research (and the shared theoretical and empirical orientation), the go-alongs focused on the practices of shopping, cooking and eating.

Participants were asked at the end of the food diary interviews if I could accompany them on each or any of these three occasions. The specific order of shopping, cooking and eating was suggested to participants. This, I judged, would theoretically enable the research to be conducted on one day: shopping could be conducted from which a particular meal could be prepared, which I could, if the participant was amenable, then join them for. In practice, due to the constraints of people's schedules, the shopping was often conducted on a separate day to the cooking and eating. Participants were remunerated €10 for the shopping trip, and €10 for the cooking.

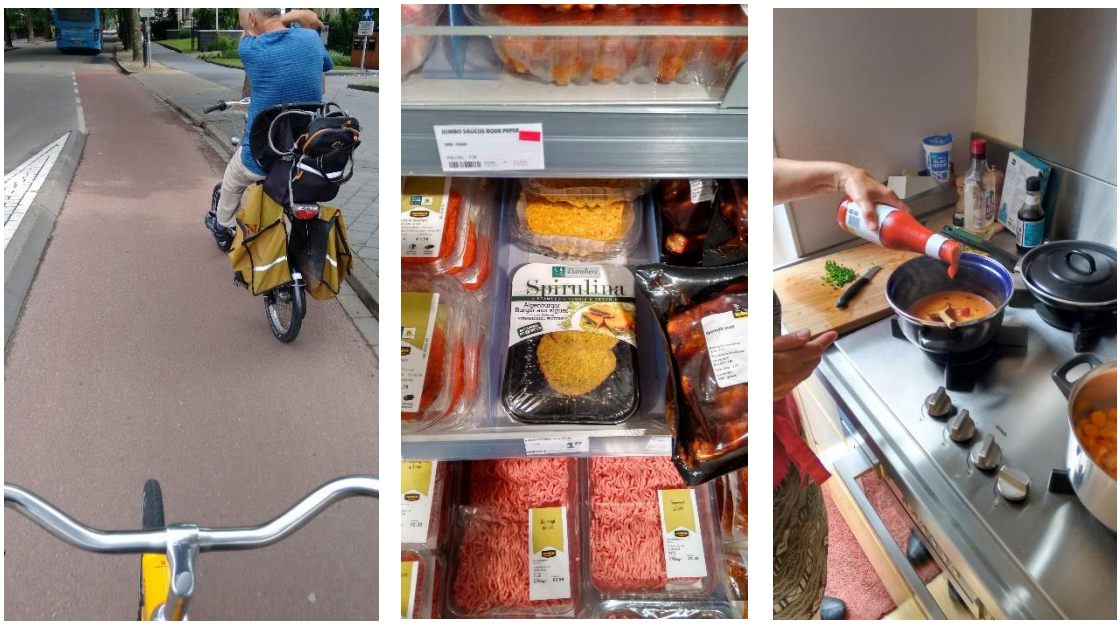
For the shopping go-alongs (n=12), I arranged to meet with participants when they were going food shopping, and requested that the trip was as 'normal' as possible – i.e. that they did not make a special trip just because I would be accompanying them. A similar approach was adopted for the cooking (n=13) and eating (n=10) go-alongs. I expressed a preference for evening meals (in line with the focus of the research), and those which were as 'normal' as possible. Eating go-alongs always involved the consumption of whatever had been prepared during the cooking go-alongs.[29] Three participants took part in a cooking go-along, but not a shared meal. One participant took part in cooking and eating, but found it too difficult to arrange a shared shopping trip in her schedule.

Each of the three different types of go-alongs was audio-recorded. The audio recordings were intended to provide a relatively unobtrusive record of events, so that they could proceed as naturalistically as possible. To this end, when shopping, I generally carried the recorder in my coat pocket. This provided a recording which was of slightly poor quality but of sufficient clarity to transcribe. I elected to conceal the recorder – after having informed participants I was recording – in order to make the encounter seem less 'interview-like'. During cooking and eating I left the audio recorder somewhere on a nearby surface.

I also took photographs during the go-alongs. For the shopping trips, it was helpful to take pictures during the journey to the shop(s) as well, particularly when the journey was relatively complicated and fitted in around other practices (see Figure 6).

[29] This generally meant that I consumed the same food as well, although there was one exception. That participant suggested that if I were to eat with her, it would entail the purchase of food specifically for the occasion, which would provide a rather inaccurate picture of her mundane eating practices. Thus I ate an oven pizza while she ate a different, typical week-night dinner.

Figure 6 – Shopping and cooking with participants



Although other researchers advocate the use of film as a research tool (Hindmarsh and Tutt, 2012; Simpson, 2011) and have successfully applied it to understand domestic practices (Martens, 2012; Meah and Watson, 2013), in the present research I opted just to use photographs. This was partly to try and make the research less invasive – given the relative lack of time between initial contact with participants and the go-alongs – and partly because of the specific focus of the research. The analytic orientation was towards understanding general aspects of cooking and eating, rather than detailed analysis of the temporally unfolding nature of eating practices (cf. Sweetman, 2009). For such a purpose, photography was deemed sufficient.

Despite my efforts to make the go-alongs somewhat naturalistic, they were of course contrived encounters. This was illustrated on two occasions where participants hesitated in a moment of indecision near the fresh fruit section of supermarkets before buying fruit. The impression given was that my presence was the reason for the hesitation and subsequent fruit purchase. One of these respondents in particular had consumed no fruit during their two weeks of food diary, thus indicating that the fruit-buying may have been induced as a result of being observed. Such occurrences were nevertheless relatively rare.

Another relevant consideration was that during typical routine shopping trips participants would not have an English person following them round and asking them questions. Yet as I was accompanying people on routine trips, they were arguably not completely divergent from the kind of shopping that would have been conducted without my presence. The generally high level of equivalence between the food diaries and the contents of subsequent shopping trips indicated this was probably the case, although the go-alongs' contrived nature (as evidence by the fruit-buying) is important to acknowledge. Indeed, research into practices using visual and participatory methods – as elsewhere in social research – does not provide objective accounts of external 'truth', but rather data which is the product of a situated encounter between researcher and participant (Kvale, 1996; Phoenix and Brannen, 2014; Pink, 2012; Power, 2003; Sharma and Chapman, 2011).

As with the other research methods, the discussion during the go-alongs was intended to be open while attending to key elements of eating practices. In a similar vein to the food diary interviews,

go-alongs were intended to gain insight into the lived reality of eating practices in situ, and also to act as a means of elicitation for further discussion.

In the case of shopping, participants were questioned about the practices, or elements of practices, that were proximate to insect-based foods' 'place' within webs of eating practices (see, in particular, Chapter 9). This typically entailed a focus on the acquisition of meat replacer products within shopping trips, although not at the expense of other topics. Shopping trips also provided insight into the more general ways in which diets were constituted.[30]

In the case of cooking, this focus was slightly more problematic. Of the 13 meals prepared during the cooking go-alongs, nine did not involve meat replacer products, which were insect-based foods' closest equivalent in participants' eating practices. In such cases - for example, where a participant was making a tuna lasagne – attempts to direct the discussion towards insect-based meat replacer products bore a somewhat awkward relation to the unfolding cooking practices. Such encounters were nevertheless useful because they prompted lengthy discussions about the provisioning and preparation of food, the *lack* of meat replacer products eaten, and so on. The absence of the relevant food items was itself productive.

The go-alongs provided useful data, but were in certain senses a less successful research method than the food diaries and other interviews. I discuss these issues in the following section.

Go-alongs: advantages and drawbacks

Intended to provide deeper insight into the lived reality of participants' eating practices, the participatory encounters had a slightly problematic relation with the topic under investigation. The problem was twofold. Firstly, people had generally stopped eating insect-based foods by the time the second phase of research began. Secondly, the eating events that I accompanied people to were often not the kind of eating events in which insect-based foods would have been eaten.

Nevertheless, the go-alongs served a number of important functions. Firstly, they provided a deeper understanding of the kinds of practices into which insect-based foods *could* have fitted (and, temporarily, had). These, specifically, were the practices of eating 'meat replacers' and the broader webs of practice in which food was acquired and consumed. Secondly, the go-alongs operated (in a similar manner to the food diaries) as a 'jump off' point for further discussion about participants' mundane eating practices. Thirdly, they provided useful insights into the material environment and physical organisation of eating practices. Lastly, they illustrated the existence of different 'modes' of eating: that is, different configurations of practices which constituted different enactments of the 'compound practice' of eating. This last point in particular contributed to the analysis undertaken in Chapter 8.

Although the participatory methods offered some useful insights into the practical reality of participants' food practices, there were also some aspects that were less successful. For example, there was a misalignment between the focal practices of the project (i.e. mundane evening meal consumption) and those that were highlighted in a number of the cooking and shared meals (i.e. 'special' evening meal consumption). The context in which insect-based foods were consumed – in which 'context' may be understood as the configuration of practices through and among which an evening meal event was enacted – was in many cases *not* the context in which I cooked and

[30] Notable in this sense was the relatively high speed at which some participants navigated supermarkets, even when accompanied. This provided empirical support for the practice-theoretic notion of shopping as habitually and routinely conducted without significant amounts of explicit rationalisation.

ate with participants. Cooking and shared meals often occurred on a Friday evening due to the constraints of participants' schedules, and in many cases had a more elaborate, social tone than those eating practices in which Insecta products had been consumed (see Figure 7). This meant that in a certain sense, the participatory methods did not address the research questions, which were dealt with only by the interviews and food diaries.

Figure 7 – Elaborate meals

Another issue with the shared meals was that in discursive terms they yielded relatively little extra insight into participants' eating practices. While the meals helped to provide a sense of the material context of eating practices, I found it difficult to reconcile my role as 'researcher' with that of 'dinner guest' in terms of steering conversation towards food and eating. To do so was relatively unproblematic while shopping and cooking. However, as an invited dinner guest, to keep returning to one topic rather than allowing conversation to flow freely goes against the 'embodied dispositions' I have acquired during socialisation as a middle class person. To be sure, in some cases the conversation remained around the subject of food and eating relatively organically. However in others – namely those that occurred on Friday evenings – efforts to direct the conversation back to the research topic threatened to mirror Garfinkel's 'breaching experiments', in which standards of mundane social propriety are deliberately violated. Whether a more skilled researcher could have overcome the constraints of their habitus remains an open question; nevertheless the project yielded a good quality of data without this particular point having huge ramifications.

Despite these less successful aspects of the research, the go-alongs were not conducted in vain. The *absence* of insect-based foods from people's diets made the go-alongs instructive in an unexpected way: they illustrated the complexity and contingency of eating practices into which insect-based foods did not easily fit. Further, the identification of the different configurations of practice that characterised 'mundane' and 'elaborate' enactments of evening meal events led to the conceptual distinction between different 'modes' of eating which is developed in Chapter 8. Indeed, the accumulation of research which was apparently *not* of direct relevance to the central research questions ironically helped to provide both empirical and conceptual resources for the elaboration of new theoretical concepts. These concepts, in turn, helped to clarify specific aspects of how novel foods may become 'accepted' and integrated into people's diets. Thus, although the participatory methods' relation to the central research questions seemed for a period to be cast

into doubt, ultimately they provided some strong empirical support for the themes developed using other methodological approaches.[31]

In addition to the participatory methods, another round of interviews was conducted with actors broadly associated with the production of insect-based foods. It is to a discussion of this research area that I now turn.

3.4 – PRODUCTION

This section explains the third phase of research, in which the production of insect-based foods in the Netherlands was investigated. I discuss the research design, sampling and methodology, after which I move on to a general discussion of issues relating to all three phases of the research. These include data analysis, research-in-translation, ethics and positionality.

Research design

During the preparatory stages of the thesis, it became apparent that the consumption and production of foods were closely – and indeed, inextricably – related. I discussed this idea in Chapter 2, noting in particular the extent to which this argument has motivated a considerable amount of debate both within human geography and within food studies scholarship more broadly.

The first phase of research clarified the implications of such debates for the present thesis. As is explained in Chapter 6 (the first empirical chapter prepared, based on the first phase of interviews), the central aspects of public acceptance, even in relatively superficial terms, are the key criteria of price, taste and availability. These are all related to the production of foods. Indeed, it could be argued that they are *principally* related to the production of foods.

Following the analysis undertaken in Chapter 6, the need to investigate the production of insect-based foods began to appear essential if a thorough understanding of the subject area was to be arrived at. As such I conducted research with individuals associated with the production of insect-based foods in the Netherlands. Rather than being narrowly defined as food manufacturers, this included actors broadly involved with the 'supply-side' of insect-based foods (cf. House, 2018). This included individuals working in business, academia, and regulatory roles.

Sampling

A broadly 'farm-to-fork' analysis was sought, the objective being to speak with all relevant actors in the supply chain of the insect-based foods that were available in the Netherlands. Although the theoretical basis of the thesis conceptualises food consumption as something that is enacted among complex webs of practices or networks of actors and not as the result of a linear supply chain (see Chapter 2), when identifying relevant participants it was nevertheless useful to think in a stepwise fashion about how insect-based foods arrived on the shelves. In particular, I

[31] The participatory methods also offered useful insights into aspects of eating practices which I have been as yet unable to explore. One of these in particular is the way in which the material conditions of eating as a compound practice relate to a) the acceptance of novel foods and b) the constitution of human diets in general. I noted that technology often played a significant role in the establishment, maintenance and change of diets: for example, a faulty oven, an expensive pan received as a gift, and or a newly acquired potato fryer had a notable role in shaping the diets of the relevant participants. Nonhuman actors evidently also had the capacity to 'resist' the integration of novel foods into human diets. These themes will be explored in later work.

considered which different stages were involved, and which actors were involved at different points.

Given that the focus of this phase of research was intended to elucidate a specific and relatively limited network of actors, purposive sampling was used (Etikan et al., 2016). Key actors were identified through desk research and then contacted via email. Snowball sampling was also used. Participants were given information about the research (Appendix 6) and provided informed consent. When I had completed interviews, I asked participants if they could put me in touch with other key actors. Generally I asked about key individuals mentioned during the interviews, and occasionally other individuals that I thought (or knew) the participants may have access to. The interviews focused chiefly on the Netherlands, but also included a Belgian participant (who was involved with the production of insect-based foods sold in the Netherlands) and a US participant (who was contacted to gather some contextual information for the analysis conducted in Chapter 5).

The participants interviewed during this phase of research are outlined in Table 4 below. It is worth noting that I attempted to interview more participants in this stage of research, but in some cases (i.e. where it appears I was being perceived to infringe upon corporate privacy) my requests to be put in touch with individuals were denied. However, given the relatively small size of the network of actors involved, I was still able to gain a good understanding of the supply-side relations associated with insect-based foods in the Netherlands. This is likely to be more difficult in larger, more geographically dispersed investigations (Hughes, 1999). It is worth noting that one interview (with the sales manager) did not yield analytically salient data, and is thus not drawn upon in the relevant empirical chapter (Chapter 5).

Table 4: Supply-side participants

Role	Involvement
Scientist, insect farm (NL)	Works for a large insect farm, which supplies the insects used in the Insecta products
Sales manager, insect farm (NL)	Works for a large insect farm, which supplies the insects used in the Insecta products
Owner, insect farm (NL)	Works for an insect farm that also produces a wide range of food products
Civil servant (NL)	Involved with regulation of insects as food
Academic (NL)	Involved with large research project on insects as food
Food producer (BE)	Works for the company that produces Insecta
Category manager (NL)	Works for the supermarket chain that sold Insecta
Insect-based product manufacturer (US)	Produces insect-based products. Contacted in order to investigate use of species in the US

Methods

Phase 3

The method used for the production research was semi-structured interviewing. As such it was largely subject to the epistemological and methodological considerations discussed above, i.e.

that interview accounts must be considered a co-production between researcher and participant, and thus cannot be taken as a direct reflection of the practical reality of social life. Interviews are nevertheless a useful means of investigating an area which would otherwise be obscure. As Hughes (1999) argues, interviews offer economic geographers a useful means of elucidating complex networks of commercial relations. A further advantage of the use of interviews in the present context is that, as with the consumption research, the research investigated what people or organisations *had* done, rather than what they think they *might* do.

However the production interviews raise particular epistemological considerations. Commercial participants clearly have a degree of responsibility to maintain a positive view of their companies. This may, as with elite interviewees in general, mean that participants are to some extent engaged with the production of a particular narrative (e.g. Morris, 2009). Of course, a similar point applies to personal interviews. However, given the nature of capitalist endeavour, provision of a positive account is arguably incumbent upon commercial interviewees to a greater extent than it is with private individuals.

On the whole, deliberate occlusions in the producer interviews were relatively clear. For example, in the following extract, I had clearly reached a point at which no further details would be forthcoming:

> Interviewer: Is your producer, are they making vegetarian convenience foods for somebody else? Are these kind of products, products they're making already?
>
> Respondent: I don't see the relevance of this question to be honest. What you can know is that our production partner has some knowledge in vegetarian food products as well, yes.

There were also a small number of occasions where I suspected I was being supplied with a lightly edited account of events. Although such occurrences were rare, they highlighted the fact that interview accounts offer a necessarily limited mode of data collection. Had it been possible, a full-scale multi-sited ethnography of the production side of insect-based foods would have been instructive. Yates-Doerr's (2015b) ethnography of the research project discussed in Chapter 5 indicates the fruitfulness of more sustained engagement with the supply-side of insects as food. As it was, I had to reach a compromise between what was theoretically ideal and what was practically achievable.

I now turn to a discussion of the general methodological aspects of the research that affected all three phases of data collection. I begin with a discussion of data analysis.

3.5 – DATA ANALYSIS

This section explains how data analysis was conducted. I first discuss the interview data (for both consumption and production research), and then turn to an explanation of how the participatory research was analysed. I include the food diaries within the category of participatory research. I then explain how coding of low-level themes related to the development of empirical chapter themes.

Interviews

Interviews were recorded using an electronic audio recorder and fully transcribed. This applied to all interviews, including the 10 which were conducted by my research assistant. She provided transcripts of the original Dutch-language interviews, as well as English translations of each (methodological issues pertaining to translation are discussed in Section 3.6). Interview data was

coded thematically. Coding was both data-driven (inductive) and theory-driven (deductive) (cf. Thomas, 2006).

In the data-driven coding, emergent codes were identified through close, comparative reading of transcribed data. New codes were created in an ongoing process as interviews were read through, and superordinate categories were created in order to arrange the codes in relation to each other (Lincoln and Guba, 1985). Data-driven codes include the key criteria of price, taste and availability that emerged, and which were of central analytic relevance.

In the theory-driven coding, codes were developed with reference to the key relevant aspects of eating practices discussed above. Theory-driven codes included those relating to the provisioning and consumption of food, the influence of proximate practices, and the constitution of domestic routines.

Re-coding was also conducted with material already analysed (e.g. Strauss, 2003). For example, Chapter 6 is based on a largely inductive mode of coding in which key factors affecting public acceptance of insects as food were sought. By contrast, the more specific argument concerning edibility of foods made in Chapter 5 required a re-coding of material in order to identify salient data. Similarly, the explicit focus on materials, competencies and meanings (cf. Shove et al., 2012) in Chapter 9 entailed recoding the transcribed data in these terms.

The analysis is based primarily on inductive coding, which prioritises the themes which emerged as relevant from the data. Theoretical interpretation of the data was subsequently applied, and re-coding conducted where necessary. However in practice, the inductive and deductive modes of coding were not completely distinct. Rather than representing completely separate tasks, they are two different orientations to coding which operated concurrently (Lincoln and Guba, 1985; Strauss, 2003). Indeed, the codes often overlapped, as with the 'availability' code. This would have emerged from the data in the absence of a specific theoretical orientation, but was also a crucial aspect of coding informed by theories of practice.

All transcribed material was coded. The point at which new codes ceased to be identified occurred relatively early on within the coding process, suggesting a degree of homogeneity in the core principles operative in the constitution of the compound practice of eating (cf. Warde, 2016). The point of 'saturation' – where new codes cease to be identified by continuing analysis – was thus reached (e.g. Saunders et al., 2017). However, analysis did not stop at this point, but rather continued until all data were accounted for.

Participatory methods

The participatory methods used include the food diaries that participants completed, as well as the 'go-alongs' that were conducted.

Food diaries

The food diaries were not intended as a systematic, primary data source, but instead operated as a stimulus to discussion. As such, they were not analysed and coded in the same detail as the other interview materials. Interviews conducted in and around participants' kitchens when the food diaries were complete were the principal mode of data collection in this area. These were transcribed and analysed in the same manner as the interviews discussed above. When transcribing food diary interviews, I added notes in the transcriptions to clarify which photograph went with which part of the discussion.

Shopping, cooking and eating

Go-alongs were audio recorded. The data from shopping and cooking go-alongs was transcribed in its entirety, but the data from the shared meals was not. This was because, as noted above, a substantial quantity of the spoken data from eating go-alongs was about analytically non-relevant subjects (e.g. books). Where conversation in eating go-alongs was in some way related to food and eating, it was transcribed.

During transcription I added inline notes that were not covered by the spoken data, for example regarding what was going on in the shop or kitchen at the time. I also added analytic notes where relevant. Coding of the go-along data was both inductive and deductive (Thomas, 2006). Go-along data was analysed in relation to codes developed during earlier stages of research (interviews, food diaries), but new codes were generated where necessary. The go-along data in particular helped to develop a code regarding the role of nonhumans in food consumption, but otherwise largely added extra detail to existing codes.

Photographs were also consulted during analysis of the go-alongs. The photographic material played a supporting rather than central role in the analysis, and was not systematically analysed. This was consonant with the analytic orientation of the research, which sought to trace the general contours of eating practices and their relational constitution. The photographic data were nevertheless useful in 'illustrating' audio recordings of go-alongs, and thus bolstered the analysis.

Coding and chapter themes

Chapter themes were developed following the identification of prominent codes in the data. These codes were developed inductively.

Three chapter themes (Chapters 6, 7 and 9) were arrived at following initial 'open' coding of the Phase 1 interview data, undertaken during the development of Chapter 6. This is the most general empirical chapter and was the first, in chronological terms, to be written. During this coding a prominent theme emerged regarding participants' views vis-à-vis the ethical and ontological position of insects as food, which formed the basis of Chapter 7. Once this theme was identified, the material was recoded in order to provide more sophisticated analysis of the topic.

Another prominent code that was identified, regarding dietary 'fit' of insect-based foods, led to a focus on the eating practices into which insect-based foods were (or were not) integrated. Along with comparative historical material (House, 2018), this code formed the basis of Chapter 9. Further codes were added to the Chapter 6 coding in accordance with the explicit theoretical objectives of Chapter 9 (e.g. regarding relevant practices, as well as their relevant constituent elements.)

The theme of Chapter 8 was developed from a fresh round of coding, which incorporated data from Phases 1 and 2 of the research. This round of coding – as with the first round – was inductive, although it was informed by the developing arguments and theoretical orientation (e.g. a focus on eating practices, and the relevant dimensions of those for understanding the acceptance and uptake of novel foods.) The chapter theme was one of two main themes identified during this round of coding. The other, relating to the role of the material environment in shaping consumption of (novel) foods, is not explored in the present thesis. Chapter 8's current theme was selected as it a) offered insights into the acceptance of novel foods that have not, to the best of my knowledge, been identified in relevant literatures; b) indicated affordances for the development of practice theory; and c) fitted more closely with the other chapters of the thesis.

The theme of Chapter 5 was initially inspired by the first round of coding, which indicated that aspects of insect-based foods themselves (and thus factors relating to their production) were likely to be important in shaping consumption. These ideas were briefly introduced in Chapter 6, but were further developed following inductive coding of the Phase 3 data. Coding proceeded iteratively alongside the development of a relevant theoretical orientation (actor-network theory), which offered a useful means of framing the data, as well as broader literature reviewing into the concept of edibility. Initially intended to provide a purely 'supply-side' view of insects as food, it became evident (both from relevant literature and the developing research) that the integration of consumer perspectives would also be necessary. Consequently the data from Phases 1 and 2 was coded inductively in relation to the broad theme of edibility. As Phase 1 had involved more specific discussion of why participants had initially eaten Insecta, and their other experiences with insects and other culturally unusual foods, it was this data that contained analytically relevant material. Thus this was brought into the analysis, further shaping the theme of the chapter.

I now turn to a discussion of some other, more general methodological considerations affecting the research. The first of these relates to conducting research-in-translation.

3.6 – RESEARCH-IN-TRANSLATION

The research was conducted in two languages, English and Dutch, which almost always – as I explain below – entailed a process of translation. Translation is an important issue in social research. Depending on the nature of research, translation may have a number of significant implications, pertaining to epistemology, power differentials, and speaking for 'othered' populations (Sidhu et al., 2016; Temple and Young, 2004). While the present research did not entail the immediate difficulties related to cultural sensitivities presented by – for example – cross-cultural research with ethnic minority groups (e.g. Sidhu et al., 2016), the conducting of research-in-translation nevertheless raised a number of important methodological considerations. These are discussed in this section.

The population of the Netherlands has, in general, an extremely high level of English (#1 out of 80 global countries studied in the 2017 English Proficiency Index: see Education First, 2018). Correspondingly, conducting research in English was, in practical terms, relatively unproblematic. The majority of participants in the present research did so mainly or exclusively in English (30 of the 40 participants in Phase 1; 19 of 20 participants in Phase 2).

Nevertheless, there were several salient issues regarding translation in the present research. These related to three main areas: participants' accounts being provided in their second language; participants' accounts being translated by a third party; and participants' accounts being provided in *my* second language. I explore each in turn, explaining strategies employed to mitigate translation-related difficulties (both practically and epistemologically) in relation to each.

Dutch participants speaking English

The first key area in which translation was methodologically salient related to participants who provided their accounts in English. With the exception of three participants – two of whom were from English-speaking countries, and the other of whom received a substantial proportion of their basic education in English – participants were not native English speakers, and thus provided accounts in their second language.

In the majority of cases this was not especially problematic. Of the 27 non-native English-language participants in Phase 1 of the research, 19 had a level of English that could be described as fluent. A point worth noting is that many of these individuals had completed or were undertaking higher education courses, which in the Netherlands are commonly delivered in English. Among the 19 English-language participants in Phase 2 – of whom 18 were non-native English speakers – 11 could be described as fluent.

Despite the advanced English language skills of these participants in general, some translation-related issues were evident. These pertained chiefly to the participants with a lower level of English.

Some participants evidently found it difficult to express themselves fully in English. For other participants the use of their second (or third) language clearly contributed to a lack of nuance, which was not directly reported but was evident in comparison with the more fluent accounts of other participants. These particular methodological issues were clearly apparent. However, a further consideration is that lack of clarity or detail in participant accounts may not necessarily have been evident: the expressive character of second-language accounts may have been affected in ways that were not immediately clear (Cortazzi et al., 2011). Also relevant is the issue of 'transliteration', in which certain concepts or phrases have no direct translation and must be re-interpreted in the target language (Regmi et al., 2010).

A number of strategies were employed to minimise epistemological difficulties in this area. During interviews I encouraged participants to 'gloss' remarks in Dutch if necessary. In earlier interviews, when my Dutch was weaker, I was able to check certain words or phrases if necessary with my research assistant. In later stages, when my Dutch had improved, I was able to understand and respond to these translations during the interviews. Another strategy was to use a translation app during interviews if any particular terms were problematic. This approach was mostly employed during the earlier stages of research, when I had a poorer command of Dutch.

In a more general sense, my effort to intensively learn Dutch was a strategy to manage translation-related issues. In particular, my food-related vocabulary improved relatively quickly, which was partly a consequence of conducting interviews. Before I was able to converse to a good standard, I had nevertheless developed a sufficient vocabulary to allow participants to use Dutch words if they did not know the English. (The words, I noticed, were often similar between interviews). Encouraging interviewees to use their first language if necessary helped to mitigate some of the difficulties regarding the general expressive quality of second-language interviews (Cortazzi et al., 2011).

The strategy of intensively learning Dutch also helped with transliteration. Words such as *gezellig* (roughly meaning 'convivial') have no direct English translation; however intensive Dutch lessons and immersion in the research context meant that I was able to learn salient terms relatively quickly. Prolonged immersion contributed to my more general understanding of the socio-cultural context of the research (cf. Choi et al., 2012). I would argue that the Netherlands' relative socio-cultural similarity to the UK made my acculturation somewhat easier than if the research had been further afield.

The study's methodology, with an emphasis on visual and participatory methods, was in part intended to circumvent an excessive focus on verbal accounts (see above). This was in keeping with the theoretical orientation of the study, but is epistemologically advantageous in relation to translation. Of course, the visual and participatory methods were discussed verbally, entailing similar epistemological considerations to those discussed above. Nevertheless the use of these

methods helped to 'ground' the research in relation to the practical reality of eating practices (cf. Pink, 2012).

The physical co-presence of participant and researcher in these encounters enabled a degree of understanding that words alone could not capture (Merriam and Tisdell, 2015), relating to debates about how meaning in cross-language research encounters is actively co-produced (Welch and Piekkari, 2006). However, this presented an analytic difficulty, in that, on occasion, I returned to transcribed material to look for specific quotations and found that points were implied but not clearly and fully vocalised. Thus, an analytic strategy employed to overcome this difficulty was a principle of caution: where I had taken the *impression* of a certain meaning from participants' accounts, but this was not clearly stated in spoken language, the data was omitted from the formal analysis.

Further translation-related issues were related to the participants who provided their accounts in Dutch. These participants were mostly interviewed by my research assistant, which raised a number of epistemological considerations.

Dutch accounts translated into English

As noted above, 10 of the first 40 interviews (during phase one) were conducted in Dutch by a Dutch research assistant (RA). This raised practical and epistemological issues. A key practical issue was the extent to which unsupervised interviews conducted by a different person would be similar to mine; the point that qualitative research projects develop as they unfold is of particular salience here (Lincoln and Guba, 1985). Epistemological issues included the translation of material from one language to another, which adds a further layer of interpretation to the data (e.g. Cortazzi et al., 2011). Here I discuss how these practical and epistemological issues were managed.

The use of an RA introduced some practical difficulties into the research, because she was to conduct unaccompanied interviews. In order to align my own interviews with those of my RA as much as possible, I explained the background and research design of the project face-to-face. I developed an interview schedule, which I talked through with the RA. With the agreement of my first interview participant, the RA was also present, so she could get a 'feel' for how the interviews were intended to be conducted. In order to monitor the ongoing research, I asked her to send transcripts of interviews to me before each new contact. I would email comments and advice, and every two or three interviews we would speak face-to-face about the ongoing research. This enabled an alignment of my own interviews with those conducted by the RA, and helped to smooth out differences between both modes of interview. It followed principles of research 'best practice', in which a translator who is fluent in both languages is sought and in which communication about the research strategy between researchers is crucial (Choi et al., 2012).

Strategies were also employed to mitigate potential epistemological issues raised by the use of an RA. The most significant potential issue was the translation of interview data from Dutch to English by a third party. Translation of research materials has elsewhere been identified as introducing an extra layer of interpretation into research (Regmi et al., 2010). In order to manage potential difficulties in this respect, the RA 'glossed' potentially obscure remarks in the transcripts she provided. These included cultural references and idioms, in which the Dutch language is particularly rich. We also agreed to discuss any interview material which presented a particular difficulty, although beyond the 'glossed' sections this need seldom arose. As my Dutch improved, I was later able to check Dutch-language transcripts if I felt that anything may

require verification. Despite these strategies, the use of an RA introduced an epistemological limitation: I did not have the advantage of 'being there' during the co-production of research data, and thus did not have experience of the interpersonal and non-verbal aspects of the research encounter (cf. Temple, 1997). Nevertheless I would suggest that – given the strategies employed, and my immersion in the research context – that these issues were less significant than they might have been if I was reliant on, for example, a more detailed and extensive 'second-hand ethnography' (Temple, 1997).

The final main area in which research-in-translation raised practical and epistemological issues was in relation to Dutch participants speaking Dutch. This meant that, in a reversal of the first scenario explained here, it was me who was participating in my second language.

Dutch participants speaking Dutch

By the time Phase 2 of the research was conducted, I had acquired a sufficient level of Dutch that I was able to conduct basic interviews in that language. This had some benefits (particularly in that it enabled participants to explain in Dutch what they found difficult to communicate in English), but also some drawbacks (in that my less-than-perfect mastery of the language led to some confusion). I explain these issues in this section, and indicate how they were managed.

Four of the participants in the second phase of the fieldwork had originally participated in Dutch, and so my emails to them regarding further participation were also in Dutch. In one of the four cases, we simply switched to English during the early stages of the interview. The participant had a high level of English, so this was unproblematic. The same strategies applied as for the other English-language participants discussed above. For example, she was able to clarify things in Dutch if unable to articulate them in English.

Two other participants had a much lower level of English. In both of these cases we spoke a mixture of Dutch and English; in both of them, it became apparent during transcription that there were points at which we had misunderstood each other. Caution was thus exercised during analysis, and I omitted any data which appeared to have followed misinterpretation in either direction.

The interviews with the fourth of these participants were conducted entirely in Dutch. These went more smoothly, and the subsequent transcriptions did not suggest any misunderstandings had occurred. I was initially concerned that the participant had provided less elaborate answers with me than she had with the RA. However, upon comparing the transcripts there did not appear to be any substantial difference in the length or sophistication of the responses.

Summary

Conducting research-in-translation raised a number of practical and epistemological issues. These related to both participants and researcher using their second (or third) language, and the potential 'interpretive layer' introduced by the use of an RA. Strategies to mitigate potential difficulties were employed. It is argued that the use of visual and participatory methods may have further helped to avoid difficulties presented by exclusively verbal data collection methods.

I now move on to a discussion of researcher positionality, which is another important consideration in relation to the research project as a whole.

3.7 – POSITIONALITY

Reflexive consideration of researcher positionality, and how this affected the 'making' of research, is crucial in the critical social sciences (England, 1994). Problematic power asymmetries involved with researching marginalised groups were arguably largely absent in the present research, which involved a middle class white European person talking to other middle class white European people about what is – at least in the present circumstances – a relatively mundane and uncontroversial subject. (A study of insect consumption in rural areas of South America would no doubt have been, in many respects, crucially different).

Nevertheless, it is worth considering the extent to which my positionality affected the research. I highlighted above the possibility that the support of 'government' funding may have smoothed the research process; it is also important to acknowledge the extent to which my privileged position (e.g. education, gender and social class) is likely to have helped facilitate the research in a more general sense (Rose, 1997). The findings presented here are a product of my own socially situated position (male, white, heterosexual), regardless of whether that is immediately evident (Bourke, 2014). As Rose (1997) observes, it is often very difficult to establish the effect one's positionality has had on a research project: however, it is perhaps this difficulty itself which indicates that such an effect is present. The comparative ease with which I was able to arrange for my research materials to be distributed throughout a national supermarket chain, for example, is likely to have been influenced by my positionality: things may well have been more difficult had I not been white, male or middle class. Similar considerations probably apply in relation the portions of the research conducted in participants' homes as well.

Further important considerations relate to power relations within the research. Writing in relation to qualitative interviews specifically, Kvale (2006) identifies a fundamental power asymmetry between researcher and participant. Despite earlier exhortations within relevant debates that interviews constructed a mutually-beneficial, dialogical space, for Kvale this is a fallacy. Rather, "a fantasy of democratic relations masks the basic issue of who gains materially and symbolically from the research and where claims of participation mask the issue of power" (2006: 482). He continues,

> The term *interview dialogue* is therefore a misnomer. It gives an illusion of mutual interests in a conversation, which in actuality takes place for the purpose of just the one part – the interviewer.
>
> Kvale, 2006: 483, original emphasis

In the present research, such considerations were salient. I regarded participants as helping with the research, given that without their input there would be no project at all. Nevertheless, in relation to the project itself, as well as the broader structures of education and employment that situated the research, they were still ultimately positioned as a resource. Privilege was also operative in my relation to research participants and the accounts they gave. Being able to have the final say with regards to the interpretation of data and presentation of results is also, as Rose (1997) notes, a privileged one. Power asymmetries were not uniform across participants. Supply-side participants (including people such as professors and corporate executives) occupied a privileged 'gatekeeper' role, and – as the examples of response refusal (discussed above) indicate – my own relative lack of power was evident during those interviews (cf. Desmond, 2004). Despite such considerations, in all cases it is important to acknowledge my own privileged position with regards to the framing and presentation of results.

It is also worth remarking on the overlapping identities at work in the research process (Bourke, 2014), for example the fluid boundary between researcher and participant (Humphrey, 2017). I noted above the way in which this fluidity, and the tension between my learned dispositions and the contrived nature of research, may have meant that my shared meals with participants were not as 'productive', in instrumental terms, as they might have been. Overlapping positionality is also evident in the way that the research and my own diet were clearly entwined. Although I had begun to eat less meat in the years preceding the research, during the process of designing and conducting the research I began to eat a largely (although by no means exclusively) vegetarian diet. I thus had a similar dietary orientation to most of my participants, who were also making conscious efforts to reduce their meat consumption.

My own lack of insect consumption is based on similar factors to those of my participants: I regard the products as similar to vegetarian convenience foods, a substantial category among which preferable versions exist (cf. Chapters 8 and 9). I also regard the consumption of insects as non-essential for those who have already decided not to eat meat in the first place. That these type of findings were strongly evident in the research is worth considering in the light of my own positionality. However I would suggest my 'insider' status regarding a 'flexitarian' dietary orientation helped to bolster my understanding of participants' accounts, rather than leading to a jaundiced interpretation of data. Had participants unanimously agreed that the insect-based foods under investigation were excellent, I would of course have reported this. Nevertheless it is important for the 'trustworthiness' of the research to explain my own proximity to participants in this respect (Shenton, 2004).

I now discuss a final methodological area relevant to the research as a whole: the ethical aspects of the project.

3.8 – ETHICS

Given the general focus on mundane eating practices, the research did not raise any obvious ethical issues. Nevertheless it was important that the research and relevant materials were approved by an ethics committee at the University of Sheffield, and adhered to protocols for ethical 'best practice'.

Approval was granted by a departmental ethics panel in early 2015, in accordance with university guidelines (https://www.sheffield.ac.uk/rs/ethicsandintegrity). Participants provided informed consent at each stage of the research, and research data was anonymised and stored in password-protected files. Participants were supplied with information sheets that provided further detail about the research, the ethical approval it had received, including their right to withdraw from participation at any time. See the Appendices for the participant information sheets and consent forms.

Before concluding this chapter and moving on to the empirical portion of the thesis, I provide a brief clarification of how the various sections of data relate to the empirical chapters themselves.

3.9 – USE OF DATA IN EMPIRICAL CHAPTERS

The empirical chapters present the findings of the research, which was conducted in three phases. Phase 1 consisted of 40 interviews with consumers of insect-based foods; Phase 2 consisted of 20 follow-up interviews, as well as 17 food diaries / interviews and a set of go-alongs: these involved shopping (12), cooking (13) and eating (10) with participants. Phase 3 consisted

of seven interviews with people associated in some way with the production of insect-based foods (broadly conceived).

The Phase 1 research is used in Chapters 5, 6, 7 and 9. The Phase 2 research is mainly used in Chapter 8, but also informs the arguments developed in Chapters 5 and 9. The Phase 3 research is used in Chapters 5 and 9. Chapter 9 also draws on archival research for a paper about sushi in the United States (House, 2018), which was researched and written in order to provide material for comparative analysis. (At the time of research, there was – to the best of my knowledge – no scholarly account of the establishment of sushi in the United States.)

3.10 – SUMMARY

This chapter explained the research design and methodology for the thesis. In the context of the site selection and research questions, the two main empirical elements were explained: research attending to consumption and production of insect-based foods respectively. After these sections, a number of more general methodological issues were addressed. These included data analysis, research-in-translation, positionality and ethics. The chapter concluded with a summary of the use of data in empirical chapters. These empirical chapters follow. The next chapter provides an outline of the empirical portion of the thesis, and indicates how the empirical chapters relate to each other.

Chapter 4 – Public acceptance of insects as food in the Netherlands

4.1 – Introduction

The following five chapters present the empirical findings of the thesis, the primary focus of which is public acceptance of insects as food in the Netherlands. In this short chapter I outline each of the following empirical chapters, explaining how they fit together and relate to each other.

4.2 – Chapter overviews

The first empirical chapter (**Chapter 5**) focuses mainly on production, manufacture and retail of insect-based foods in the Netherlands, providing a detailed analysis of the insect-based products that are the focus of the subsequent empirical chapters. Drawing theoretically on actor-network and more-than-human perspectives, and empirically on interviews with 'supply-side' actors, it traces the genealogy of the production networks from which insect-based foods in the Netherlands have developed. It argues that the foods were developed for reasons that were primarily technocratic, rather than culinary, and that they emerged out of relations and mutual influence within a complex and contingent supply-side network, rather than being the 'best' design possible. These points are argued to have significant implications for the extent to which they are consumed. In order to explore the ways in which supply-side activities, interactions and developments have implications for the consumption of insect-based foods, the chapter also includes empirical material with consumers of the foods. Drawing together data on both supply and consumption, I argue that the constitution of insect-based foods may have been sufficient to achieve their 'edibility' in *principle*, but that it precludes their routine consumption in *practice*.

Chapter 6 then moves to a more general account of public acceptance of the insect-based foods discussed in Chapter 5. Chapter 6 draws on the first wave of consumer interviews, and is informed by theories of practice. It presents the foundational findings of the thesis: that acceptance of insect-based foods is affected by conventional factors, such as price, taste, availability and 'fit' with established eating practices; and that single trial and routine consumption of foods are fundamentally different things. These key findings permeate all of the other empirical chapters, and have significant epistemological implications (as suggested in Chapter 2) for research on the acceptance of novel foods. Chapter 6 also provides an extensive literature review, amongst which two main trends are identified and against which the chapter is situated. As little has changed (in terms of prominent themes and foci) in the literature discussed since the publication of this chapter, its arguments are, I would argue, of enduring relevance. Similarly, the other empirical chapters in this thesis can be understood as situated, in similar terms, against the limitations of the current literature on Western consumer acceptance of entomophagy.

Chapter 7 develops ideas introduced in Chapter 6, which explores the question: 'Are insects animals?' As noted in Chapter 6, a significant proportion of participants – i.e. consumers of insect-based foods – defined themselves as vegetarian. Chapter 7 draws on my discussions with these participants regarding the ethical – and, indeed, ontological – status of insects in relation to other animals. The chapter identifies a folk taxonomy of animal life that informs the constitution of ethical diets. Contextualising the findings within scholarly debates around insect

sentience and animal ethics, it directs attention to the ethical dimension of insect-based foods, questioning the extent to which the 'ethical' qualities of the latter (e.g. Duncan, 2013) are consonant with a relational ethics of care, and suggesting that there may be a 'limited economy of sympathy' (Bourke, 2011) when it comes to the ethical treatment of animals. The ethical status of food animals plays into the expanded notion of 'acceptance' of novel foods which the thesis attempts to elucidate.

Indeed, it is the accounts of (quasi-)vegetarian participants that are primarily drawn upon in the subsequent chapter. **Chapter 8** shifts analytic focus to the constitution of diets, exploring how insect-based foods fit into those and explicitly engaging with theories of practice. Drawing on the point made in Chapter 6 that 'fit' with established dietary practices is crucial for the routinisation of novel foods, Chapter 8 builds on practice-theoretic work on eating to introduce two new concepts: 'modes of eating' and 'phased routinisation'.

The concept of modes of eating theorises how the 'compound practice' of eating (Warde, 2016) is recurrently conducted amidst the prevailing configurations of social practice affecting and constituting one's diet. It is defined as a particular configuration of practices, both alimentary and non-alimentary, organised in relation to a particular 'teleoaffective structure': that is, "a range of normativized and hierarchically ordered ends, projects, and tasks, to varying degrees allied with normativized emotions and moods" (Schatzki, 2002: 80). Phased routinisation builds on the concept of modes, introducing a degree of historicity into the analysis. Defined as a largely stable configuration of particular modes of eating, it theorises the way in which eating involves both routine and more fluid elements. It also introduces periodisation to the analytic resources of practice-theoretic food research, conceptualising how longer-lasting shifts in food consumption are achieved as a result of significant, enduring modifications in the configurations of social practice affecting and constituting one's diet. These concepts are argued to be a useful conceptual resource for social scientific analyses of food consumption, with wider potential applications for practice-theoretic social research more broadly.

Nevertheless, while the primary focus of this chapter is to extend the conceptual resources of theories of practice vis-à-vis eating, it also plays a critical role in explaining the substantive question of public acceptance of insects as food. Insect-based (and other novel) foods must be able to withstand the vagaries of phased routinisation if they are to be successfully established: this entails their competitiveness with possible alternatives on the key criteria – price, taste, and availability – highlighted throughout the other empirical chapters. Further, insect-based (and other novel) foods will inevitably be consumed within particular modes of eating, to which researchers and commercial actors must be attentive. In this sense, the example of sushi is instructive: as I have argued elsewhere (House, 2018), the successful introduction of this novel food in the US related to its positioning as part of high-end dining, rather than mundane food consumption. Further analysis of the success or failure of novel foods, vis-à-vis the modes of eating in which they are consumed, is encouraged.

Chapter 9, the fifth and final empirical chapter, brings analysis of sushi into dialogue with that of insects. Addressing the prominent claim that 'insects are the new sushi' (e.g. Ballingall, 2014), the chapter undertakes comparative analysis of the (successful) introduction of sushi to the US and the (largely unsuccessful) introduction of insects to Dutch diets. By demonstrating why insects are *not* 'the new sushi', the chapter directs attention to the need for novel foods to a) have a coherent place within relevant culinary practices (e.g. particular cuisines), and b) to be produced, distributed and sold in such a way as to represent a preferable selection from among an array of possible alternatives. Beyond these substantive points, the chapter argues that the

application of theories of practice to the topic of novel foods can prove highly instructive. It suggests that theories of practice offer a productive way to conceptualise the production-consumption nexus in relation to food and eating, and to account for it analytically.

4.3 – SUMMARY

The thesis now proceeds to the five empirical chapters. It should be noted that as the chapters were not written in the order in which they are presented here, some arguments are presaged in early chapters that are not fully developed until slightly later on. In order to orientate the reader and to provide a linear 'flow' through the material, contextualising texts are appended at the start of each of the chapters.

Chapter 5 – Insects as food in the Netherlands: production networks and the geographies of edibility

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5.1 – CONTEXTUALISING REMARKS

The primary focus of this chapter is the 'production network' from which the insect-based foods analysed in the present thesis have developed: that is, a network of actors, broadly on the supply-side of insect-based foods, which are in some way associated with the foods' development and production. This includes academics, insect breeders, advocates, government funders and regulators, entrepreneurs, and supermarket executives. It is in the context of Chapter 5's analysis that the problems with insect-based foods elaborated in Chapters 6, 8 and 9 can be understood. The chapter suggests that the Big Four insect species (outlined in Chapter 1), which are more or less the only ones used for human food applications in Europe, are essentially unsuited to use as food. This, as I argue in Chapter 5, is in large part a consequence of the Big Four's origin as animal feed, rather than human food: here it is worth repeating Mintz's remark that "humans eat, they do not feed" (Mintz, 1999; quoted in Bentley, 2008: 111).

Other than these substantive points, the chapter seeks to make two key theoretical arguments. One of these, reflecting established debates within actor-network theory and STS, is that there is no 'grand architect' or 'heroic entrepreneur' overseeing the development of insect-based foods in the Netherlands (cf. Drakopoulou Dodd and Anderson, 2007). Instead, insect-based foods as they are currently constituted arose out of complex and contingent interactions among a widespread supply-side network – or 'hybrid collective' – in which individual actors have influenced, but not determined, the course of events (cf. Garud et al. 2010). Consequently, they do not represent the 'best of all possible worlds', but rather are a consequence of complex processes characterised by path dependence, compromise, serendipity, and mutual influence.

A further, related theoretical argument is that the 'edibility' of insect-based foods – their positioning within the "cultural categories of what can and cannot be eaten" (Long, 2004: 32) – is also shaped by the contingencies of the supply-side network. Empirical material from consumers of the foods is brought in to the analysis, to explore how aspects of the products' development and production subsequently affect their consumption. As I will argue, the production network may successfully construct insect-based foods as edible, but this appears to be at the cost of the foods' repeat consumption. The chapter advances a conceptualisation of edibility as the product of interactions between actors broadly involved with both the supply- and demand-side of food. Thus, it connects with and presages arguments developed throughout the thesis regarding the mutual implication of supply- and demand-side factors in the successful establishment of novel foods (cf. House, 2018). It also demonstrates how the specific example of insect-based foods is likely to be of theoretical relevance beyond the substantive area of entomophagy, by contributing to a theorisation of edibility that may be more broadly applicable.

This chapter principally addresses **RQ4** ('How have the insect-based foods currently available in the Netherlands been developed?') and **RQ5** ('What implications do the supply-side aspects of insect-based foods have for their consumption?'). As the chapter also accounts for the consumption of insect-based foods, and the ways in which this is shaped by production, it also addresses **RQ1** ('How are insect-based foods being integrated into established practices of food and eating in the Netherlands?') and **RQ3** ('If insect-based foods are not being integrated into eating practices, why not?').

5.2 – ABSTRACT

A nascent subfield within food geographies research investigates edibility, or how things 'become food'. In the context of efforts to create more sustainable foodways in Europe and the US (the 'West'), this question is pertinent. One proposed contribution to these efforts is the Western adoption of insects as human food. Related scientific and commercial activity in the Netherlands has been prominent in this area. This chapter draws on research with people involved in the development of a Dutch edible insect network, and with the production, supply and consumption of a range of insect-based foods. It explains how this network arose out of the interaction between heterogeneous, mutually-influential actors, and acts to delimit the 'horizon of possibility' for insect-based foods. The chapter then presents a case study of a range of insect-based foods, arguing that the food products themselves, and their edibility, can similarly be understood as a network effect. Agency in both the design of foods and the construction of edibility is conceptualised as distributed, multiple and contingent. The chapter also discusses the disjuncture between edibility (in principle) and routine consumption (in practice): new foods may be successfully positioned as 'edible', but this does not mean that people will eat them. Implications for debates on the conceptualization of edibility are discussed.

5.3 – INTRODUCTION

How do "things become food" (Roe, 2006b: 105)? Within the rich geographic literature around food, a nascent subfield has emerged which engages with this question in particular, investigating and elucidating the constitutive geographies of 'things becoming food' (e.g. Bennett, 2007; Probyn, 2011; Roe, 2006a, 2006b; Sexton, 2016, 2018; Waitt, 2014; see also Chapter 9). In this literature, which I term the *geographies of edibility*, the principal analytic focus is the concept of the in/edible: the "cultural categories of what can and cannot be eaten" (Long, 2004: 32).

The positioning of particular foods as in/edible is a relational process, which in broad terms is negotiated through mutually implicated practices of production and consumption. However, it involves a heterogeneous range of elements including – inter alia – discourse, technology, sites and modes of food production, provisioning and eating, legislation, interpersonal relations, the taste and materiality of food, and its visceral, non-discursive or immaterial attributes (e.g. Evans and Miele, 2012; House, 2018; Krzywoszynska, 2015; Longhurst et al., 2008; Probyn, 2011; Roe, 2006a, 2006b; Sexton, 2016, 2018; Smith, 2012; Vialles, 1994; Waitt, 2014; Waitt and Phillips, 2016). These points are reflected in accounts of the wax and wane of food which do not deal explicitly with the notion of edibility, such as in Houlihan's (2003) account of tripe in northern England. Houlihan demonstrates how the edibility of tripe was to a large extent temporally bound, and connected to contemporary industrial labour relations, food supply infrastructure, and family eating practices.

Historical examples from Europe and the US (the 'West') reflect the situated and constructed nature of changing edibility, and that it is liable to change over time (e.g. Mennell, 1996). Things may 'become food' for relatively long periods, such as sushi (House, 2018), avocado (Charles, 2002), or sugar (Mintz, 1985), or for much shorter ones, such as organ meat (Wansink, 2002), tulip bulbs (Vorstenbosch et al., 2017), or dogs (van Es, 2000).

In the context of current debates around the sustainability of food, and efforts to make improvements in that direction, understanding how edibility may be deliberately constructed is a salient concern. Research in this area is still relatively limited, but has explored efforts to construct the edibility of new 'alternative proteins' including plant-based products (Sexton, 2016, 2018), genetically modified food (Roe, 2006a), and insects (Sexton, 2018; Stock et al., 2016; Yates-Doerr, 2015b; see also Chapter 9). Prominent focuses within this work are the manifold strategies employed to construct edibility and the ways in which these may not, despite the best efforts of those involved, be successful.

The present chapter seeks to extend and enrich these debates. It explains and analyses one such proposed solution to the unsustainability of current Western meat consumption: efforts in the Netherlands to encourage the use of insects as human food, and the production of insect-based foods in the same region. The context in which such foods were created is explained in terms of a network of actors, both human and more-than-human (Latour, 1996; Whatmore, 2006), which has shaped the 'horizon of possibility' for insect-based food – what insect-based foods *are*, or *can be*. This is argued to have implications for the production and consumption of insect-based foods, both in the Netherlands and beyond. The chapter examines a case study of a range of insect-based foods, suggesting that the production of these foods, and of their edibility, can also be understood as resulting from interactions within a network of heterogeneous actors.

The chapter has two central arguments. The first is that edibility is a *network effect* (Law, 1992). To conceptualise edibility in this way directs attention to the way in which its constituent elements – the kind of things listed in the discussion of literature above – are related to each other, are interdependent, and are mutually constitutive. That is to say, it is not that edibility simply represents the outcome of the successful arrangement of heterogeneous entities into a particular constellation (although in one sense, it certainly does). Rather, through their involvement in the construction of edibility, these entities affect and shape each other. This argument also entails a move away from seeing the construction of edibility as chiefly the responsibility of entrepreneurial strategy (e.g. Sexton, 2018; cf. House, 2018), and towards a view of edibility as *co-produced* by a diverse range of actors. Edibility in this account is situated and contingent: it does not entail general acceptance of insects, although this may be the aim.

The second main argument is that edibility and consumption are *not the same thing*: it is possible for a food to be positioned as 'edible' without anyone actually eating it. The analysis illustrates a fundamental tension, in which socio-material arrangements and network connections necessary for the construction of edibility may in fact work against the routine consumption of the foods in question. Connections between edibility and routinisation are discussed at the end of the chapter.

5.4 – INSECTS AS FOOD

The idea that insects should be adopted as a human food source in the West is not a new one (e.g. Holt, 1885; DeFoliart, 1992; Meyer-Rochow, 1975), but its recent prominence can be attributed to a report published in 2013 by the Food and Agricultural Organisation of the United

Nations (FAO), entitled *Edible Insects: Future Prospects for Food and Feed Security* (van Huis et al., 2013). Synthesising global knowledge around insect consumption ('entomophagy'), the report argued for Western use of insects as a new, sustainable protein source in both human food and animal feed. The principal grounds for this were environmental and nutritional: in both senses, insects compare favourably with conventional meat animals. The global prevalence of entomophagy was cited as a strong indicator of insects' appropriateness as human food.

The report was downloaded 2.3 million times in 24 hours. It sparked a wave of media interest (Smith and Pryor, 2014a, 2014b), academic research, and – perhaps unsurprisingly – significant commercial interest. A plethora of start-ups and small businesses have since appeared in Europe and the US, marketing whole insects or foods containing insects as a processed ingredient (for examples, see Engström, 2018).

However, the wave of new commercial endeavours following the report were established in the context of a pre-existing network of research, policy and business activity in the area. While defining an absolute origin of this network is likely to be rather difficult (cf. Latour, 1996) – one could, for example, identify the earlier pieces advocating Western consumption of insects as foundational – it evidently began to assume a more formalised character in around 2006.

I term this network the 'Dutch edible insect network'. Although its actors were – and are – primarily based in the Netherlands, it also involves Belgian universities, businesses and governmental agencies, and the FAO, a global NGO headquartered in Rome. It is also shaped by academic and less formalised knowledges about insects from all over the world. The decision to term this network 'Dutch' is thus a heuristic one. In addition to signifying the territorial location of primary actors, the designation follows a popular understanding of the Netherlands as playing a key role in the area (e.g. Anderson, 2015; Jansson and Berggren, 2015), self-identification of the Netherlands as a forerunner and advocate for sustainable protein sources including insects (e.g. Green Deal, 2018; Willemsen, 2015), and the substantial financial and institutional support provided by the Dutch government (addressed below). Although I will also explain, for example, how developments in Belgium act (and are acted upon) within the network, I continue to use the designation 'Dutch' for the sake of clarity. In what follows I also employ the term 'European edible insect network', to indicate the broader context in which the Dutch network is situated, and is a constituent and influential part.

This following analysis is divided into two sections. In the first section, I explain the development of the Dutch edible insect network. I conceptualise its development as the weaving together of heterogeneous elements in alignment towards a common project, the establishment of insect-based food in the Netherlands and across Europe.[32] The process by which these heterogeneous actors become recruited or enrolled to the project can be understood one of *translation*, in which their diverse interests are translated in accordance with a unifying idea (Latour, 1996).

In the second analytic section, I apply these insights to a case study of a specific range of insect-based food in the Netherlands and Belgium. I explain how the Dutch edible insect network has shaped the horizon of possibility for these foods, and suggest the conceptual account of the network itself can be fruitfully extended to an analysis of the foods' development. This entails a view of food production as the achievement of a "hybrid collective" (Callon, 2004: 4) rather than an individual entrepreneur (Drakopoulou Dodd and Anderson, 2007), and of the development of

[32] The same argument applies to the related but distinct goal of facilitating and creating insect-based animal feed, discussion of which is beyond the scope of the present chapter.

foods (as with other innovations) as a distributed, negotiated process, rather than as involving the linear diffusion of a stable artefact (e.g. Akrich, 1992; Håkansson and Ford, 2002). Drawing on research with consumers of these foods, I analyse how the foods were successfully positioned as edible, and how their edibility was shaped by the complex and contingent processes of production, supply, and consumption. I then discuss how the achievement of edibility does not necessarily entail consumption of foods so positioned, drawing out implications for the edible insect sector and future research on the geographies of food.

5.5 – METHODOLOGY

As part of a larger project investigating public acceptance of insects as food in the Netherlands, this chapter focuses on evidence from semi-structured interviews with six individuals involved in some way with the development of an edible insect sector in the Netherlands. Interviews were conducted during 2016 and 2017, and participants included a scientist at the Netherlands' Wageningen University and Research Centre; a scientist at a Dutch insect farm; the owner of a Dutch insect farm; a civil servant working for the Dutch food safety authority; a product development manager at Damhert, a Belgian manufacturer of insect-based foods; and a category manager at Jumbo, a Dutch supermarket chain who sold those insect-based foods.

Participants were recruited purposively via email or existing contacts. Recruitment was principally oriented to two main questions: the genealogy of the insect-based products discussed below, and the more general question of why certain species are used for human food applications and not others.

Not all attempts to organise interviews were successful. For example, some individuals involved with insect breeding did not respond to interview requests, and some requests to be put in touch with actors in the supply chain for insect-based foods were refused. However, development of the chapter's argument proceeded iteratively alongside the identification and interviewing of participants, with each informing the other. Thus, while the participants are not fully representative of the Dutch edible insect network, I would suggest their accounts are sufficient to address the central questions which motivated the research. As part of the iterative identification of relevant participants, a North American insect-based food producer was also interviewed: the objective was to investigate the determinants of species choice in that context.

The chapter also draws on semi-structured interviews with 40 consumers of a range of insect-based convenience foods in the Netherlands, all of whom had voluntarily purchased the foods and were recruited via in-packet flyers. Interviews typically lasted for 45-60 minutes, and were conducted in a location of participants' choosing (usually cafés). These interviews sought to understand how the insect-based foods were (or were not) integrating into people's diets. Participants were questioned about when, where and why they had bought and eaten the products, and whether/why they had (not) done so again. Interviews also involved broader discussion about participants' diets. This covered general practical aspects of shopping, cooking and eating, consumption of meat alternatives, and consumption of culturally unusual foods.

All participants provided informed consent, and interviews were recorded and transcribed. Coding and analysis of interview material was conducted using NVivo 11 software. All participants were anonymised. The research project under which interviews were conducted was granted ethical approval from the author's university.

5.6 – THE DUTCH EDIBLE INSECT NETWORK

Starting in around 2006, circuits of exchange between academia, policy and business in the Netherlands began to formalise into an edible insect network, with the shared goal of encouraging and facilitating insect consumption in the Netherlands and elsewhere in the West. The constitution of this network, and the ongoing mutual influence of its component parts, has led to a small number of species becoming relatively fixed as 'the' food insect species. This, I will suggest, has significant implications for the extent to which they are consumed. I explain the academic, governmental and commercial components of the Dutch edible insect network, before turning to a discussion of the legal and normative stabilisation of key insect species.

Academic interest

The Netherlands' Wageningen University and Research Centre (WUR) is a long-standing hub of research and advocacy relating to entomophagy. Academics at WUR – particularly the entomologists Arnold van Huis and Marcel Dicke – became increasingly interested in the subject throughout the 1990s and 2000s (van Huis et al., 2014). In 2006, Wageningen hosted the six-day City of Insects event: its exhibitions and activities included opportunities to learn about, and try, entomophagy (WUR, 2013). In 2009, Marcel Dicke gave a talk entitled (after Holt, 1885) 'Why not eat insects?' at TED Amsterdam. The following year he repeated the presentation at TEDGlobal, attracting significant global media attention (e.g. GrrlScientist, 2010), and by 2011 Dicke and van Huis were writing on the subject in the US popular press (Dicke and Van Huis, 2011). Such efforts intensified media interest in entomophagy within the Netherlands (van Huis et al., 2014), furnishing a discursive context in which related commerce and research developed. They also helped to bring the topic to global attention (van Huis et al., 2014).

Broader academic interest in the subject was also burgeoning during this period (e.g. Paoletti, 2005; Verkerk et al., 2007), and in 2008 a PhD project on insects as food and feed began at WUR (Oonincx, 2015). Since 2003 the FAO had also been engaged with the topic, holding a workshop focused on entomophagy in 2008 (Durst et al., 2010). Exchange between WUR and FAO paved the way for the landmark report on the subject discussed above (van Huis et al., 2013).[33]

At WUR in around 2006, plans were conceived for a large cross-departmental research project on entomophagy, involving collaboration with commercial insect breeders. The Dutch government offered their "verbal support" (WUR, 2014, n.p.) and reportedly were also involved with the development of the proposal.[34] The project was aligned with contemporary developments within the government itself.

Policy interest

In July 2009, the Dutch government laid out a strategic plan for the Netherlands to become a world-leader in sustainable food production and consumption within fifteen years (Ministerie van Landbouw, Natuur en Voedselkwaliteit, 2009), and announced €6m of funding for research and knowledge exchange in the area (Rijksoverheid, 2009a). In 2009-2010, a number of related government initiatives were launched. Some were targeted at consumers (Rijksoverheid, 2009a), while many focused on the sustainability of the production and supply of food (Rijksoverheid, 2009b, 2009c). The development of sustainable protein sources was a particular focus (Rijksoverheid, 2010a, 2010b).

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[33] Interview, WUR scientist.
[34] Interview, WUR scientist.

It was in this context that the WUR project – 'Sustainable production of insect proteins for human consumption' (SUPRO2) – was awarded in 2010, with funding of €1m. Project research investigated the nutritional and safety aspects of insects as food (Klunder et al., 2012; van Broekhoven, 2015; Yi, 2015), as well as their sustainability (Oonincx and de Boer, 2012) and consumer acceptance (Tan, 2017). Project stakeholders, including researchers, business and government representatives, met around every six months. From the outset, the project had substantial involvement from the burgeoning Dutch edible insect sector.[35]

Commercial interest

In the Netherlands in 2006-2007, Ruud Meertens, a breeder of grasshoppers for animal feed, came together with 'innovator' Marian Peters and poulterer Jan Ruig, and the three of them decided to commercialise insects for human food (van Huis et al., 2014). Mealworm producer Van de Ven was known personally to Meertens due to their geographical proximity, and expressed interest in joining.[36] Ruig suggested that a minimum of three insect species would be necessary for the commercialisation efforts (van Huis et al., 2014); consequently, the insect breeding company Kreca was contacted and agreed to produce the lesser mealworm for human consumption.[37] Together these parties formed VENIK, the Verenigde Nederlandse Insectenkwekers (Dutch Insect Breeders' Association) (van Huis et al., 2014).

WUR's Arnold van Huis was involved in some VENIK meetings from the outset, having become acquainted with them following Kreca's involvement in the City of Insects event. A senior project member from WUR reports that SUPRO2 was "also on behalf of the insect industry," referring to VENIK, who were present at, and chaired, all project stakeholder meetings.[38] Thus, the science and business sides of the Dutch edible insect network developed alongside each other, as part of a circuit of exchange. SUPRO2 was planned to begin with a broad species focus, to be narrowed as the project progressed. The species ultimately focused on corresponded with those that VENIK had been producing for human food (see the project literature cited above).[39] This emphasis has been reflected in ongoing academic research in the area (e.g. Azzollini et al., 2016; Hartmann and Siegrist, 2017; Hustinx-Broekman, 2017; Miglietta et al., 2015; Rumpold et al., 2014; Siemianowska et al., 2013; Stoops et al., 2016; Wynants et al., 2017). It may, I would suggest, be acting to normatively stabilise these species vis-à-vis human food applications.

Species selection

The early activities of VENIK's founding members established the first three insect species to be reared in the Netherlands for human consumption: the migratory locust (*Locusta migratoria*) – usually referred to, one assumes for PR purposes, by the taxonomically proximate designation of 'grasshopper' – the mealworm (*Tenebrio molitor*), and the lesser mealworm (*Alphitobius diaperinus*), which are both species of beetle larvae. From around 2007, VENIK began selling these species (whole and freeze-dried) to the Dutch public via Ruig's company (Kreca, 2011; van Huis et al., 2014). It was not until later that these began to be incorporated into different product types and sold elsewhere.

The locust and mealworm were not so much 'selected' as appropriate species for human food production as directed by existing socio-material arrangements. The locust was the only species

[35] Interview, WUR scientist.
[36] WUR scientist, personal communication, 2nd Feb 2017.
[37] WUR scientist, personal communication, 2nd Feb 2017.
[38] Interview, WUR scientist.
[39] Interview, WUR scientist.

that its breeder produced (Meertens Insectenkwekerij, 2010), and the mealworm was the species which its breeder specialised in (Van de Ven, 2009). Both companies had a history of producing its respective species for animal feed (i.e. for zoo animals and 'exotic pets' such as reptiles, birds and spiders).[40] As a result, the requisite technology and expertise had been developed around particular species.

Kreca, who provided the lesser mealworm, produced fourteen species (van Huis et al., 2014), and thus had more wide-ranging production capabilities. However, the lesser mealworm was chosen for its high protein content and for practical reasons, including ease of rearing, relative fecundity, reliable reproductive rate, and short lifecycle.[41] The selection of this species was thus primarily technical and instrumental rather than culinary, a point which has significant implications for its consumption.

The physiology, materiality and behaviour of the lesser mealworm has facilitated its 'enrolment' into human food production practices (Callon, 1984). This enrolment was not solely the responsibility of human actors, but was shaped by the diets of the reptiles and birds for which the insects were initially produced (cf. Callon, 2004). The selection of this insect was not directly determined, but was shaped by the pre-existing socio-material entanglements that provided the context of its choice. Indeed, these points apply equally to the grasshopper and the mealworm, whose selection was shaped by the 'heaviness' of the norms, expertise and technology within the insect rearing networks in which they were respectively situated (Håkansson and Ford, 2002).

These three species were the only insects reared for human consumption in the Netherlands until 2013, when a new company, DeliBugs, began producing the house cricket (*Acheta domesticus*) for human food.[42] Kreca, which had been rearing the insects since the 1980s (van Huis et al., 2014), began producing a food-grade version in around 2015.[43] The cricket is more difficult and thus more expensive to rear than mealworms and lesser mealworms, but has other reported benefits, such as superior taste (e.g. Hofsink, 2015) and versatility. Breeders can manipulate the taste profile and protein content of crickets by altering their substrate, which is made easier by the species' omnivorousness.[44]

A crucial aspect of the four main species' selection is their *affordances* for food production (Gibson, 1986; see also Bennett, 2007; Roe, 2006b). Mealworms and lesser mealworms remain within their substrate during rearing, and are thus easier for humans to manage and to enrol into food production networks.[45] "Behavior", as Gibson (1986: 135) argues, "affords behavior": in this

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[40] Interview, WUR scientist.
[41] Interview, scientist at a Dutch insect farm.
[42] Interview, Dutch insect breeder. Western companies also produce the banded cricket (*Gryllodes sigillatus*), but for present purposes it is not necessary to distinguish between cricket species.
[43] WUR scientist, personal communication, 2nd Feb 2017. It is unclear whether this development relates to a circuit of influence between Europe and the US, following the cricket's prominence in US edible insect production. In 2012, the first major US insect-based food – the Chapul cricket-based protein bar – was launched, itself a result of the global reach of Marcel Dicke's 2010 TEDGlobal presentation (Wilkey, 2012). The use of crickets reflects the prescriptive influence of existing socio-material assemblages seen in the Netherlands. Crickets were one among a limited range of species for whom an animal feed supply infrastructure had already been developed in the US (also for exotic pets), and were seen as a more palatable alternative to species such as cockroaches (Interview, North American insect-based food producer). Thus despite post hoc rationalisation regarding crickets' suitability as human food (e.g. Bennington-Castro, 2017), their selection was from a limited range of alternatives, shaped by existing socio-technical arrangements.
[44] Interview, Dutch insect breeder.
[45] Interview, scientist at a Dutch insect farm.

context, the erratic and energetic behaviour of certain species – particularly grasshoppers, but also crickets – makes them more difficult to manage during rearing. This has a direct impact upon the amount of human labour necessary to rear and slaughter them, which in turn impacts upon the cost of their production, their retail price, and subsequently their viability as a food ingredient.[46] Mealworms and lesser mealworms afford easier integration into food applications due to their physiology and behaviour. Crickets are more difficult to rear but assimilate the flavour properties of their feed, a balancing of physiological and behavioural characteristics that provides a crucial affordance for the human food producer.[47]

In a manner of speaking then, certain species 'resist' enrolment into the agri-food network (cf. Latour, 2000), while others collaborate in their enrolment. The intersecting *Umwelten* of different organisms – the aggregates of their respective affordances – "determine their possible interactions within an ecological complex" (Lorimer, 2007: 916; von Uexküll, 1957). In this case, that complex involves humans and technological artefacts, and pertains to the broader project of the construction of edibility. The extent to which particular species may 'become food' is influenced by the affordances of those species. Crucially, however, the affordances that ease the production of certain species are not necessarily still affordances in the rather different context of their consumption.

These four species – which I term the 'Big Four' – now represent the 'industry standard' food insect species in the Netherlands, and indeed across Europe. Their central position, I would argue, derives chiefly from the developments outlined above. However, their positioning within legislation and regulatory discourse has also been important in shaping the horizon of possibility for insect-based food, both within and beyond the Netherlands.

Legislation and regulatory discourse

A substantial influence on edible insects in Europe has been their position within European law. Until 2015, insects for human consumption fell into a legal grey area, in which no specific EU regulation dealt explicitly with them. Despite the lack of explicit regulation for food insects in the EU, general legislation such as the General Food Law (regulation EC No 178/2002) still applied, as did various regulations regarding the rearing and supply of insects (Federal Agency for the Safety of the Food Chain, 2014).

Under EU legislation (EC No 258/97) during this period, insects broadly fitted within the definition of 'novel food', defined by the European Food Safety Authority as "food that European citizens have not consumed to a significant degree prior to May 1997" (European Food Safety Authority, 2016, n.p.). For novel foods to be brought to market, they had to either be supported by a full risk assessment or by a demonstration that they had a history of safe use as a "traditional food" outside of Europe (European Food Safety Authority, 2016, n.p.).

However, when insects came to the attention of the European Commission in around 2011, it became apparent that the wording of the novel food legislation – which dealt with products obtained *from* animals, but not *whole* animals – did not fully account for food insects (Gleadle, 2011). As a corrective, new EU novel food regulations were announced in 2015, which came in to force on January 1st, 2018 (EC No 2015/2283). Those involved with the production and supply of food insects in Europe are now required to submit applications to have specific insects permitted for sale, via either the 'novel' or 'traditional' route (for a detailed discussion see Belluco et al.,

[46] Interview, scientist at a Dutch insect farm; interview, Dutch insect breeder.
[47] Interview, Dutch insect breeder.

2017). Prior to 2018, it was the prerogative of individual member states to decide whether to permit the sale of food insects. In certain states, such as the UK, sale of insect-based food was tolerated (Gaffey, 2015); in others, such as Italy, it was forbidden (Rettore, 2016). The relatively formalised context of regulatory permissibility in the Netherlands and Belgium played a significant role in the stabilising of the Dutch edible insect network.

In around 2010-2011, VENIK contacted the Dutch food safety authority (NVWA) to discuss regulatory requirements, and were asked to provide information about the safety of the species, which at the time was (and indeed, still is) limited. The NVWA also considered whether insects were a novel food, and their subsequent regulatory position.[48]

A temporary period of regulatory tolerance was agreed, whose boundary was the 2018 introduction of the revised Novel Food regulation.[49] This tolerance – which did not prescribe the insect species that may be used – was predicated on VENIK members' adherence to a 'standard control regime', incorporating general EU legislation regarding the production and supply of food (cf. Federal Agency for the Safety of the Food Chain, 2014). Specific food safety criteria for insect products were also established, including that insects must be prepared according to approved procedures (e.g. Hazard Analysis and Critical Control Point [HACCP]) and methods (i.e. blanching and drying), and must be labelled clearly due to potential allergenicity. The NVWA also requested that VENIK began to draft a hygiene code for the industry.[50] Dutch regulatory tolerance enabled the continued production of food insects in the Netherlands for both domestic use and international resale (e.g. Kreca Ento-Food, 2017c), and led to the presence of various insect-based foods in shops and restaurants in the country (e.g. Stevens, 2017). However, compliance with procedures to ensure food safety is expensive (e.g. Vandeweyer et al., 2017), which has ramifications for their feasibility as food.

Dutch regulatory tolerance was by no means a foregone conclusion. There remains a general lack of evidence regarding the food safety of insect species, and there are indications that the Big Four may have similar allergenic properties to house mites and crustacean species (Hustinx-Broekman, 2017). The context of permissibility in which Dutch insect producers continue to operate (and which due to exports, has a considerable geographic spread), was originally a relational achievement between governmental organisations: the Ministry of Economic Affairs (EZ), who promotes new protein sources, the Office for Risk Assessment and Research (BuRO), who carries out independent risk assessments, and the NVWA, who enforces food law. The tolerance period represents a balancing of interests. VENIK had provided the NVWA with assurances that insect consumption, in a global sense, was demonstrably prevalent and safe, despite lack of scientific data on the subject; further, the presence of a Dutch edible insect sector was in harmony with the contemporary governmental objectives around sustainable food production (particularly in the EZ). Thus, despite limited safety data, the decision was for regulatory permissibility rather than the precautionary principle (the more conventional standpoint of risk managers). Such tolerance is, of course, responsive, and would be revised should safety incidents occur. None has yet been reported, and the tolerance remains.[51]

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[48] Interview, NVWA employee.
[49] In effect the tolerance period has been extended. Under the revised Novel Food regulation (EC No 2015/2283), any species already legally sold as food prior to 2018 may continue to be sold without specific approval until 2nd January 2020.
[50] Interview, NVWA employee.
[51] Interview with NVWA employee.

Despite a lack of explicit legal prescription of permitted species in the Dutch context, regulatory discourse may have acted to further stabilise the centrality of VENIK's three original species in the Dutch edible insect network. In October 2014 the Dutch food safety authority produced an advisory report, in which the risks of the three species VENIK were selling to the public were assessed based on the available evidence (Bureau Risicobeordeeling & Onderzoeksprogrammering, 2014). This was not a legally-binding document, but summarised the state-of-the-art in relevant scientific research and set out recommendations regarding safe processing, possible allergen risks, and daily consumption limits. Although the document's formal role was limited to an advisory one, there are indications that it may be being used in a more directly prescriptive capacity, particularly when taken alongside a slightly earlier ruling from the Belgian food safety authority, the Federal Agency for the Safety of the Food Chain (FASFC).

In May 2014 the FASFC announced that the production and sale of ten insect species for human consumption would be tolerated in Belgium, provided that other more general standards and procedures were met (Federal Agency for the Safety of the Food Chain, 2014). These included "the application of … good hygiene practices … traceability … obligatory notification … labelling … and the implementation of [a] HACCP based self-checking system" (Federal Agency for the Safety of the Food Chain, 2014: 5). The ten species had been identified following an investigation into which insects were commercially available as food in Belgium, of which six species "appeared to be regularly offered for human consumption".[52] They included the Big Four, as well as morio worms (*Zophobas atratus morio*),[53] and wax moth larvae (*Galleria mellonella*). The FASFC statement noted that its ruling was subject to a safety assessment by an internal scientific committee (Federal Agency for the Safety of the Food Chain, 2014); this assessment was published in September 2014, confirming the tolerance of the ten species (Scientific Committee of the Federal Agency for the Safety of the Food Chain and Superior Health Council, 2014). Less than two weeks later, the sale of two ranges of insect-based food was announced in the country (Hope, 2014).

Two points are worth noting about the FASFC's safety assessment. Firstly, among the studies cited, the SUPRO2 research is prominent. This suggests that the constitutive circuit of exchange between policy, academia and business from which the research derived had implications for the establishment of food insects in Belgium. Secondly, the safety assessment cites a 2012 study from the NVWA, whose title is identical to that published in 2014 (Bureau Risicobeordeeling & Onderzoeksprogrammering, 2014). This suggests that the NVWA/BuRO investigation had been underway for some time, and that in-progress findings were shared with their Belgian counterparts, implying another point of exchange and mutual shaping in the network.[54]

5.7 – INSECT-BASED CONVENIENCE FOODS

At the time of research, perhaps the most prominent insect-based food in Europe was the Insecta range of insect-based convenience foods. Produced by the Belgian functional food company Damhert Nutrition, this range included products such as burgers, nuggets and schnitzel, which were very similar in appearance, taste and texture to vegetarian convenience foods.[55] Indeed, they

[52] Email enquiry to FASFC, 14 Feb 2017. Author's translation.
[53] Also known as 'superworms', this species is related to mealworms and lesser mealworms, but larger.
[54] I was unable to obtain formal confirmation of this point.
[55] The range can be viewed at https://web.archive.org/web/20170107180119/http://www.damhert.be/en/shop/insecta

were sold in the same section of Dutch supermarkets as vegetarian products (more on which below).

Production

The idea of producing an insect-based product range was reportedly conceived at Damhert in 2012, and was considered harmonious with their commercial positioning as a pioneer in functional foods and vegetarian products. Product development was a two-year process (2012-2014). The first year involved the identification of a supplier of insects, and then a production partner to manufacture the foods (a Dutch company with experience of producing vegetarian convenience foods). Identifying a production partner who was both willing and able to work with insects was reportedly difficult.[56] The second year was spent in product testing. When the products were ready, a Dutch retailer was identified.[57]

Each of these stages shaped Insecta in important ways, and contributed to how the products' edibility was constructed. I frame my account of this thematically rather than chronologically, by looking at species selection, product form, and retail.

Species selection

Species selection for Insecta was shaped by the dynamics of the Dutch edible insect network, which affected what was available and legally permissible at the time of product development. Damhert's insect supplier was Kreca (now Protifarm), who produced all Big Four species. These were the ones tested for product development, with mealworms and lesser mealworms ultimately being decided upon. These were reportedly deemed the tastiest species by internal tasting panels, due in part to their lack of hard shells, which were found to create a less pleasant end product. Fortuitously, these species were also substantially cheaper than crickets or grasshoppers.[58] Thus although the two "best" species were selected for use in the Insecta products based on the key criteria of taste and price, they were chosen from a small list of alternatives, whose legality and feasibility was prescribed by network dynamics.

Damhert sought to include the highest feasible proportion of insects in the products. To include less than 10% was seen as not "being honest" about creating an insect-based product. Different quantities of insects were tested, and the figure of 14% was eventually alighted upon. In addition to the key considerations of taste (not too strong) and price (not too expensive), this was partially due to the insects themselves: quantities of more than 20%, it transpired, were difficult to digest.[59] Thus, the materiality of the insects, by acting upon the taste buds and digestive systems of their human eaters, limited the range of and extent to which the insects were enrolled in the production of foods (cf. Bennett, 2007). It also affected the form of the resulting foods.

Product form

The form of the product range was shaped by a number of factors. The insects themselves had a role to play: test products involving whole insects were found to be too close to rotting meat in

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[56] Interview, Damhert product development manager. A separate interviewee (Dutch insect breeder), discussing the widespread caution food manufacturers still exercise towards integrating insects into food products, suggested that it may derive from the way in which insects have historically been treated as a contaminant in health and safety regulations.

[57] Interview, Damhert product development manager. The products have also been sold in Belgian shops since their launch. As I only have data on Dutch consumers and retailers, the present analysis is confined to the Netherlands.

[58] Interview, Damhert product development manager.

[59] Interview, Damhert product development manager.

appearance (Cardinaels, 2014), engendering an affective response – the 'yuck factor' – which directed product development to the use of grinding. Indeed, an employee at Kreca has also opined that mealworms are "not attractive" as food (quoted in Nooteboom, 2015, n.p., author's translation).

The Insecta products were deliberately not modelled on insect-based dishes from elsewhere in the world. Instead, insects were to be integrated into product types familiar to consumers in Belgium and the Netherlands. The target market segment was 'flexitarian' consumers: those who are deliberately looking to reduce their meat consumption for environmental reasons, but who do not object per se to the consumption of animals.[60]

The form of the foods was also affected by pre-existing expertise and business networks. Given their prior experience with vegetarian convenience foods, the production partner already had expertise with producing suitable recipes, and they also had a network of existing suppliers.[61] The pre-existence of expertise and ingredient supply networks are of course hugely useful in developing a new product, where starting completely anew may not be feasible. Yet the 'heaviness' of such networks acts upon and shapes the production process (Håkansson and Ford, 2002). Thus the recipes (and consequently the taste) of Insecta were affected by the production partner's earlier activities: they were not designed with a totally 'blank canvas'. [62]

Within Damhert itself product development involved a "really big group of people," among whom were internal taste panels, industry experts, and a research and development department, all of whom exerted an influence on the creation of Insecta.[63] Development of the range was also affected by feedback from the Dutch supermarket who arranged to stock Insecta.[64] Thus the products were not fixed, radiating out in a linear direction from the supplier, but rather shaped, and indeed *designed*, during the process of diffusion (cf. Bijker, 1995).

Retail

In the Netherlands, Insecta products were stocked in branches of Jumbo, a national supermarket chain. Trialled initially in a handful of stores in late 2014, they were rolled out across all 550 branches nationwide during 2015. By 2016 the number had been reduced to a relatively small proportion of branches, and their sale now appears to have ended.

The fact that Insecta were sold in Jumbo at all was the result of a number of contingent factors. The individual at Jumbo's headquarters primarily responsible for arranging the sale had been interested in the topic of insects as food for some years, yet was only able "to do something about it" relatively recently, having attained a position of appropriate seniority and the support of a sympathetic colleague in a different part of the company. Around the same time, the owner of

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[60] Interview, Damhert product development manager. For discussion of consumers' ethical positioning of Insecta products see Chapters 6 and 7.
[61] Interview, Damhert product development manager.
[62] It should be noted that the contingency and compromise involved in the production of Insecta is not particularly unusual in food product development. Companies must operate within the bounds of what is financially and practically achievable, and in the context of existing commercial relationships (Håkansson and Ford, 2002).
[63] Interview, Damhert product development manager. Indeed, to use the name 'Damhert' is to simplify or "punctualize" (Law, 1992: 385) a company which itself is a complex and contingent network of actors and interests. The extent to which the internal workings of the company affected the development of Insecta would offer a fascinating extension to the present case study, but unfortunately such data were unavailable.
[64] Interview, Jumbo category manager.

fifteen stores in the north of the country had also decided to start selling insect-based foods, which had directed discussion to the subject within the relevant echelons of the firm and led to the development of a unified strategy for the launch.[65] A number of relatively senior Jumbo employees were thus enrolled to the project of insects as food. Contemporary 'buzz' around the subject (Smith and Pryor, 2014a, e.g. 2014b; van Huis et al., 2013) furnished a propitious context, a space of "interessement" in which enrolment became feasible (Callon, 1984: 207). Jumbo's prevailing interests as an organisation – an explicit commercial orientation as a sustainable and forward-thinking retailer[66] – translated without difficulty into alignment with the project of insects as food.

The appearance of Insecta on Jumbo's shelves arose from circuits of exchange between Jumbo and other actors within the Dutch edible insect network, as well as the products' integrability within existing socio-technical arrangements. Selection of Insecta drew in part on the trust developed in an existing business relationship between Damhert and Jumbo. It was also directed by Jumbo's need to conform with general food safety standards, applied as a standard to fresh foods in general, which confined the range of appropriate insect-based food products to those produced in the EU. An alternative range of foods[67] was sold in the fifteen northern branches, but considered less suitable for national sale due to the presence of whole insects – the predicted affective response of consumers (the 'yuck factor'), relating to the materiality of the enrolled insects, shaping which products were actually sold. Insecta products were integrated within existing distribution networks established for the sale of fish; their presence in supermarkets was thus facilitated by the prior existence of socio-technical arrangements involving both human and more-than-human actors.[68]

The actual placing of Insecta products – in the aisle with vegetarian foods and other 'meat replacer' (*vleesvervanger*) products – was an individual decision, but was bounded by the socio-material entanglements in which it was exercised (cf. Garud et al., 2010). The individual at Jumbo responsible for the placement of Insecta noted that they made this potentially "polarizing" decision because Insecta seemed a better fit with other "protein alternatives" than conventional animal-based products. Market research had also indicated that vegetarians and flexitarians may be amenable to the product.[69] The practical reality of the physical arrangement of stores – not just shelves and aisles, but the other foods sold – provided the *relational* context in which these foods were placed. They may not have been an exact fit with falafel and soy-based chicken-style pieces, but were deemed to be more coherent with such products than with chicken breasts or beef burgers.

Consumption

Edibility

Despite the contingencies and compromise involved during the creation of Insecta, the resulting products reached – at least for some people – the stage of edibility: they had 'become food'. However, there are two caveats.

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[65] Interview, Jumbo category manager. The stores operate on a franchise system and thus have a relatively large degree of autonomy over the products they stock.
[66] Interview, Jumbo category manager.
[67] The range can be viewed at https://web.archive.org/web/20180420072818/http://www.conbuggie.be
[68] Interview, Jumbo category manager.
[69] Interview, Jumbo category manager.

Firstly, this population was limited, and among them only a small proportion continued to eat Insecta at least semi-regularly (discussed further below). Secondly, contra speculative arguments about the role of processed insect products as a 'gateway dish' entailing progression to acceptance of other insect preparations (see Chapter 9), there is no evidence that Insecta achieved the edibility of 'insects' in an abstract sense. Rather, edibility was bounded, pertaining to a specific product range.

Apropos of the edibility of insects in a more general sense, two rough groupings can be identified. There were those for whom the edibility of insects was *dependent* upon Insecta, and there were those for whom insects were, broadly speaking, *already* considered edible. Construction of the edibility of insects, by the supply-side hybrid collective (and in relation with consumer practices), was mostly an achievement only for the former group. For the latter group, Insecta chiefly represented a means of obtaining insect-based food. Nevertheless these are, I argue, differences of degree and not of kind: as far as Insecta represented a successful construction of the edibility of insects, it was in relation to a specific product type, processing method and insect species, and not necessarily of 'insects' more generally.[70] This point is, I would suggest, an important one, given the prevalent assumption in related research that overcoming the initial barrier to trial represents the main problem for efforts to increase acceptance of insects in general (e.g. Caparros Megido et al., 2016).

For some people, the edibility of insects derived from the form, type and placing of Insecta products. These participants reported that the edibility of Insecta was dependent upon the invisible inclusion of insects, reflecting arguments elsewhere that edibility depends on the tactical absenting of certain aspects of food (Evans and Miele, 2012; Sexton, 2016; Vialles, 1994). For example, one participant, Bianca, had not eaten a grasshopper when earlier given the chance due to its appearance, but was happy to eat Insecta. Another participant, Patrick, mentioned that the general lack of photos or information about Insecta's arthropod contents "made a difference" to his preparedness to eat them. These points related to the explicit production strategy outlined above, which sought to mitigate the 'yuck factor'.[71] The mealworm species used for the products were in this respect the most appropriate (from the range of alternatives), due to their relative unobtrusiveness.

Various facets of the 'meat replacer' form of the foods aided the construction of edibility.[72] A prominent aspect was the perceived sustainability of the products, which were positioned as such by Damhert (the range's tagline was 'Go Green – High Protein') and in broader entomophagy discourse (e.g. van Huis et al., 2013). Protein and nutrient content were also raised by a number of consumers. Co, one of a small number of participants who made no efforts to reduce his meat consumption (see Chapter 6), directly connected Insecta's protein content with its edibility. Discussing the unusualness of insects, he reported that "I'm not too fussed about trying insect products, because I know that they contain a lot of protein."

Others, for whom Insecta represented an alternative to vegetarian convenience foods, suggested the products' relatively high levels of protein and vitamin B12 were conducive to edibility.

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[70] A comparable example can be found in the 1960s US, when the positioning of certain raw seafood species as edible did not automatically entail the edibility of different raw species in sushi (House, 2018).
[71] Of course, here we are dealing with those who are willing to give insects a try: for many the 'yuck factor' is sufficiently prohibitive regardless of efforts to encourage edibility.
[72] Insecta products were overwhelmingly consumed instead of plant-based convenience foods rather than meat products, calling into question the extent to which they are fulfilling their purported environmental objectives.

Crucially, however, these considerations were often entwined with insects' ambiguous ontological position, somewhere between 'animal' and 'vegetable' (see Chapter 7). The conjunction of these factors appears to have opened up a space within ethically-oriented diets for the consumption of a new animal protein product, even in cases where animal consumption was otherwise limited or precluded. This space can be viewed as a relational achievement between consumer practice and the complex supply-side interactions which shaped and positioned the foods (both literally and discursively). It indicates the final form of Insecta was not necessarily the 'correct' way to construct the edibility of insects, but a particular, situated example of how edibility may be relationally achieved.

The relational nature of Insecta's edibility was further exemplified by the way in which the products were "punctualized" by consumers (Law, 1992: 385) who otherwise may not have eaten insects. That is, the heterogeneous supply-side procedures necessary to ensure the products' safety were assumed to have been fulfilled, due to the products' position on supermarket shelves. Mariska recounted the first encounter she and her boyfriend had with Insecta while shopping:

> Are we really going to do this? Will we do this? Yes, let's just do it. Yes – are we sure? Well, if it's in the stores we probably won't die from it, so let's just eat it … And that's why we were like, 'alright, these burgers are in the stores, so they must be edible'.

Punctualization was also evident in the group of people for whom acceptance of insects was not dependent upon Insecta. Maarten mentioned that he was interested in eating insects in general, and occasionally ate insects he found while out in the countryside. However, he was unsure about the safety of the species sold in fishing shops. Insecta were thus taken to represent a source of safe and available food insects.

For others in this latter group, Insecta had 'become food' largely because they were available and novel. These people were keen to eat insects, which was often part of an explicit general curiosity about food that reportedly led to the frequent sampling of new things. A number of people had tried both the whole insects sold in the Netherlands and one or more products from the Insecta range. Yet for these participants, the edibility of insects must still be understood as confined to the specific products available in the Netherlands. It is not possible to assume that sporadic consumption of certain kinds of insect-based food will automatically lead to the acceptability of other species or products (cf. Caparros Megido et al., 2016).

For all consumers, Insecta products represented the situated construction of the edibility of insects. It was simply that for some people, such as Maarten, this appears to have been substantially less dependent upon the specific attributes of Insecta. The groups are also not totally discrete. Bianca, for example, had happily eaten an ant while trekking through the jungle while on holiday, but would not eat a dried grasshopper upon her return to the Netherlands. Edibility is situated and constructed: acceptance of 'insects' is a misnomer. In countries where certain insect species are consumed, acceptance of insects is confined to particular species positioned as edible (Tan et al., 2015; Yates-Doerr, 2015b).

Despite the varying degrees of ease by which Insecta became positioned as edible for different participants, they were in another way largely united. Overwhelmingly, they did not consume Insecta regularly. The successful construction of edibility in *principle* for a particular food does not mean that people will actually eat it in *practice* (cf. Waitt, 2014).

Routinisation

Consumption of Insecta products was low, and repeat consumption infrequent. The placing of Insecta products had a bearing on whether, how, and to what extent they were consumed. However, so did other aspects of the products, whose genealogy extended back into the Dutch edible insect network. These were the form, price, taste and availability of the foods.

The *form* of Insecta was, as noted, highly comparable to vegetarian convenience foods or 'meat replacers'. This 'scripting' (Akrich, 1992) was furthered by their *placing* among such foods. Consequently, Insecta tended to be situated as a 'meat replacer' within food provisioning and consumption practices, which positioned them as one among an extensive array of feasible alternatives. Thus framed, Insecta were assessed according to criteria that typically applied to such foods (see Chapter 9).

For example, the *price* of Insecta – at the time of research, €3,95 per pack – was higher than most comparable alternatives, and impeded repeat consumption. The relatively high price related to the insects' cost, itself shaped by species behaviour, the socio-technical arrangements of rearing, and compliance with food regulations and safety procedures.

For a third of participants, the *taste* of Insecta was judged good enough to encourage consumption. For others, who were more ambivalent, it was not. Such consumers reported finding the taste of the Insecta burger "a bit boring" or "a bit dull", which may have been related to efforts to create a versatile product without any overpowering flavours. Indeed, the general orientation of product development was to integrate insects invisibly into familiar product forms, which itself derived from available species (and the associated circuits of exchange 'further back' in the production network), pre-existing knowledges, production methods and resources, and established socio-technical arrangements. Key among this was the balancing of demands for an "honest" quantity of insects with those around price and palatability.[73] It appears the finished range reflected these compromises, in part, through its taste. Although the range did include a more heavily spiced product (see Chapter 1), the central principle was still of concealment rather than centrality of insect flavour, a strategy which has elsewhere been questioned (e.g. Chapter 6). The latter product was also seldom available.

Indeed, the general *availability* of Insecta was limited. This was partly because it was sold only in one chain, which comprised 17.4% of Dutch supermarkets at the time of research (Distrifood, 2017). Participants reported not always shopping in the same place, due in part to the web of other social practices affecting food provisioning. Further, given Insecta's positioning as one-among-many meat replacer products, where it was unavailable alternatives were simply selected instead. Availability was also limited within stores, who could exercise a degree of autonomy in deciding which products to stock. In many stores Insecta was only intermittently available; when available, it was often only one product from the range (usually the burger). These points precluded routine integration of the foods into diets, either directly (when out of stock) or in terms of dietary variation: people tended to report that they repeatedly ate the same products only when the taste was exceptional, and/or if they were highly versatile (for example, relatively 'unscripted' chicken-style pieces rather than a more heavily scripted burger product).

[73] Interview, Damhert product development manager.

5.8 – DISCUSSION

Developed in the context of the Dutch edible insect network, Insecta was a range of insect-based food whose edibility was successfully constructed. Edibility was nevertheless limited to a specific configuration of insects, preparation methods and other ingredients, and was constructed and negotiated through exchanges within the socio-material assemblage of the 'hybrid collective' that produced the food. Further, complexities and contingencies in the production process also impacted upon the products' consumption. A tension was evident between the network interactions necessary to create an edible product, and those which would facilitate routinisation. In Callon's (1984) terms, the stage of interressement – in which consumers tentatively engaged with the edible insect project (i.e. trial consumption) – was reached; the enrolment of consumers, in which their sustained participation (i.e. routine consumption) is achieved, was not.

The success of a given initiative depends upon the enrolment of relevant actors, including users or consumers as well as a project's architects. Examples include the achievement of a working technology (Callon, 1986), the successful implementation of a regulatory measure (Shove and Walker, 2010), and the present example of 'things becoming food'. Success is not pre-determined but rather an emergent property of relations within a network of relevant actors, relating to the translation of actors' interests to the initiative's aim (Latour, 1996). If translation is successful and relevant users or consumers are enrolled, the project succeeds, as with the congestion charge in London (Shove and Walker, 2010). If users are not enrolled, the project fails, as with the widely-ignored public smoking ban in Greece (Stamouli, 2017).

In the present example, emergent problems in translation are chiefly engendered by the insects themselves. As Yates-Doerr (2015b: 106) observed following lab ethnography at WUR, "insects that are easily mass-produced are not the insects people typically want to eat". Insects which are 'good for science' or 'good for entrepreneurs' are not necessarily 'good to eat'. Amidst present network relations, the Big Four insect species are the point at which the "chain of translation" (Latour, 1996: 33) necessary to enrol European diners to the entomophagy project is broken. Under current conditions, therefore, these insects do not appear to be suitable for use as human food.

This is not an inherent property of the species in question. It derives from their articulation within the socio-material entanglements of the Dutch edible insect network. Situated instances in which these insects 'became food' indicate how the brief but propitious alignment of interests within a given set of network relations engenders the construction of edibility. The interests espoused by supply-side actors regarding insects as food – principally, healthiness and sustainability – are shared by consumers during instances of consumption.

Yet for consumers, the routine consumption of foods also involved the fulfilment of interests that diverged from the Dutch edible insect network's dominant orientation towards sustainability. These pertained to the accomplishment of enjoyable and achievable food consumption, relating to factors such as price, taste and availability. Consumers' sustainable eating objectives were often fulfilled by similarly positioned foodstuffs, such as plant-based 'meat replacer' products, which simultaneously fulfilled the more conventional food-related interests (see Chapter 9). Consumers were therefore enrolled to the consumption of different 'sustainable' or 'healthy' foods. Although interests relating to sustainability/health and enjoyable/achievable food consumption were not inherently mutually exclusive, they were generally not both fulfilled by Insecta.

I would suggest that under current network conditions, the Big Four insect species are the network entities which render these two interests irreconcilable. These species, it appears, are rather difficult to make into products that people want to eat regularly. They dominate the horizon of possibility for Western insect-based foods, but this is not because they have been independently determined to be the 'best' species for the purpose. Their dominance is the product of contingency and circumstance, and should perhaps be challenged.

These points have practical implications. For those wishing to produce and promote insects as food in the West, identification of alternative species may be necessary. I have argued elsewhere that the successful introduction of novel ingredients relates to the 'cultural intelligibility' afforded by their emplacement within a coherent framework of culinary practices, such as those associated with a particular cuisine (see Chapter 9). Such positioning may help to facilitate the continued enrolment of consumers, although this would still ultimately depend upon the successful alignment of interests across the network of production and consumption (cf. House, 2018). If suitable insect species could not be reared, for example, the 'chain of translation' would again be broken.

These arguments also have epistemological implications, particularly regarding research into Western 'consumer acceptance' of insects as food (see Chapter 6). Low consumer acceptance of entomophagy in the West is not derived from intangible "cultural barriers" (Looy et al., 2014: 131) but rather from the specific socio-material relations that obtain in the contexts of Western insect consumption. This view involves a radical shift in emphasis regarding how we might investigate and understand 'barriers' to consumer acceptance. It is not simply that supply-side actors have yet to refine their efforts, or that consumers have yet to be 'convinced'; it is the insects themselves, and the networks in which they are involved, that are the problem. Of course, this does not imply that the insects are wilfully conspiring against their consumption. Rather, the way in which the insects are mobilised and articulated as edible within current network relations mitigates against their acceptance, which I suggest should be understood as routine consumption.

Future research should acknowledge the operation of distributed agency in the acceptance of insect-based food, which evidently involves more than convincing or educating consumers (cf. Reverberi, 2018; WUR, 2017). The success of insects as a Western food source will depend upon the alignment of actors across the production, supply and consumption of food, accounting for both the sustainable and more conventional orientations of food consumption. Orienting efforts around a suitable cuisine, rather than abstract sustainability objectives, may be a fruitful avenue of enquiry in this respect (see Chapter 9). A culinary focus may also offer a way out of the impasse highlighted above, in which efforts to achieve edibility also work to preclude routine consumption. Although the tactical absenting of animal ingredients may encourage consumption of food in certain contexts (e.g. Evans and Miele, 2012), this principle does not appear to easily translate to insect-based foods.

In highlighting the complexity and contingency at work in the construction of edibility, the present findings also have implications for research within food geographies and critical food studies more broadly. To the extent that edibility was deliberately constructed by certain actors in the Dutch edible insect network, it was only within the context of existing socio-material entanglements that decision-making agency was exercised (cf. Garud et al., 2010). Agency in the construction of edibility is distributed: the "heroic entrepreneur", acting in isolation, does not exist (Drakopoulou Dodd and Anderson, 2007: 349). Thus, accounts of novel food products which foreground the strategies of individual firms in the formation of edibility (e.g. Sexton, 2018) elide the constitutive role of the numerous 'unseen' actors, both human and more-than-

human, which together act to position particular foods as edible. Edibility can be understood as a network effect: while human actors may exert disproportionate influence on the network and enrol other actors, these activities are dependent upon network relations with other entities. It is *together* that these entities are constitutive of edibility.

Further, edibility does not necessarily imply consumption. While on the face of it this is a rather obvious point – one may recognise Brussels sprouts as edible, for example, without actually wanting to eat them – it has significant implications for efforts to construct the edibility of *new* foods, an area of ever-increasing relevance both for those seeking to produce 'sustainable' foods and those trying to account for them theoretically. Explorations of how edibility may be constructed for potential protein sources that do not fully engage with consumption (e.g. Probyn, 2011; Sexton, 2018; Stock et al., 2016) are thus limited, despite being analytically rich and advancing debates substantially beyond narrow, speculative research into 'willingness to eat' such foods (e.g. Gmuer et al., 2016). Edibility cannot be achieved without consumers: it is, to a significant extent, *relational* (Roe, 2006a, cf. 2006b). Thus, some investigation of the role of consumers – i.e., how, why and to what extent newly or provisionally 'edible' foods are consumed – is essential in future research on the construction of edibility.

Future geographic analysis into 'things becoming food' should also attend to the dynamic way in which edibility and routinisation are related. Edibility and routinisation may be achieved concurrently, such as when a new food is introduced into a new context along with an associated bundle of production and consumption practices in which to 'make sense' of it (e.g. Chapter 9). Yet it is clear that edibility and routinisation are distinct things. Efforts to understand the introduction of new foods – or the ways in which foods stop being eaten (cf. Houlihan, 2003) – would profit from attending to both. Future research should accommodate strategies to construct edibility, the geographic and sociological dimensions of routine food consumption, and the relationship between them.

To make such arguments is, of course, to reiterate an established principle within geography and cognate disciplines: that the study of food should account for both production and consumption, to at least some extent, if it is to lay claim a reasonable degree of analytic veracity (e.g. Goodman and DuPuis, 2002; Mintz, 1985). That point bears repeating here, I would suggest, in the context of efforts to create and to understand new, more 'sustainable' foods, and indeed in relation to efforts to understand the shifting contours of food consumption in more general terms. Edibility is a relational achievement at the confluence of production and consumption, which nevertheless does not imply that foods will be routinely consumed. Further, edibility is a quality of food – like taste (Cook, 2018) or freshness (Freidberg, 2009) – where apparently subjective and intangible qualities have direct commercial implications, as well as significance in terms of sustainability. Its complex geographies merit further investigation.

Chapter 6 – Consumer acceptance of insect-based foods in the Netherlands: academic and commercial implications

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6.1 – CONTEXTUALISING REMARKS

This chapter sees a switch of analytic focus, from production to consumption. It first provides an extensive review of literature pertaining to Western consumer acceptance of insects as food, which was current up until the point the revised chapter was submitted for publication in July 2016 (literature published since, which has not broken in any significant way with earlier work, was discussed in Chapter 1). It then presents some of the foundational results of the thesis, in which three key arguments are made.

First, 'consumer acceptance' of insects as food involves more than psychological factors (such as attitudes and beliefs), and is also constituted by a range of social and practical factors. Second, efforts to gauge consumer acceptance in whole populations may be misguided, and based on a misapprehension of how novel foods have become successfully established in the past. Third, factors affecting trial consumption of insect-based foods and those affecting repeat consumption are different, with the latter reflecting those typically associated with mundane food consumption. Three of these factors – price, taste and availability – play a decisive role in the 'acceptance' of insect-based food, and their incorporation within routine consumption practices. They recur throughout each of the analyses in the four empirical chapters.

A further factor – insect-based foods' degree of 'fit' with established eating practices – is also a central analytic theme in other empirical chapters, but is approached in a slightly different way in each. In Chapter 5, insects were positioned as 'edible', as a result of the confluence of production, supply and retail practices; in Chapter 8, they are theorised as part of particular 'modes' or 'phases' of mundane food consumption; and in Chapter 9 their place as part of an established cuisine is considered.

In the present chapter, the focus is on how insect-based foods 'fit' with people's established eating practices in a relatively direct, practical sense. However, products did not simply 'fit' or not 'fit' into eating practices. The question of 'fit' principally relates to two key dimensions: 'fit' into meal types, and 'fit' within everyday routines (both culinary and otherwise). These include, for example, the products' (lack of) integration with the typical repertoire of evening meals and how those were constituted (in particular, how frequently meat substitute products were consumed, and in what kind of meals); the way in which relevant meals – typically, the main evening meal – were constituted among and through the intersection of the other social practices, such as work, childcare and leisure, that comprised the rhythms and routines of people's daily lives; and relatedly, the way in which the rhythms and routines of *other* people's lives (often, but not always, co-habitants) influenced the extent to which insect-based foods were consumed.

This chapter addresses **RQ1** ('How are insect-based foods being integrated into established practices of food and eating in the Netherlands?'), **RQ2** ('How does the integration of insect-based foods into eating practices relate to other aspects of food and eating?') and **RQ3** ('If insect-based foods are not being integrated into eating practices, why not?').

6.2 – 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 chapter 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.

6.3 – 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., 2017), 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., 2017) 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 and Parrella, 2015) and 'healthiness' (Payne, Scarborough, et al., 2016) of food insects relative to conventional sources of animal-based protein are debated; further research into the nutritional content (Payne, Scarborough, et al., 2016; Shockley and Dossey, 2014; Testa et al., 2017), safety, and allergenicity of food insects is needed (Belluco et al., 2013; Finke et al., 2015; Testa et al., 2017); development and automation of rearing and processing technologies is required (Rumpold and Schlüter, 2013); and current EU legislation is prohibitive[74] (Belluco et al., 2013; Finke et al., 2015). In addition, the issue of consumer acceptance remains problematic.

[74] 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

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, 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 chapter 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 chapter: 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 et al., 2015; Ruby et al., 2015) or willingness to adopt them as a meat substitute (Hartmann et al., 2015; Schösler et al., 2012; Vanhonacker et al., 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 (Ruby et al., 2015; Sogari, 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; Vanhonacker 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

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sale of foods containing certain processed insect species (Bureau Risicobeordeeling & Onderzoeksprogrammering, 2014; Federal Agency for the Safety of the Food Chain, 2014).

(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 et al., 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 and 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., 2014), when participants have eaten insects previously (Lensvelt and 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 et al., 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 and 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 (Verneau et al., 2016: 34–35). 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, 2015b).

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 et al., 2010; Yen, 2015), South America (Onore, 1997; Ramos-Elorduy, 1997b), or sub-Saharan Africa (Ayieko et al., 2010; Raffles, 2010). A recent review of North American entomophagy (Schrader et al., 2016) provides a comprehensive account of indigenous and settler insect consumption, but is confined to historical rather than contemporary analysis. Studies which provide empirical data on insect consumption in the contemporary West are scarce, no doubt because until recently it was an uncommon practice. Isolated examples include the importing of particular insect species for sale to Asian communities in the United States (DeFoliart, 1992) and the consumption of bee brood by Czech beekeepers (Bednářová et al., 2013), or of moths by children in parts of rural Italy (Dreon and Paoletti, 2009; Zagrobelny et al., 2009), although the latter practice seems to have ended by the 1970s. Despite the recent growth of Western interest in entomophagy, there is a dearth of systematic research on the consumption of any of the new insect-based products. The present chapter seeks to make a contribution in this area.

Within the existing literature on Western consumer acceptance of insects as food, two general tendencies are identifiable: an analytic emphasis on the individual consumer, and the treatment of consumer acceptance as a general issue. Each of these, it is argued, should be subject to critical scrutiny, particularly during the design of future research.

Consumer acceptance tends to be treated as something which inheres largely in the individual. Studies examine the degree to which individual attitudes, preferences or traits – such as disgust sensitivity or food neophobia – are associated with one's inclination to consume insects (Hartmann et al., 2015; Ruby et al., 2015; Schösler et al., 2012; Schouteten et al., 2016; Sogari, 2015; Vanhonacker et al., 2013; Verbeke, 2015; Verneau et al., 2016). Naturally there is a degree of variability within this body of work regarding the degree of emphasis accorded to cognitive factors: for example, the suggestion that information provision may positively affect acceptance (Lensvelt and Steenbekkers, 2014; Sogari, 2015; Verneau et al., 2016) has met with disagreement from those who question the extent to which cognitive arguments are likely to affect uptake of insect-based food (Hartmann et al., 2015; Tan et al., 2016; Verbeke, 2015). Studies in this vein also recognise and attempt to gauge the likely influence of other factors on acceptance such as demographics, product attributes, or cultural context, but still on the whole accord primacy to the psychology and preferences of the individual consumer.

Even in work which foregrounds the role of affective, emotional, or non-conscious psychological processes in directing food choice (Gmuer et al., 2016; Schouteten et al., 2016; Verneau et al., 2016), the locus of consumer acceptance is nevertheless held to be *individual choice at the point of consumption*, emphasising cognitive rather than contextual factors. These latter studies acknowledge the difficulty in forecasting 'actual' consumption from web- or lab-based research, but nevertheless imply a substantial degree of coherence between participants' evaluations and their future consumption behaviour. This type of work holds that consumer attitudes or responses are remarkably durable and coherent across different social contexts, and downplays the extent to which food consumption – in the context of 'real life' mundane eating practices – is influenced by social and practical factors, as well as by products themselves.

While generally neglected, it is important to clarify that contextual factors or product attributes (including factors such as availability) *are* acknowledged by some researchers (Lensvelt and Steenbekkers, 2014: 545–546). Foremost among these factors is taste. Hartmann et al. (2015), for example, note that the sensory properties of insect foods are likely to be more influential than perceived nutritional benefits (see also Tan et al., 2015; Verbeke, 2015). It is simply that product

attributes beyond taste – such as the price and specific form of insect foods – and, to a greater extent, contextual factors and the influence of existing social or culinary practices, tend to be accorded less analytic emphasis within the existing literature than individual attitudes or preferences.

While attitudes towards food, individual dispositions, and the sensory evaluation of foods are unarguably important aspects of the formation and maintenance of diets, the degree of emphasis placed on the role of the individual in food selection in recent consumer acceptance research can be critiqued by those who emphasise the habitual, embodied aspects of food provisioning, the importance of social practices in directing food consumption, and the influence of one's social and cultural, as well as physical, environment in directing mundane consumption (Delormier et al., 2009; Halkier, 2010; Halkier and Jensen, 2011; Molander, 2011; Southerton et al., 2004; Warde, 2005, 2016). For example, Halkier and Jensen (2011) argue that food consumption is highly relational, arising from the intersection of a range of other practices such as work, school, care, and socialising. Halkier (2010: 36) sees food consumption as being dependent upon practical and social 'do-ability', given the constraints of one's social and material environment. Indeed, the notion of 'food choice' itself is problematic (especially for those on limited budgets, but also more generally), as it emphasises individual decisions rather than the socially embedded nature of much food-related behaviour.

If we consider the issue of consumer acceptance from this perspective, some limitations of the current body of research are illuminated. Factors such as price, availability, and a product's degree of fit with existing eating habits – which evidently exert a substantial influence on mundane food consumption – tend to be positioned as 'product attributes' within work that otherwise foregrounds individual attitudes and preferences (e.g. Lensvelt and Steenbekkers, 2014). Although price and availability (Lensvelt and Steenbekkers, 2014; Looy et al., 2014) of products are recognised within the existing literature as having a likely bearing on the adoption of insects as food, as is the degree of fit which insect foods have with existing culinary practices and knowledge (Looy et al., 2014), these factors have not hitherto been foregrounded in consumer acceptance research. Practice-based accounts of food consumption (Delormier et al., 2009; Halkier, 2010; Halkier and Jensen, 2011; Molander, 2011), system-level analyses of insects as food (Shelomi, 2015), and accounts of the construction of 'edibility' (Sexton, 2014; Stock et al., 2016) all indicate that supra-individual factors are likely to be at least as important as individual ones when determining whether or not insects are successfully incorporated within existing dietary routines.

A shift in epistemological emphasis, away from individual attitudes and preferences towards the contextually embedded, practical realities of food consumption, may also necessitate new methodological approaches. Web-based surveys and controlled taste sessions, for example, cannot tell us how insect-based foods will actually work in social context. The provision of information about insect-based foods for participants in a controlled study may be associated with greater acceptance of such foods (Lensvelt and Steenbekkers, 2014; Schouteten et al., 2016; Verneau et al., 2016), but people's use of information in the 'real life' context of food provisioning and consumption is much more fragmentary and contingent (Warde, 2016). Simply informing consumers about the relative benefits of eating insects is manifestly insufficient to induce consumption (Hartmann et al., 2015; Tan et al., 2015, 2016). Having recognised this point, it follows that more empirical studies of 'actual' instances of insect consumption in the West are necessary, as the kind of effects observed in controlled studies may not be reflected when products are situated within the context of mundane food practices.

This is not to say that much of the existing body of consumer acceptance research should be disregarded. Large-scale surveys are useful in identifying likely 'early adopters'[75] of insects as food (Hartmann et al., 2015; Verbeke, 2015), and sensory tests offer a useful resource in the development of insect-based products (Caparros Megido et al., 2014) that are both tasty and culturally appropriate (Tan et al., 2016). These are important areas of research for efforts to develop insects as human food in the West. It is simply that a link between reported willingness to consume insect-based foods and 'actual' future consumption must not be assumed. The influence that social practice, social context and the specific characteristics of particular products exert on food consumption requires empirical research. As Payne et al. (2016) note, the lack of coherence in the findings of recent consumer acceptance research is probably due to the influence of the widely different methodologies, contexts, and products used in those studies.

The second broadly identifiable trend in the existing literature is that consumer acceptance of insects as food is treated as a *general* issue. Although few studies have empirically assessed the overall levels of consumer acceptance of insects as food in general population samples (Ruby, Rozin, and Chan, 2015; Verbeke, 2015), across the literature the key to gaining Western consumer acceptance is largely framed as a question of identifying and reducing obstacles to wider acceptance in whole populations. Scholars identify a need to counter the Western cultural stigma associated with the consumption of insects (Costa-Neto and Dunkel, 2016; Hartmann et al., 2015; Lensvelt and Steenbekkers, 2014; Looy and Wood, 2006; Mlček et al., 2014; Shockley and Dossey, 2014), via strategies to educate the public (Looy and Wood, 2006; Rumpold and Schlüter, 2013), change attitudes (Lensvelt and Steenbekkers, 2014; Looy et al., 2014; Looy and Wood, 2006; Shockley and Dossey, 2014; Verneau et al., 2016; Yen, 2009a) and overcome disgust (Belluco et al., 2013) or neophobic reactions in Western consumers (Hartmann et al., 2015; Shockley and Dossey, 2014). Costa-Neto and Dunkel's assertion that "There is a need to eradicate or greatly reduce the Western-driven stigma over the use of insects as food" (Costa-Neto and Dunkel, 2016: 54) is a fairly typical example of how the issue of consumer acceptance is framed.

Yet to conceive of an entire population – or even substantial parts of one – as the appropriate target for efforts to introduce a new food may be misguided. Instead, it is the 'early adopters' that most merit scholarly attention. Before one can start to think about increasing the general acceptability of a particular food, some degree of established consumption must be achieved, however small, on which greater acceptance can be built. This approach does not emphasise *reducing or changing negative attitudes* in the general population, but *increasing the positive and distinctive attributes* of insect-based foods, such as their taste (Deroy et al., 2015), so that a relatively small but established number of repeat consumers can be attained. In an excellent analysis of the problems facing the societal diffusion of insect-based foods, Shelomi (2015) makes the point that poor availability is likely to hamper Western uptake of insects as food as well. He argues that while there has been an overwhelming focus on efforts to increase demand for, and acceptance of, edible insects in general, "[t]hese efforts ignore the fact that changes in values are often supply driven, and not the other way around" (Shelomi, 2015: 315). Indeed, supplier-induced demand has elsewhere been identified as a defining aspect of the successful establishment of new food products within Western diets (Mintz, 1985). While it is crucial to acknowledge that supply-side changes in food distribution cannot alone account for a new food's popularity – the

[75] The term 'early adopters' is used in this chapter to refer to consumers who are among the first to adopt a new food. The term's usage here is more general than its use within 'diffusion of innovations' research (e.g. Shelomi, 2015), where it refers to the *second* wave of innovation diffusion after a small number of 'innovators' have first adopted the practice.

"[c]onsumption and production" of food, Murcott (Murcott, 2001: 11) argues, "are mutually constitutive" – historical evidence suggests that demand for new foodstuffs is nevertheless substantially affected by increases in supply (Ellis et al., 2015; Mintz, 1985). A particular food must be widely available if it is to become an accepted and integrated part of people's diets.

Whether or not, as Shelomi asserts, edible insects are a "failed innovation" (Shelomi, 2015: 314) is open to debate, but it remains that in scholarly and commercial efforts to develop insect-based foods greater attention could profitably be paid to foods that have previously been 'novel' and that have gradually gained widespread acceptance in the West. Studies of this type tend to show that new foods gain popularity in one small segment of society first, before diffusing further. This has evidently been the case with sugar (Mintz, 1985), tea (Ellis et al., 2015; Mintz, 1985), sushi (Corson, 2008; Issenberg, 2007), and white bread (Mennell, 1996). Such diffusion is manifestly not attributable to simple attitudinal change, but rather to changes in price, availability, symbolic value, and social practices associated with the novel foods in question (Ellis et al., 2015; Mennell, 1996; Mintz, 1985). Importantly, novel foods do not remain fixed as diffusion occurs, but rather change and develop during the process of diffusion, as indeed other innovations – such as the domestic freezer – do as well (Shove and Southerton, 2000).

The two tendencies in the literature identified above are therefore open to critique on the grounds that a) food choice is not solely an individual matter, but rather is also substantially dependent on price, availability, habit, routine, social context and social practice, and b) that research into consumer acceptance would be well served by focusing on early adopters rather than general populations, as it is the early adopters who ultimately determine if a novel food will stand or fall. These points provide the general theoretical context for the explanation of the empirical work which constitutes the remainder of this article, a study of consumers of insect-based convenience foods in the Netherlands.

6.4 – METHODS

This chapter is based on 33 semi-structured interviews with Dutch consumers of the Insecta range of insect-based convenience foods, produced by the Belgian company Damhert Nutrition (http://www.damhert.be/en/shop/insecta).[76] The range includes burgers, nuggets, schnitzel and 'pittige punten' (a spicy triangular product, similar in appearance to a hash brown or potato croquette), all of which are made with vegetables and 13-15% ground-up buffalo worms, the larvae of the *Alphitobius diaperinus* beetle. The buffalo worms are not visible, and – in the author's opinion – the taste of buffalo worms is not particularly prominent, and likely to be identifiable only to those who have previously eaten the insects in their whole form. The products require cooking in a comparable way to conventional vegetarian convenience foods. For example, the Insecta burger is cooked by frying for two to three minutes, or heating in an oven for nine minutes.[77] The Insecta products were available in branches of Jumbo, a Dutch national supermarket chain, during 2015. They were typically stocked alongside other 'meat substitute' products such as soy- or vegetable-based convenience foods.

In order to recruit participants, small recruitment cards were added to packs of the convenience foods sold across all branches of Jumbo during September and October 2015. The cards explained

[76] At the time Chapters 6 and 7 were written, the full number of 40 interviews in Phase 1 of the research had not been completed.
[77] A number of high-quality images of the Insecta burger, including a cross-section of the cooked product, are available at http://glowofbeauty.nl/insectenburger/.

that consumers of the insect-based foods were sought for an interview, and that on completion of an interview they would receive a small cash remuneration.

Registered individuals were contacted in Dutch to ask if they wished to proceed with an interview, and if they were comfortable conducting an interview in English. 10 interviews were conducted in Dutch by a research assistant, and 23 interviews were conducted in English by the author. Interviews were all conducted in person at a location of the participant's choosing, except one of the Dutch interviews, which was conducted via Skype. Interviews were recorded with audio recorders. The research received approval from the University of Sheffield's internal ethics committee, and participants signed consent forms prior to the interview. All interviews were transcribed and the Dutch interviews were translated into English. The transcribed interviews were coded by the author using NVivo.

A basic interview schedule asked direct questions about the product, such as why it was chosen, how it was eaten, whether it was enjoyed, and whether it would be bought again, plus some broader questions about meals typically eaten, dietary preferences, and how food was provisioned.

It is important to acknowledge here that the following analysis is based on participants' reported – rather than 'actual' – food consumption and associated practices, although in the interest of readability the chapter refers to what people do, rather than what they say they do. Jerolmack and Khan (2014) have argued convincingly that it is a fallacy to assume a direct link between reported accounts of behaviour and the practical reality of that behaviour. Further, interviews (and indeed other modes of social research) are not static examples of 'objective' data, but rather are co-produced between interviewer and interviewee (Pink, 2012). To assume a perfect account of consumer behaviour is unproblematically accessible via reported accounts is to make assumptions about the relationship between talk and action comparable to those which prevail in much of the consumer acceptance work discussed in the foregoing literature review. However, a defence of the use of interview methods in this context can be advanced along the following lines.

Firstly, the present study uses reported accounts to investigate what participants *have* done, rather than what they think they *might* do. This approach is rare in existing work on Western consumer acceptance of insects as food, and it is argued that it represents a needed addition to the literature. Studies which use reported accounts to investigate participants' 'willingness to eat' insect-based foods (e.g. Gmuer et al., 2016), by contrast, assume that imaginary eating events are equally amenable to investigation via self-report, which is arguably somewhat more problematic. Secondly, it is important to address the argument that the embodied, habitual nature of many social practices leads to deficiencies in spoken accounts of them (e.g. Martens, 2012). This potential methodological drawback is important to acknowledge, but there are numerous examples of insightful work on food and social practices that use interview data as a significant (if not always exclusive) component (Evans, 2012; Halkier and Jensen, 2011; Meah and Watson, 2013; Warde, 2016).

The themes outlined below represent the strongest aspects to have emerged from the data, and while they cannot necessarily be said to represent the most salient factors for all consumers of insect-based convenience foods, they are a strong, empirically-grounded set of themes which are likely to reflect the broader group of consumers of insect-based convenience foods from which this group of participants was drawn.

6.5 – RESULTS

Overview of participants

In line with the theoretical foundation of the research, analysis focused on participants' reported *practices* rather than attributes such as demographic background. Nevertheless, some prominent themes among accounts of participants' general dietary orientations were evident. These are briefly outlined here, alongside key aspects of participants' food consumption practices, to provide context to the following analysis.

A preference for organic food was commonly reported among participants (mentioned by 42% of the group), as were conscious efforts to eat healthily and to get enough nutrients and protein, and an interest in trying new foods. A number of participants also explicitly connected their concern for the environment with their food and lifestyle choices, such as trying not to use their car more than necessary.

Although explicit reference to 'environmentally-friendly' behaviour was only made by around a quarter of participants, almost all of the participants were to some extent ethically-informed food consumers. That is, the majority of them reported considering the ethical implications of their diets, and making efforts to contribute towards the improvement of animal welfare or the environment through their food choices where feasible. Participants fell into four broad categories: meat eaters, who ate meat daily or almost daily and made no effort to reduce their meat consumption (15%); meat-reducers, who ate meat frequently but were making efforts to reduce their meat consumption (12%); those with a mixed diet, who ate a mixture of meat and non-meat dishes, often having around three non-meat days a week (40%), some of whom self-defined as 'flexitarian'; and self-declared 'vegetarians', many of whom ate fish as well as insects (21%) as well as some who did not (12%). The finding that some participants self-reported as vegetarian but were prepared to eat insects is explored further below.

Repeat consumption of Insecta products was relatively low, with the majority of participants having tried Insecta once (58%) or more than once but not regularly (18%). Apropos of this latter group it should be noted that several participants had initially tried Insecta only once but felt that they should try another product since they knew they were going to be interviewed. As such the 'true' quantity of people who had only tried Insecta once, without being affected by the research process, is higher than the present data indicate. The consumption of Insecta products at least semi-regularly was relatively low (24%), with the highest consumption being once every two weeks, weekly, or twice a week (all 3%).

The types of meals people prepared with Insecta products were largely similar. The most common way in which Insecta products were eaten was part of the traditional 'aardappel-vlees-groente' (potato-meat-vegetable) meal configuration, henceforth referred to as the 'AVG'. Insecta was often incorporated into this type of meal (55%) or in a version of this meal type, for example with pasta, rice or grains instead of potatoes (27%). Outside of the AVG format the Insecta burgers were prepared as one would a conventional burger, between two pieces of bread (27%). Occasionally more creative use of Insecta products was made, for example with participants slicing them up and adding them to tortillas or stir fry dishes (9%). One participant ate the schnitzels as a snack with mayonnaise, in the style of the *bitterballen* that are a popular bar snack in the Netherlands.

Initial motivations for consumption of insect-based foods

In a reflection of Sogari's (2015) findings, the main reported motivations for trying Insecta products were a general interest or curiosity (42%) and a feeling that Insecta products were more environmentally-friendly or sustainable than conventional meat products (33%).

> When you look at sustainability, I think it is a very good alternative. For the pressure we put on our livestock, all those kinds of things. So that's why I thought, "it is meat, but it is responsible".
>
> Jelmer, meat reducer

The level of reported environmental motivation for trying Insecta was high (33%) when compared to the main dietary motivations of price, taste, and quality that are frequently identified in previous research (Food Standards Agency, 2016). Indeed, studies with UK consumers indicate that the number of participants who reportedly foreground ethical or environmental impacts when choosing particular food products is low. A market research survey that asked people to choose from a pre-defined list of factors puts the figure at 19% (IGD, 2013). Another study, which (like the present research) did not provide participants with a list of factors to choose from, found that only 2% reported being influenced by environmental considerations when buying food (Food Standards Agency, 2008). As such, the present data indicate that those likely to try insect-based foods probably have a higher than average level of environmental concern, which is to some extent manifest in their dietary orientation and preferences. The most significant way in which this manifested itself was in relation to meat consumption. As explained above, among the participants were a notably large number of meat-reducers. On this evidence it seems that the target market for insect-based convenience foods is people who are closer to being 'flexitarian' than average. Nevertheless, as is shown below, the strong environmental motivations for initially trying Insecta were not alone sufficient to ensure repeat purchase.

A feeling that Insecta products were good for one's health also reportedly prompted initial consumption (24%), in line with Sogari's (2015) findings. For meat-eaters this was generally because they are lower in fat than conventional meat, whereas for vegetarians (who were nonetheless prepared to eat insects), or those with mixed diets, it was generally because Insecta were seen as being relatively high in protein and nutrients compared to other 'meat alternatives', such as veggie burgers.

> When I would have two different kinds of meat, I would definitely look at the ingredients, and what it consists of. And I would always pick the one that contains less fat and more protein. That's why I'm not too fussed about trying insect products, cos I know that they contain a lot of protein. They could very well be a substitute of my regular meat.
>
> Co, meat reducer

> I am a vegetarian so I always eat meat substitutes instead of normal meat, that is, if I eat meat substitutes...I saw that in this insect burger were a lot of proteins, relatively. So that was for me actually a reason to try it for the first time.
>
> Willemijn, vegetarian (no fish)

Participants also reported being motivated to try Insecta products because they would introduce novelty or variety (18%) into their diets.

> That was also the main reason why I wanted to try it. To taste something different.
>
> Sofie, meat eater

Factors affecting repeat consumption of insect-based foods

One of the key findings was that the motivations for trying Insecta products and the factors that affected their repeat consumption were quite different. While initial trying of the foods tended to be prompted either by curiosity or by rationalised principles such as a desire to reduce the environmental impact of one's diet, the degree of repeat consumption was chiefly influenced by a number of more practical factors that one would expect to be associated with the consumption of more conventional food products: price, taste, availability, and degree of fit with current eating habits. Another key factor related to the perceived status of insect-based foods as a source of healthy, ethical protein, particularly as a 'non-meat' source of protein for those who excluded certain animal species from their diets or tried to reduce their meat intake. The factors affecting repeat consumption did not tend to work in isolation, but rather were woven together in the positioning of Insecta as a food which was (or was not) repeatedly consumed.

Price

At the time of the interviews, the price of Insecta was relatively high: a pack of two insect-based burgers cost around €4, more than most equivalent vegetarian (€2-3) or meat (€1-3) products. Around a third of participants (36%) found the insect foods to be prohibitively expensive. Just under half mentioned the relatively high price, but said that it would not alone hinder future purchase (45%). Although for the majority of people price alone would not hinder purchasing (64%), it was often considered to be one of a range of intersecting factors that together hampered future purchasing. Rolf (mixed diet), a relatively regular consumer of Insecta products, remarked that

> For me it's more of a – I wouldn't say luxury item, because it's not at a restaurant or something – but even though it's just €4 I always think ok, I will not buy it as much as if it was €2.50 or €3.

Taste

Opinions about the taste of Insecta products were divided. Around a third of participants said that they liked the taste and that it was a reason they would buy the products again (30%); the same proportion said that they disliked the taste and that it was a reason that they would not buy the products again (30%); and a slightly larger group were ambivalent about the taste, saying it was "fine" or "ok" (39%). Within this last group of participants, some found the taste "low" or "flat", but suggested that this meant the products could be "combined with anything" or you could "add your own flavours". Repeat consumers generally liked the taste, although one participant regularly consumed Insecta despite being ambivalent about it. For him, Insecta represented a high-protein, 'non-meat' foodstuff that was easily integrated within a favourite vegetarian meal and compatible with his lactose intolerance. In this instance, the taste of Insecta products did not have a significant bearing on his repeat consumption of them.

Availability

Participants commonly remarked that the low availability of products meant that they were able to buy them less frequently than they would have liked, in line with Shelomi's (2015) argument that the low availability of insect-based foods leads to 'passive rejection' of them. Different dimensions to the idea of 'availability' were evident. Some participants commented that their intention to purchase Insecta products had been impeded by Jumbo being out of stock:

> I found a few times that I thought: 'I think I'll buy an insect burger, it's not available, well there goes that plan'.
>
> Pieter, meat reducer

Others mentioned that they did not live or work near enough to a Jumbo store to be able to buy them easily, or that their daily lives were sufficiently variable that they did not always buy food from the same places (27%):

> I buy them [Insecta] when I do my shopping in [town], but that's only occasionally when I happen to visit my mother on a weekday. But sometimes I visit her in the evening and I can't buy anything [there]. I try to plan that occasionally, but… And then I work at different places so most of the time I do my shopping somewhere on the way back home. And one day I pass a Jumbo, the other day I pass Albert Heijn [supermarket], and the other day I passed a Co-op [supermarket]. So that depends on where I am.
>
> Margeet, vegetarian (eats fish)

The idea of availability also related to the variety of products available. Participants mentioned that they might buy more if there was a greater variety sold (12%). When asked if there was anything about Insecta that prevented her from buying them again, Jasmijn (mixed diet), said

> No, not really. I would prefer if the Jumbo had more types of the Insecta things, because they really had one choice, so it's not really something I would buy every week because well, it becomes boring.

Co (meat reducer) mentioned that despite being aware of Insecta's existence he had not found the burger for a long time, because he does not often shop from the vegetarian / meat-replacement aisle. He suggested that if the Insecta products were located by the conventional meat then they would be easier to find. While this may be the case for him, the majority of participants seemed to expect to find the products near the meat substitutes, so the placement of Insecta in Jumbo stores was for most people appropriate. As Mariska (mixed diet) said:

> For me it [Insecta] is a meat substitute, definitely. Just as I think tempeh is in the right place [in the vegetarian section], and tofu, to me that is logical. I do not know where I would go look for it otherwise. I would not look for it in the meat segment.

This is potentially an important finding, as appropriate category management for insect-based products (and indeed other novel foods) in future will be crucial. Although the marketing of insect-based products as a vegetarian option or 'meat substitute' has attracted criticism in the Netherlands (Partij voor de Dieren, 2014), the decision made by Jumbo's category managers to place Insecta among meat substitute products seems to have been the correct one, given the expectations of participants in this study. Insecta products seemed to occupy a place between 'meat' and 'not meat' in participants' minds, and as 'non-meat' in participants' eating practices. Following this finding, and work which has suggested that insects are unlikely to represent a direct replacement for conventional meat in the near future (Verbeke, 2015), it appears that the most appropriate category management of insects would be to position them as a more ethical protein source than conventional meat, but not necessarily one that is 'fully' vegetarian, thus targeting consumers who adopt an ethically-motivated reduction in meat without completely precluding the consumption of animals.

Degree of fit with current eating patterns

This factor was particularly significant. Put simply, if participants typically ate large amounts of vegetarian convenience foods, it was easy for them to integrate Insecta products into their diets, because it did not involve the reconfiguration of meals or the acquisition of new culinary skills. Conversely, participants who did not eat significant quantities either of vegetarian convenience foods or of other similar products, such as conventional meat burgers, found that the Insecta products did not integrate easily into their diets. Insecta products were treated by the majority of participants as being broadly equivalent to vegetarian convenience foods, rather than meat products.

The degree of fit with participants' current eating patterns is difficult to quantify. Clearly it would be difficult for people to provide some kind of standardised indication of how well Insecta products were fitting into their diets. In the present analysis, degree of fit has been assessed in relation to how well Insecta integrated into participants' prevailing modes of cooking, including their routinely consumed meal types and products, shopping habits, and typical preparation techniques. Participant diets can be usefully grouped in three ways: those that were a good fit with Insecta, those that were a poor fit, and those that were in a sense both a good and a poor fit.

Most people's diets were, in the abstract, a good fit with Insecta products (64%). Of these participants, most were vegetarian or had a mixed diet (89%). Most of them frequently ate vegetarian convenience foods, such as veggie burgers, usually within the AVG format or a modified version of it (such as using pasta or grains instead of potatoes). Angela (vegetarian, no fish) was a particularly good example of how Insecta products were being integrated into existing reduced meat or meat-free diets. She was a vegetarian who did not eat fish but was happy to eat insects. She ate vegetarian convenience foods five or six times per week in the AVG format which often included vegetarian burgers, so Insecta products fitted seamlessly into her established eating patterns.

The diets that were a poor fit with Insecta products (18%) were generally of the more 'foodie' type. These people tended to put much less emphasis on the convenience aspect of food, and more on the taste and the use of 'proper' ingredients. They all reported that it was normal for them to cook from basic ingredients, and thus pre-made products featured little in their diets. Most of them mentioned that they simply did not eat many burgers or ready-made products:

> I actually eat very little ready-made products. I do a lot of cooking with basic products. So one of these ready-made burgers is fun and easy, and if I'm on holiday in the Netherlands I would buy it more easily than when I'm at home. Because at home I always cook with basic products.
>
> Els, mixed diet

Not all diets that were a poor fit with Insecta were highly varied, 'foodie' type diets. Mariete (mixed diet) did not cook a huge variety of dishes relative to other participants, but nevertheless explained not buying Insecta again as a result of its limited applications, which did not fit with her regular use of 'ingredient'-type vegetarian products such as soy-based imitation chicken pieces:

> It's a full product that you can't really use in a dish, the same way you can use little bits of chicken for example, or the meat replacement chicken, or like strips of meat that you just toss in a big pan. The Insecta products are just too big to do anything interesting with.

A number of diets were simultaneously a good fit and a poor fit with Insecta (18%). Sometimes this meant that Insecta had not been eaten more than once. For example, Ruben (vegetarian, no fish) regularly ate vegetarian convenience foods, a meal pattern into which Insecta would fit easily: however, he reported that he was happy with the seven or eight meals that made up his current culinary routine, and saw no reason to change it by incorporating Insecta products, even though he found them appealing for taste and environmental reasons. Further, he typically used 'ingredient' type meat substitutes, such as a soy-based mincemeat-style product, which meant he ate relatively few burger-style products. On the other hand, sometimes the apparent lack of fit between Insecta and people's diets did not prevent Insecta from being repeatedly consumed. For example, Willemijn (vegetarian, no fish) always cooked meat-free meals from basic ingredients and rarely used pre-made vegetarian products. However, due to concerns about her protein intake, she had begun deliberately buying products such as Insecta even though they did not fit so well into the type of dishes she was used to making. These examples, of participants whose consumption of Insecta products had a somewhat awkward relationship with their established dietary routines, illustrate well how the interplay of different factors can affect their consumption: products can be a good or a bad fit with people's cooking habits, but this does not in itself determine whether or not they are eaten more than once. It should also be borne in mind that even among people whose dietary routines were a good fit with Insecta (64%) there were additional confounding factors that frequently prevented Insecta being integrated into regular culinary routines.

Household composition and family circumstances

Participants' domestic circumstances played a significant role in the extent to which Insecta products were incorporated into diets, and also the manner in which this was achieved. Where participants were members of a multiple occupancy household who regularly shared meals – typically as part of a family who lived and ate together – the issue of such meals 'fitting in' with other household members' dietary requirements, in terms of both taste and nutrition, was raised.

For a number of participants, the diets of other household members were a consideration when buying and cooking Insecta products, but did not significantly inhibit consumption (21%). Most of these people were the lone consumer of Insecta products or vegetarian products in a couple or a family. Often, for example, a couple would eat most of the same meal, but one would have an Insecta product or vegetable-based product, whereas the other would have a meat product. The way in which meals were organised meant that people's different preferences could be easily accommodated, even if one or more household members were antipathetic towards Insecta. Margeet (vegetarian, eats fish), for example, cooked the same vegetables and rice for her whole family, but different protein elements for herself and her eldest daughter (both vegetarian) and her husband, son and youngest daughter (all meat eaters).

A smaller number of participants stated that the need to accommodate co-residents' preferences within shared meals specifically inhibited their consumption of Insecta (12%). For example, Jelmer (mixed diet) remarked that "it tasted fine, but the children are less enthusiastic, haha. Yes, that's important".

A third of participants lived alone and/or cooked only for themselves (33%). Substantially more of this sub-group reported Insecta fitting easily into their diets (82%), relative to those who regularly share meals or cook for others (57%). Rianne (vegetarian, eats fish), for example, was a student who lived in shared accommodation but cooked and ate individually. As such she did not have to organise her meals to account for the preferences of her housemates. Although they were reportedly "too afraid" to try Insecta, this did not affect Rianne's consumption of the

products, because the other occupants of her house were not routinely accommodated within her daily cooking. The relative ease with which Insecta products were integrated within single-person culinary routines suggests that the absence of having to accommodate other people's preferences may contribute significantly to the uptake of novel foods such as Insecta. As such, the data supports other research which indicates the configuration of diets is not simply a matter of individual choice, but rather the result of competing social practices and ethical concerns, such as care for one's family (e.g. Halkier, 2010; Molander, 2011). In cases where co-residents must be accommodated within shared meals, routine integration of new and potentially divisive foodstuffs is manifestly more difficult to achieve.

Insects as an ethical source of protein

The tagline on the packaging of Insecta products – "Go Green – High Protein" – neatly encapsulates the way in which Insecta's perceived status as an ethical, high protein food was associated with their repeat consumption. The high protein content of the products relative to comparable vegetarian convenience foods was explicitly mentioned by several participants as a factor that encouraged repeat purchase (15%). (The burgers contain 23.4g of protein per 100g, around 8g higher than a soy-based burger frequently purchased by a number of respondents.) Willemijn, for example, explained that "the combination that there are a lot of proteins in it and it is just very tasty, that's why I buy it often". All except one of these participants was either a vegetarian or had a mixed diet: these kind of participants were generally explicit about making sure their diet included, as Mariska said, "all your complete proteins". Yet it was Insecta's perceived status as an *ethical* protein source that appeared to have a greater bearing on repeat consumption. There were both environmental and animal welfare dimensions to this perceived ethical quality.

Participants felt that Insecta was substantially better for the environment than conventional meat products, largely due to the lower emissions and resource use associated with the rearing of insects compared to livestock[78]. This was expressed across the range of dietary types identified, from 'full-time' meat-eaters to vegetarians, including those who did not eat fish. A small number of participants (6%) reported that they routinely ate Insecta products despite not finding the taste particularly appealing, partly because they represented an environmentally-friendly meat replacement.

Insecta products were also deemed to be more 'ethical' than conventional types of meat because of insects' perceived lack of sentience and capacity to suffer. That meat-eating participants were prepared to eat insects is perhaps not surprising (beyond the relative unusualness of the food): what is potentially more significant is that some self-defined vegetarians, who were reportedly motivated by concerns for the welfare of other animal species, deemed insects an ethically permissible source of food. This appeared to be related to the ambiguity of insects' status as an 'animal' for participants, which included both meat-eaters and vegetarians. As Co (meat reducer)

[78] The extent to which food insects are 'better' for the environment than other protein sources has been debated. Despite requiring much less land to grow than conventional livestock, it has been argued that the proposed environmental benefits of insect rearing relative to livestock rearing are dependent on the identification of a substrate that is less resource-intensive than existing sources of commercial animal feed (Lundy and Parrella, 2015), which are currently used by a number of companies rearing insects in Europe (Hubert and Arsiwalla, 2016). Nevertheless, the prevailing discourse surrounding the Western consumption of insects is that it represents a more 'sustainable' food choice than conventional meat, a point which has been emphasised in the marketing of Insecta products (e.g. http://www.damhert.be/en/shop/insecta).

said: "I guess it's better to eat [Insecta rather than meat products] because no animals were killed", and Pieter (meat reducer) and his girlfriend ate Insecta products on their 'meat-free day'. Els (mixed diet) thought that insects "are animals, but not animals like the real animals." Vegetarian respondents often had difficulty accounting ethically for insects:

> I think that they [insects] don't have so very much brain. So in that respect I think they're more like plants or something. Although I don't like killing a fly if it's not necessary. I try to catch it, put a glass over there and put it outside. But still er, no. Insects are... well. I don't really consider them being animals. [...] I don't think they have any consciousness...They're living on reflexes I think. A lot of smaller animals, you think they have some brains, and they, yeah they might have some kind of consciousness. And then I don't like to eat them. But with the insects I, well...
>
> Margeet, vegetarian (eats fish)

> It's difficult because, why should I eat worms and not eat cows? Is it because they feel less, or because I like them less as a type of animal? But... yeah. It's easier for me to eat insects than larger animals, I think that's true. [...] Because I think there would be much more animal suffering with mammals, and animals that have more... have a, maybe have a bigger central nervous system? I don't know. A bigger capacity for suffering.
>
> Ruben, vegetarian (no fish)

The identification of a group of self-declared vegetarians who eat some animal products reflects earlier work showing that 'vegetarianism' is a diverse concept (Beardsworth and Keil, 1991) which for many self-defined vegetarians does not totally preclude the consumption of meat (Dietz et al., 1995). This point has led to calls for vegetarianism to be conceptualised as an 'orientation' rather than an either/or decision (Janda and Trocchia, 2001). The introduction of insect-based foods to Western markets further illustrates the diversity of vegetarianism(s) and demonstrates that basing ethical dietary proscriptions on the perceived capacity of particular species to suffer may become more difficult when dealing with certain 'border' species, such as insects and fish, that are evidently easier to deny mind and moral standing than cows, sheep, or chickens (Bastian et al., 2012).

Although 27% of participants were self-defined vegetarians, all but one were prepared to eat insects. Given that a prominent Dutch vegetarian organisation has stated that they do not consider eating insects to be vegetarian (Vegetariërsbond, 2016), it might reasonably be suggested that consumption of insects by vegetarians in the present study may not be reflected in the wider vegetarian population. This point has potential implications for the broader acceptance of insect-based foods, as it suggests a particular ethical tendency among their consumers: pro-environment, and pro-animal welfare, excepting certain species. In any case, the perceived ethical qualities of Insecta alone were not sufficient to induce routine consumption. Positive ethical assessments were typically subordinate to a range of intersecting social and practical factors in determining whether or not repeat purchases were made.

Interplay of factors

One of the central findings of the research was that none of the factors discussed above worked in isolation. Rather, it was the interplay of factors that determined how frequently people ate Insecta, if indeed they did so more than once.

People who ate insect-based foods at least semi-regularly generally had to have positive versions of all of the above factors present (liking of taste, acceptance of price, etc.) However, if any of these factors were negative (e.g. dislike of taste) or absent (e.g. the products were unavailable), repeat consumption was negatively affected and integration of Insecta products into diets was impaired. It should be noted that occasionally a participant ate the products relatively regularly despite having a problem with a particular aspect of them. Pieter (meat reducer), for example, thought the price was high but was "willing to be an early adopter and pay for the privilege". James (meat reducer) regularly ate the nuggets despite being ambivalent about the taste, because he felt they were an interesting and ethical meat alternative which he could use as a basic ingredient in more complicated dishes. Such exceptions notwithstanding, the presence of one or more negative factors generally precluded repeat consumption.

6.6 – DISCUSSION AND CONCLUSIONS

A key conclusion is that there is a disjuncture between the initial motivations behind purchasing insect-based convenience foods and the factors affecting repeat consumption. The initial motivations included a general interest or curiosity, a feeling that Insecta products were more environmentally-friendly or sustainable than conventional meat products, a feeling that Insecta products were good for one's health, and/or the introduction of novelty and variety into diets. These findings support previous research into motivating factors and the likely characteristics of early adopters of insects as food (Sogari, 2015; Verbeke, 2015).

However, most of the main factors affecting repeat consumption were notably more practical and contextual, and associated with the routine consumption of more conventional foods. These were the price, taste, and availability of products, and their degree of fit with established dietary practices, including the accommodation of other people's preferences. Another influential factor more closely related to initial motivations was the status of Insecta products as a source of protein that was seen as more 'ethical' than conventional meat, either for environmental or animal welfare reasons. Repeat consumption typically required the successful interplay of all these factors. Negative factors, such as when participants found the products too expensive and largely unavailable, led to their 'passive rejection' as foods (Shelomi, 2015), despite a willingness otherwise to eat them. The cognitive emphasis implied by 'passive rejection' could perhaps be better conceptualised as a 'failure to integrate' into established eating practices. For most participants, practical, supra-individual factors appeared to exert a greater influence on repeat consumption than more rationalised considerations about the ethical position of insect-based foods. This suggests that product attributes, practical and contextual factors, and considerations of existing dietary practices, habits and routines should receive a greater emphasis in consumer acceptance research than has hitherto been the case.

As noted above, practical factors are acknowledged in some current research on consumer acceptance of insects as food, but they are typically accorded less emphasis than individual psychological factors. 'Acceptance' is not simply a case of whether or not an individual will eat a particular product once, but also the extent to which that food becomes an accepted and integrated part of their established culinary regimes. This to a large extent depends on product attributes as well as much broader considerations of the diverse, intersecting and habituated social practices in which an individual takes part, including their food provisioning and consumption practices. As Halkier (2010) suggests, the integration of particular foods into dietary practices relies on their 'do-ability': they must be both practically feasible and normatively appropriate. Given the similarities between insect-based foods and conventional foods highlighted in the present study, it is suggested that the same dynamics of integration into

people's diets – or of resistance to integration – may be salient for other novel food products as well.

Once insect-based foods are for sale in supermarkets and similar contexts they are subject to the same kind of considerations as more conventional foods. This finding supports previous research which shows that in the case of organic food shopping, participants often prioritise practical factors, such as price, above ethical principles (Clarke et al., 2008). The distinction between factors predicted to affect acceptance of insects and those which manifestly affect repeated consumption also echoes earlier work with genetically modified food in the UK (Sleenhoff et al., 2008).

Among the participants in the present study nobody refused to eat the products because they found them disgusting (although some reported initial trepidation and a disinclination to eat whole insects). The sample was comprised entirely of self-motivated consumers of insect-based foods and thus does not provide data on general levels of acceptance in the Dutch population. Focusing on willing early adopters may however be more productive than trying to gauge factors that will affect acceptance in the general population, because it is these early adopters who will form the kind of initial market for edible insects that Verbeke (2015) discusses.

Those interested in developing insect-based foods for Western markets should be mindful of the fact that trying a food product once does not necessarily mean that people will eat it again, particularly if it is culturally unusual (Tan et al., 2016). The data presented here suggest that if insect-based foods are to be commercially successful they will need to be at a comparable level of price, tastiness and availability to existing Western foods. Exactly *which* foods will depend on how insects are incorporated into new products. In the case of insect-based convenience foods, for example, it appears that vegetarian convenience foods are the primary reference category against which insect-based versions are judged. People *will* pay a premium for new foods, but only if they have other advantages relative to existing foods (Shelomi, 2015), such as a distinct and pleasurable taste, as well as the ability to be easily incorporated into existing culinary regimes. The idea that taste should be a key focus of edible insect product development has already been proposed elsewhere (Deroy et al., 2015), and the data from the present study bear these arguments out. However, as Tan et al. (2016) note, taste alone will not ensure incorporation of insects into Western diets, as cultural appropriateness and contextual factors are also important.

The specific form of the foods that insects are incorporated within appears to have a bearing on their acceptance. Previous research (e.g. Wansink, 2002) has shown how new or unusual ingredients have been accepted by Western consumers when incorporated into familiar foods. Research on the acceptance of insects as food has also suggested that insects are likely to be more acceptable to Western consumers when they are disguised or incorporated in familiar foods, rather than visible (Gmuer et al., 2016; Hartmann et al., 2015; Lensvelt and Steenbekkers, 2014; Schösler et al., 2012; Tan et al., 2015), and some researchers have suggested that incorporation into convenience foods might be one of the most acceptable ways in which to introduce edible insects to Western diets (Schösler et al., 2012; Verbeke, 2015). However, the data presented here suggest that there are problems with incorporating insects in convenience foods that go beyond the issue of visibility. Clearly there is no 'one-size-fits-all' method for developing new foods: what worked well for organ meat in the 1940s (Wansink, 2002) may not work in the same way for buffalo worms in the twenty-first century. Other than the obvious differences in social context, all of the factors described above also have a bearing on the uptake of insect-based convenience foods. But it is also possible to engage in some informed speculation about the particular reasons

that adding beetle larvae to vegetable burgers does not appear to have been a huge commercial success.

One reason may be the fact that the Insecta range were all 'finished' products – such as burgers and nuggets – rather than 'ingredients' like mincemeat or chicken pieces. As identified above, in some cases the fact that Insecta were 'finished' products precluded their more regular use. A burger-style product can only be prepared in a limited range of ways, which may inhibit its more regular consumption. This was particularly evident for participants in the present study who ate large quantities of meat substitute products but only of the 'ingredient' variety, as these were seen as more versatile and easier to incorporate into a wider range of dishes. As such, if an 'ingredient' type insect-based product were produced, it may be easier for people to integrate it into their culinary routines, which may encourage greater or more regular uptake.

Another reason for the current limited uptake may relate to insects' position as an invisible, 'ethical' protein source. A significant shift in Western consumer focus towards the protein content of foods has been observed in recent years (Gray, 2015; Scott-Thomas, 2013; Starling, 2015), and the consumption of abstracted forms of protein as a relatively instrumental activity (such as for muscle gain or weight loss) appears from market research sources to be increasingly popular, having branched out from specialised areas such as the exercise market (Scott-Thomas, 2013; Starling, 2015). Protein may be a particular concern for those looking to replace conventional meat with more ethical alternatives, a possibility suggested by recent increases in sales of plant-based protein (Crawford, 2015; Gray, 2015), as indeed by the present study. Yet for many vegetarian consumers, insects are still animals, raising ethical problems about eating them (e.g. Vegetariërsbond, 2016). Insect-based convenience foods seem better suited for the meat-reducer or 'flexitarian' market, or for environmentally-motivated vegetarians who do not completely rule out the consumption of some animals. That some people from this group are buying them is borne out by the empirical data presented above.

Further, currently available 'invisible' insect products such as Insecta do not appear to have a specific insect taste, form, or mode of cooking. In this sense they are arguably serving to introduce the idea of eating insects to Western audiences without a drastic reorientation of culinary practice. But are they really normalising it if so few people eat them, and if one cannot actually *see* the insects? Concealing insects in food, as Stock et al. (2016: 162) note, "dilutes the encounter with insects themselves". While the inclusion of insects as an invisible ingredient may lead to a higher willingness to try a particular product, perhaps the absence of a distinct appearance or taste reduces the positive reasons for selecting an insect-based food product in the first place, rather than a cheaper or tastier non-insect equivalent.

Perhaps a more visible insect product that draws on 'authentic' dishes from non-Western contexts would work better, in line with Deroy et al.'s (2015) recommendation that an explicit, gastronomic mode of presentation is adopted in the creation of insect-based dishes. Although fewer Westerners may want to eat something which involves whole insects rather than ground-up ones, the development of insect-based dishes with a distinct and pleasurable taste would provide a reason to eat a meal containing insects rather than another protein, such as chicken or soy. A small but committed group of early adopters of insects as food in the West is likely to be a stronger basis for commercial development – and gradually more widespread acceptance – than a larger group who have only eaten insect-based foods once. The focus of product development should therefore perhaps be on the *quality* and *distinctiveness* of insect-based foods, rather than on trying to gain the highest *quantity* of early adopters possible. Indeed if the products are tasty and

distinct, as well as being affordable and easily available, higher levels of consumption are likely to follow.

For those wishing to develop foods with insects as an invisible ingredient, it is important to remember that consumers who want a product with an invisible protein source need a reason to choose one with insects rather than another ingredient. 'Grand designs', such as relatively high levels of environmental sustainability, have been shown to be less important than more prosaic factors, such as taste and value for money, in organic food retailing (Clarke et al., 2008). Moreover, as other research has suggested (Hartmann et al., 2015; Tan et al., 2016), environmental reasons are unlikely to be sufficient to encourage the repeat consumption of insect-based foods in any meaningful quantity. Instead, things such as ease of integration with established eating practices, taste, price, and availability are likely to be key reasons for Western consumers to incorporate insects into their diets.

Chapter 7 – Are insects animals? The ethical position of insects in Dutch vegetarian diets

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7.1 – CONTEXTUALISING REMARKS

This chapter elaborates upon one of the findings highlighted in Chapter 6: that insect-based foods are consumed by some self-defined vegetarians. This point, as noted in the previous chapter, indicates both the fluidity of ethically-oriented diets and the difficulties faced in accounting for insects ethically. The chapter is relevant to the notion of public acceptance in a number of key ways.

For example, the chapter connects the 'scripting' of insect-based foods as vegetarian foods (see Chapter 5) with their integration into food practices; the uncertain ethical-ontological position of insects can be read as an emergent property of the production networks discussed in the earlier chapter, which perform ontological 'work' in positioning insects as a potentially ethically acceptable animal food. Yet a converse view also holds: the multilateral nature of edibility construction is highlighted here, as without the ethical (and ontological) positioning undertaken by (quasi-)vegetarian consumers, the products would likely be met with a more limited range of willing consumers.

In elucidating the fluidity and multiplicity of vegetarianism and comparable ethically-oriented diets, the chapter indicates that a defining aspect of the consumption of insect-based foods is their perceived ethical credentials vis-à-vis environmental sustainability. This may, as the chapter notes, be interpreted as a rather anthropocentric form of dietary ethics; nevertheless, it indicates an area which – at least for insect-based foods – is of central importance for their public acceptance. The 'public' that 'accepts' them in this case is one with a relatively high level of ethical concern, directed primarily at the environment. Although an important consideration, such concern is not – as the other empirical chapters emphasise – by itself sufficient to encourage repeat consumption of insect-based foods.

The ontological uncertainty highlighted by the chapter also opens up a space to consider a broader question pertaining to the use of insects as food: namely, do insects really represent an 'ethical' or 'sustainable' food source? Should more vegetarians begin to eat them – and, for that matter, are they really a panacea for the problems caused by meat consumption more generally? These questions relate to a broader theme developed throughout the thesis: that is, although insects are discursively framed as a sustainable alternative to conventional meat, they are typically consumed instead of plants rather than animals. These ideas are returned to in the concluding discussion in Chapter 10.

In exploring the role of food ethics in relation to consumption of insect-based foods, this chapter principally addresses **RQ2** ('How does the integration of insect-based foods into eating practices

relate to other aspects of food and eating?). By illustrating how insect-based foods are integrated into a particular variety of ethically-oriented diets, it also helps to answer **RQ1** ('How are insect-based foods being integrated into established practices of food and eating in the Netherlands?).

7.2 – ABSTRACT

In Europe there has recently been an explosion of interest in using insects as a 'new' sustainable food source, and in 2015 a major Dutch supermarket chain began nationwide sale of a range of convenience foods containing beetle larvae. In a similar approach to vegetarian convenience foods, these were essentially designed as familiar meat-style products – such as burgers, nuggets and schnitzel – that contain vegetables, as well as around 14% mealworms. Indeed, the burgers were initially labelled as 'vegetable burgers'. But are they suitable for vegetarians? Are insects 'meat'? Empirical work with consumers of the insect-based convenience foods shows how insects are in fact resistant to ontological, and consequently ethical, categorisation. Many of the consumers identify as vegetarian, but insects evidently disturb the practical intelligibilities that partially constitute the eating practices of those who are ethically opposed to meat consumption. Mealworms, for example, occupy an ontologically ambiguous place in the implicit hierarchy of sentience which appears to permeate even ethically-informed Dutch shopping habits. Exclusion of animals from Dutch diets seems to be in many cases not a fixed principle but rather is based on such things as a notional identification with, or evolutionary proximity to, the animals concerned. Care for nonhuman animals is not absolute but rather operates in a sort of 'trickle-down' manner, with humans and particular 'higher' mammals monopolising a finite supply of ethical concern. Edible insects offer a useful lens to explore the contingencies of ethically-informed food consumption in a European context, and demonstrate that vegetarianism is in fact not fixed but mutable: informed by a network of competing ethical, practical, and culinary concerns, it also evidently draws on a pervasive folk taxonomy of animal life.

7.3 – INTRODUCTION

Climate change and a rising world population are contributing to ever-increasing pressure on global food security. In this context, considerable effort is being expended within the arenas of policy, academia and business to develop solutions to the challenge of feeding the world's population in a more 'sustainable' fashion than the global agri-food network does at present. One such proposed solution is the use of insects as a source of animal feed and human food in Europe and the US (henceforth 'the West'), the defining statement of which was a report published by the FAO in 2013 (van Huis et al., 2013). This report outlined the state of the art of research into the consumption of insects – or 'entomophagy' – and has provoked a great deal of interest in the subject.

The central argument of the report, and of much (although not all) subsequent academic research and commercial discourse, is that the Western replacement of conventional sources of animal protein with insect protein would yield significant environmental benefits. Insect species consumed by humans around the globe are generally high in protein and nutrients (indeed, many species are comparable to beef in these respects), low in fat, and require considerably less land and water during rearing than the animals which are currently raised for food in the West (van Huis et al., 2013: 64). Further, the four insect species developed for human consumption in the Netherlands since around 2007 – crickets, grasshoppers, mealworms and buffalo worms – have a high feed conversion ratio relative to livestock, and, as well as requiring less feed than ruminant species, are able to subsist on a wider range of feed types (van Huis et al., 2013: 60–61).

As such, insects are argued to represent a healthy, nutritious, and environmentally-friendly source of protein, and it is these points which tend to be emphasized in the discourse surrounding edible insects.[79] Insects are also often held to represent a more *ethical* choice than some existing foods such as meat from conventional livestock (e.g. Dexter, 2016; Duncan, 2013; Moloughney, 2014).

So far there has been a relative lack of attention to the ethical dimensions of insect consumption (notable exceptions include Fischer, 2016; Gjerris et al., 2016). As this chapter attempts to demonstrate, ethical considerations appear to play a relatively significant role in the consumption of currently available insect products, and are related to an individual's ethical dietary orientation, both for those wishing to reduce their meat consumption and for self-defined vegetarians. The latter group are the primary focus here, but both groups are discussed.

The chapter is based on interviews with 33 consumers of the *Insecta* range of insect-based convenience foods. Containing around 14% ground-up buffalo worms,[80] these foods were available in branches of a Dutch national supermarket chain during 2015.[81] The respondents are organized into 'meat eaters' (5 respondents), who make no special effort to reduce their meat consumption; 'meat reducers' (17), who deliberately refrain from eating meat for one or more days a week (typically 1-3 times); and self-defined 'vegetarians' (11). Of the vegetarians, some ate no animals other than insects (4); the others also ate fish (7).

This chapter argues that the introduction of the buffalo worm into the European agri-food network gives us two important insights into vegetarianism in the Netherlands. These are:

1) Vegetarianism is not a fixed or static concept, and both its motivations and form may change over time. For some people, vegetarianism is motivated by environmental rather than animal welfare concerns. This form of vegetarianism does not preclude the consumption of animals, and thus animals whose rearing, slaughter and consumption is perceived as being 'good' for the environment (or 'better' than alternatives) are deemed an ethically permissible source of food.
2) For some vegetarians who *are* motivated to reduce their meat consumption by animal welfare concerns, insects are still positioned as an acceptable food source, chiefly because of their perceived lack of sentience and/or incapacity to suffer, but also for other reasons. This type of assessment often appears to be based on a kind of folk taxonomy of species, akin to the Aristotelian 'great chain of being.'

Empirical material is presented to explain each point in turn. However, my primary intention is to demonstrate how the introduction of a novel animal species to the human food system in an industrialized Western country 'problematizes' ethically-oriented diets, by raising a number of hitherto largely unexplored questions about animal ethics, and illuminating a number of taken-for-granted assumptions about the nature of animal life on which ethical diets frequently appear to be based. As such, the latter portion of the chapter is dedicated to highlighting two important

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[79] Agreement as to the benefits of insect consumption is not unanimous, and questions have been raised as to just how sustainable insects are. See Lundy and Parrella (2015).
[80] Buffalo worms, or 'lesser mealworms,' are not actually worms. They are the larvae of the darkling beetle *Alphitobius diaperinus*.
[81] The range of foods can be viewed at http://web.archive.org/web/20170109124949/http://www.damhert.be/en/shop/producten?categorie=insecta. As of 2018, only the burger product is still in production

further questions regarding the ethical treatment of animals that are raised by the appearance of the buffalo worm in Dutch supermarkets.

7.4 – VEGETARIANISM: A FLUID CONCEPT

Vegetarianism is not a unified adherence to a fixed set of culinary, ethical, and other principles, but rather a fairly loose term indicating a diet with a broadly ethical inflection. Such diets can differ in motivation and form over time, between individuals, and often *within* individual accounts at different points in one's "vegetarian career" (Beardsworth and Keil, 1992: 271; see also Ruby, 2012).

Research with self-defined vegetarians in the UK has identified a sort of continuum of diets, with total abstention from meat at one end to occasional consumption of meat at the other (Beardsworth and Keil, 1991, 1992). In a nationally representative US sample, only a third of those who self-defined as vegetarian did not occasionally eat poultry (Dietz et al., 1995: 539).

Clearly the term is relatively flexible in usage, and can accommodate different social and practical considerations[82] as well as the ethical variances which are the focus of the present chapter. Indeed, such flexibility has led to suggestions that vegetarianism might be better thought of as an 'orientation' rather than a completely consistent practice (Janda and Trocchia, 2001: 1206), which I would argue is a persuasive conceptual move. Among the present study participants, their particular form of vegetarianism permitted the consumption of certain animal species.

Within my group of participants, both meat reduction and vegetarianism was reportedly mostly environmentally-motivated. Environmentally-motivated vegetarianism did not completely preclude the consumption of animals. For those vegetarians who were prepared to eat both fish and insects, this was usually because those species were perceived as less environmentally damaging than livestock. Willem, (vegetarian, eats fish), said:

> It felt quite natural for us to stop [eating meat]. Not because we thought, oh those poor animals are gonna get killed, but, it's like, we don't need it. And then there's the other side of it that, how much food and water is needed to produce one kilo of beef, compared to soya, and compared to insects. […] [O]ur generation's probably gonna have sufficient food, but our next, and the next after that, they won't have, if they continue like this.

Self-reported vegetarians who did not eat any animals other than insects often did so because they had concerns about overfishing or depriving local people of food to eat – in addition to similar environmental concerns about livestock – but did not have these concerns about insects. Angela, a vegetarian who did not eat fish, explained "I don't eat fish at all" due to concerns about "the welfare of the rest of the people in the world", particularly in areas where industrial fishing has reduced the availability of fish for local people.

Whether vegetarians ate fish or not, those who were primarily environmentally-motivated often did not have a problem with eating animals per se, but rather with the environmental impact of their production. Notably the ethical justification for not eating particular species in these cases appeared to be predominantly anthropocentric, given that ethical concern was directed at the

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[82] For example, if a meal cooked by friends contains meat but a vegetarian individual does not wish to be rude, they may eat it, while still considering themselves to be vegetarian. Some elaboration of this point can be found in Beardsworth and Keil (1992: 263–265) and Janda and Trocchia (2001: 1216–1220).

wellbeing of future human generations. As Gijs (vegetarian, eats fish) said, "[I do] all the things I can help to make the planet, for my children and grandchildren, a nice place." I return to this point in the discussion section of this chapter.

7.5 – ARE INSECTS ANIMALS? THE ONTOLOGY AND ETHICS OF THE BUFFALO WORM

The identification of an environmentally-motivated form of vegetarianism that permits the consumption of some animal species is interesting because it implies that animal welfare motivations – a traditionally large facet of vegetarian diets – are not shared by everyone who aims to reduce or eliminate meat from their diets, even if they self-define as vegetarian.

However, among the vegetarians I spoke to, there *were* still some who were motivated primarily or substantially by animal welfare. For these people, the positioning of insects as edible was justified ethically on the grounds that insects were deemed to be of low moral standing, for a number of reasons. Predominant among these was insects' perceived lack of sentience or capacity to suffer, although for some people, insects were simply not 'proper' animals. In many ethical accounts of insects, it appeared that their 'low' ontological position relative to conventional livestock animals was the grounds for their diminished ethical standing. This is not an original discovery: Bastian et al. (2012), for example, observed that people find it easier to deny mind and thus moral standing to animals that are not cows, sheep or pigs. However, the data presented here provide greater insight into how this process works in the context of ethically-oriented food consumption.

Participants were questioned directly about whether they perceived insects as animals, as well as a number of more indirect questions about why they were prepared to eat certain species and not others. Although the primary focus of this chapter is vegetarians' ethical assessments of insects, some data from those who eat meat is presented to contextualize the findings.

The question of whether or not insects are animals was answered slightly differently by people who regularly ate meat and by those who label themselves as vegetarian. For meat eaters, the answer was generally a straightforward yes. For example, Dorieke (meat eater) said:

> I'm not a vegetarian so for me it doesn't really matter if it's a fish or it's a pig or it's an insect. It's all animals.

One speculates as to whether the relative straightforwardness of this type of classification is to do with there being nothing 'at stake' in the categorization of insects as animals, if your diet already involves the frequent consumption of other species.

By contrast, for vegetarians, as well as many of those who ate meat but attempted to reduce their consumption, there was often a disjuncture between their rationalized classification of insects as animals and the way in which, practically speaking, insect foods were categorized and integrated into food practices in a broadly similar way to vegetarian products. Pieter (meat reducer), for example, ate insects on his 'no meat' days, although was quite emphatic that these were distinct from his 'vegetarian Mondays'. For Pieter, insects were not 'meat', but were still animals of some sort. Angela (vegetarian, no fish) ate them in the same way as the vegetarian convenience foods she otherwise ate five or six nights a week. Jelmer (meat reducer) had the following exchange with my research assistant, which sums up the ambiguity fairly well:

Interviewer	Ok. And does the insect burger belong to the three days a week [that you eat] no meat, or does it belong to the meat days?
Jelmer	Oh… yes that's a good one. That one belongs to the no-meat days.
	[…]
Interviewer	Does not belong to meat. All right. So you do not see insects as a meat product, then?
Jelmer	Yes. Actually I do! So that is… how to put it… not a very consistent thought of mine. Haha. Uhm…

Most people discussed how rationally, *of course* insects are animals; but it seems in terms of the practical intelligibilities that help to structure eating practices, for many people they are closer to plants. When pushed to classify insects, people often describe them as animals, but also as somehow crucially different. For example, Els (meat reducer) thought that:

> They are animals, but not animals like the real animals.

Similarly, Margreet (vegetarian, eats fish) said:

> Well of course they're animals. But I don't think, well I think that they don't have so very much brain. So in that respect I think they're more like plants or something […] Insects are… well. I don't, I don't really consider them being animals.

The grounds provided for distinguishing between animals of moral standing and insects were varied, and included factors such as the difficulty in identifying or connecting with insects; that one could not cuddle insects; that insects were perceived to have low intelligence or intellectual capacity, as well as a less developed nervous system, and thus had an inability to feel pain; that insects were perceived to have less emotions than other animals; that they had no demonstrable social behavior; that in general their needs are low; that they are not 'real' animals; and that they are abundant ("they are everywhere"). Thomas (meat eater) suggested that insects' small size made it easier not to care about eating them, stating that

> Yeah they probably also have feelings, but since they're so small and insignificant actually I think it's easier to eat them than a cow or a pig or anything.

Willemijn (vegetarian, no fish) explained that as insects were not available to eat when she first became vegetarian, they are difficult to classify ethically. She felt that "there is some difference" between insects and other animals, but found this hard to explain. She added:

> Right now I don't have the feeling that… that I am violating my being-vegetarian by eating insects. But I do not have a logical explanation for that.

Willemijn's comments here succinctly capture the ambiguity surrounding the ethical position of insects in vegetarian diets that was evident across the group's responses. In addition to such ambiguity, people's ethical accounts of animals also indicated the pervasiveness of an implicit hierarchy of sentience, with humans at the top, descending through mammals, birds, fish, and insects. This also seemed to go beyond sentience, however, and appeared to relate also to some indefinable quality of being. Buffalo worms evidently occupy an ambiguous ontological position relative to other animals, which is not entirely reducible to assessments of their capacity for subjective experience. People drew the line regarding where to stop eating things at different

points along this implied hierarchy, but many made reference to the idea that moral concern was less of an issue the further away animals are perceived as being from humans.

Such an implicit hierarchy bears a striking resemblance to the time-worn notion of the 'great chain of being', which seemed to be the structuring principle of many ethically-oriented diets. This idea, which is Aristotelian in origin, is essentially the notion that life is hierarchically ordered. Classically this hierarchy was held to have God at the highest point, descending down through Man – usually Man, of course, rather than Woman – and then through animals, plants, and inanimate objects. The idea of a hierarchy *within* the category of 'human' has been discussed by Joanna Bourke (2011) in her excellent historical assessment of the Western concept of humanity. The present data suggest that internal hierarchies may obtain within the category of 'animal' as well. In general, respondents were quite happy to confirm that their conceptions of animal life were based on a notional hierarchy. Femke (meat eater) even referred to the idea explicitly, saying for her there is a hierarchy of animals that runs down from cows, through sheep, chickens, fish and so on.

These kind of assumptions were also evident in relation to fish. Indeed, many people also seemed to have difficulty classifying fish and accounting for them ethically. While a fuller treatment of this point is beyond the scope of the present chapter, there is some indication that fish are also positioned as creatures of low moral standing because of their fundamental difference from humans, in a similar way to insects – a sort of low ontological standing which provides the grounds for reduced moral concern.

For a particular group of self-reported vegetarians, then, eating particular animals is acceptable. For some who are relatively unconcerned by animal welfare, this is on environmental grounds. For others, for whom animal welfare is still a prevailing concern, this is on the grounds that some species are below the threshold of moral concern, and accounts of this ethical positioning seem to indicate a kind of folk hierarchy that at least partially structures ethical diets. Such findings raise a number of interesting questions regarding the ethical treatment of animals, and the way in which ethically-oriented diets are formed and justified. Here I indicate two pertinent areas for further discussion and investigation.

7.6 – INSECTS AND THE PRECAUTIONARY PRINCIPLE

One important ethical question raised by the prospect of introducing insects as human food is whether or not we should extend the precautionary principle to them. That is, do we owe animals a duty of care if we do not know for sure that they're incapable of experiencing pain or suffering? Writing on animal ethics more broadly, Andrew Linzey (2013) has argued that in cases where we do not fully know, we should generally give animals the benefit of the doubt.

There is a relative paucity of research into insects' capacity for subjective experience or ability to feel pain. An early review concluded that available evidence did not suggest that insects were capable of feeling pain (Eisemann et al., 1984), although this view has been questioned by subsequent research (for a review, see Gjerris et al., 2016). In a recent article, Andrew Barron and Colin Klein (2016) have argued that insects are capable of subjective experience. Although this work has been criticized, clearly the debates on insect pain and subjectivity are far from settled (see Klein and Barron, 2016). Evidently more work needs to be done to establish clearer grounds for arguing for or against insect sentience, a point which for many may have implications for ethical decisions made regarding the treatment and consumption of insects. For example, as Gjerris et al. (2016: 105) have argued in an article about the ethics of insect production for food and feed,

> As long as there is only little knowledge about the capacity of insects to experience better or worse welfare, the informal logical fallacy of argumentum ad ignorantiam should be avoided, i.e. absence of proof should not be misunderstood as proof of absence.

By contrast, Bob Fischer (2016) argues that vegans should *not* extend the precautionary principle to insects, contending that given the uncertainty regarding insect sentience, ethical priority should be given to species that we *know* (or have sufficient evidence to suspect) are capable of experiencing pain or suffering: namely, those mammalian and bird species we know to be harmed by plant agriculture. He argues further that in the light of the number of insect deaths resulting from plant agriculture, less harm may actually result from the rearing and consumption of insects that have been specifically bred for the purpose, although this particular argument may be dependent on insects being reared on waste streams rather than plant-based animal feed (see Fischer, 2016: 260–261).

Conventional animal feed is still currently used by a number of European breeders (Hubert and Arsiwalla, 2016), and the use of post-consumer waste or manure as a substrate for rearing insects is currently banned in the EU (Finke et al., 2015). As such, Fischer's stimulating account is nevertheless unlikely to spell the end of ethical discussions around the consumption of insects. Clearly these issues warrant further investigation and debate.

Here it is worth emphasizing the need to disaggregate the category of 'insects' within ethical treatments of insects as a potential food source. This need has elsewhere been identified in the literature (Evans et al., 2015) in the light of a tendency to treats 'insects' as a discrete and homogeneous category (which does, of course, also include the present chapter.) Gjerris et al. (2016) make the point that ethical considerations are likely to be species-specific: perhaps a stronger ethical case can be made for eating beetle larvae than adult crickets or grasshoppers, which are killed at a greater stage of development. Such a decision would no doubt involve the work of both biologists and ethicists. Clearly this is one area that requires greater attention as particular insect species are proposed as a potentially widespread source of food.

7.7 – ANTHROPOCENTRIC VEGETARIANISM

A further question to arise from the foregoing data concerns the ethical orientation of vegetarian diets: are both the environmental and animal welfare motivations for vegetarianism that I have discussed in a sense anthropocentric?

Environmentally motivated vegetarianism seems to be anthropocentric in the sense that the ethical concern is primarily directed at humans, and the survival of the human species. A number of people, for example, made reference to leaving the planet a good place for their children, or future generations, to grow up in. Although of course the idea of maintaining the health of the earth is certainly not an ethical position which totally disregards the welfare of animals, ethical priority does appear to be afforded to humans, rather than animals per se.

By contrast, vegetarianism which is primarily motivated by animal welfare concerns seems, on the face of it, to be less easy to conceive of as anthropocentric. Nevertheless I would suggest that this may be a useful way of conceptualizing it, because ethical care still seems to radiate out or trickle down from humans, and evidently stops at a certain point. Joanna Bourke's (2011: 100–114) concept of a 'limited economy of sympathy' is relevant here. Bourke's term refers to the tendency to extend ethical care to those who are perceived as ontologically proximate to humans, but also points out how crucially, this care is in limited supply. The idea can perhaps be usefully

extended to the analysis of animal ethics as well. For many, it seems that ethical concern is based on the identification of certain species with humans, but not others. In a sense, humans are still prioritized, as are creatures perceived to be ontologically 'close' to them. After a certain point, animals are exempted from moral concern: the economy of sympathy is exhausted. This ethical approach could be contrasted with a more inclusive ethics in which humans are considered to be just one facet of the broader sphere of animal and plant life.

In bringing my discussion to a close, I wish to emphasize that it is not my intention to try and poke holes in people's efforts to adopt a more ethical diet. All of the people I spoke to were making commendable efforts to eat more ethically, which was manifestly not always particularly easy. I wish simply to point out what appear to be prominent structuring principles within the establishment and maintenance of a particular set of Western vegetarian diets, and to suggest how these ultimately appear to rely on established philosophical notions of the prominence of humans (and species that are perceived to be 'close' to humans). Future efforts towards the development of a more inclusive animal ethics must acknowledge the prevalence of this hierarchical apprehension of animal life. The case of the buffalo worm offers us a useful way of understanding the fundamental malleability of vegetarianism, its different dimensions, and perhaps some of its limitations.

Chapter 8 – Modes of eating and phased routinisation: insect-based food practices in the Netherlands

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8.1 – CONTEXTUALISING REMARKS

This chapter, like the one which preceded it, elaborates on one of the findings introduced in Chapter 6. Sustaining the analytic focus on consumption, it turns away from the ethical dimensions of insect-based foods, addressing instead the idea that acceptance of such foods is in large measure shaped by their 'fit' with established eating practices. This concerns how, in practice-theoretic terms, people's diets are constituted; and further, which 'place' insect-based foods (or other novel foods) have within diets so constituted.

The chapter makes an explicit engagement with theories of practice, introducing two concepts for social scientific analysis of food and eating: modes of eating and phased routinisation. These theorise the way in which the 'compound practice' of eating (Warde, 2016) is organised, maintained, and may change over time.

The concept of modes of eating theorises how eating practices are constituted (through configurations of practice, both alimentary and non-alimentary) and organised (in relation to particular teleoaffective structures). Within participants' diets, different modes of eating are evident, such as 'mundane modes' that obtain (for example) during everyday evening meals and 'elaborate modes' engaged in more infrequently (for example, on special occasions). For the majority of participants, insect-based foods fitted into 'mundane modes', which meant that insect-based foods were judged according to similar criteria – such as price, taste and availability – as potential alternative foods (mainly plant-based meat replacers).

The concept of phased routinisation introduces periodisation to practice-theoretic food research, theorising 'phases' as periods of stability in the prevailing configuration of modes of eating that constitutes an individual's diet. Some participants stopped eating insect-based foods as a consequence of changing phases: others continued eating them, but only when they found the foods to be superior to potential alternatives in terms of conventional criteria (e.g. price, taste and availability). In both cases, practice-theoretic analysis illuminates how the acceptance of insect-based foods is dependent upon propitious configurations of social practice that constitute eating, and on the negotiation of the foods' place in such practices.

Based on this analysis, theories of practice are argued to offer a useful resource for understanding the sociological basis of the acceptance of insect-based foods, by directing attention to how such foods (do not) 'fit' into eating practices, both in a recurrent, routine sense and within longer-term 'phases' of eating. Further, the chapter also indicates how these concepts may contribute to the theoretical resources of the sociology and geographies of consumption more broadly: for example, by theorising periodized transitions in or out of 'healthy' food consumption, or practices such as smoking.

However, as with the other chapters, the objectives here are substantive as well as theoretical. The chapter indicates an important consideration for those wishing to introduce novel, more sustainable foods: where do such foods 'fit' within the prevailing modes through which diets are organised, and are they 'durable' enough to withstand the periodic shifts in dietary practice conceptualised here as 'phases'? Such durability relates to the foundational criteria (such as price and taste) identified in the other empirical chapters.

This chapter addresses **RQ1** ('How are insect-based foods being integrated into established practices of food and eating in the Netherlands?'), **RQ2** ('How does the integration of insect-based foods into eating practices relate to other aspects of food and eating?') and **RQ3** ('If insect-based foods are not being integrated into eating practices, why not?').

8.2 – Abstract

Sociological research on sustainable consumption has seen widespread application of theories of practice ('practice theories') as a means of transcending the limitations of epistemologically individualistic 'behaviour change' approaches. While in many ways the central insights of practice theories vis-à-vis consumption are now well-established, this chapter argues that the approach holds further insights for sociological analysis of food consumption in general, and of novel foods in particular. Based on empirical research with consumers of a range of insect-based convenience foods in the Netherlands, this chapter introduces two practice-theoretic concepts – 'modes of eating' and 'phased routinisation' – which contribute to sociological theorisations of how food practices are established, maintained, interdepend and change. Beyond its theoretical contribution, the chapter substantively extends research literatures on the introduction, uptake and normalisation of insect-based and other novel foods.

8.3 – Introduction

Among current debates in the sociology of consumption, there are two prominent emphases: sustainable consumption, broadly conceived, and the development of theories of consumption which break with the orthodoxies of 'behaviour change' approaches (e.g. Mylan and Southerton, 2017; Shove, 2010). This chapter extends these debates by analysing the attempted introduction of a range of novel, purportedly more sustainable foods – insect-based convenience foods – into Dutch diets. Drawing on theories of practice ('practice theories'), it introduces two concepts for the sociological analysis of food, and indicates how these may contribute to the conceptual resources of practice-theoretic research in general. The chapter's theoretical contribution is particularly useful, I argue, for analysis of the acceptance and routinisation of novel foods, helping to elaborate how positioning of foods as 'edible' is sociologically achieved rather than a purely psychological matter (cf. Chapter 5). The chapter also makes a substantive contribution to literatures on the introduction, uptake and normalisation of novel foods, indicating how the sociological constitution of established diets may inhibit novel foods' diffusion.

Practice theories are a loose grouping of related theories regarding the nature of 'the social' and of human activity (e.g. Schatzki, 2002; Shove et al., 2012; Warde, 2016), which share a number of characteristics. Most prominent among these is their common contention that 'the social' is not situated in the mental activities of the individual, or in the determining influence of social structure, but rather at the level of social practice.

In these terms, social life is constituted of myriad interrelated social practices in which people participate: for example, those of driving, cooking, or playing football. Thus for many (although not all) practice theories, it is practices themselves that represent the fundamental unit of social

analysis (Nicolini, 2016). A practice can be understood as 'a routinized way in which bodies are moved, objects are handled, subjects are treated, things are described and the world is understood' (Reckwitz, 2002: 250). Practices are constituted of a number of interconnected elements, including bodily and mental activities, objects or materials ('things'), practical, motivational and background knowledges, and emotional states (Reckwitz, 2002: 249). Despite conceptual and terminological differences between different practice theories (e.g. Nicolini, 2016), three key areas of theoretical confluence are identifiable.

Firstly, practices do not exist in isolation: they are *related*. They are conducted amidst, and shaped by, proximate practices. For example, the practice of eating breakfast could be shaped by shopping practices, work practices, childcare practices, and so on, which may affect its content, location, timing and affective valence. These related practices themselves shape, and are shaped by, other practices. Social life may be understood as a web or 'mesh' (Schatzki, 2002) of interrelated, interdependent practices.

Secondly, practice theories are *recursive*. Practices are constitutive of 'the social', but 'the social' so constituted also shapes the performance of practices. A supermarket trip, for example, may be shaped by adjacent practices (e.g. work, social commitments) and contextual factors (e.g. the weather); in turn, the shopping trip shapes subsequent practices, whether eating-related or otherwise.

Thirdly, stability in social affairs is conceived of as a *recurrent* achievement, an emergent effect of repeatedly performed social practices. These are not, as Shove et al. (2012) note, exact replications of each other. Rather, each performance of a practice is a distinct occurrence, which may or may not involve the same elements as previous performances. While the recurrent performance of a particular practice using the same constituent elements leads to a degree of social stability, such stability is essentially provisional. This is how practices afford modification and change over time. Gradual changes in the constituent elements of a practice lead to their mutual reshaping in and through the reconfiguration of practices as they are recurrently performed.

It has become commonplace to assert the conceptual advantages of practice theories over 'behaviour change' models of human activity (e.g. Shove, 2010), and practice-theoretic consumption research has proliferated. Although the widespread application of practice theories to diverse empirical studies of (un-)sustainable consumption has met with justifiable criticism (Evans, 2018), such theory remains, I argue, an insightful basis for analysis of food consumption.

Perhaps the most comprehensive practice-theoretic account of eating is that developed by Warde (2016), which foregrounds, inter alia, the role of routine, convention, and 'the encompassing flow and sequence of action' in shaping food consumption (Warde, 2016: 150). Other research has emphasised the role of routine in food consumption (Wahlen, 2011), its social and contextual derivation (Delormier et al., 2009), and the interdependence of eating with other social practices (Halkier and Jensen, 2011). Food has been conceptualised as a 'nexus' point, at which a plethora of mundane daily practices are interconnected (Paddock, 2017).

Practice theories have been employed to understand how eating may change over time, for example with regards to the integration of new technologies (Truninger, 2011), the 'normalisation' of food types (Halkier, 2017), or the 'transition' to new dietary orientations such as veganism (Twine, 2018). Research has also investigated how diets may change or be changed with a specific focus on public health or increased sustainability (Sahakian and Wilhite, 2014). Such studies have substantiated a central argument of practice-theoretic analysis: that successful

dietary change (whether in orientation, 'healthiness' or vis-à-vis the uptake of new foods or technologies) involves all related areas of food practice, and indeed a web of non-alimentary practices as well.

Despite these advances, however, there is a dearth of research investigating the integration of specific novel foods into established eating practices. This chapter addresses that subject, presenting empirical data from a research project investigating public acceptance of insects as food in the Netherlands.

Building on the work of Warde (2016) and Schatzki (2002), the chapter's principal objective is to offer a theoretical extension to practice theories as applied to the sociology of food. It does so by introducing two concepts: a) modes of eating, which refer to the different ways in which eating is recurrently performed amidst the prevailing configurations of social practice affecting one's diet; and b) phased routinisation, which refers to the way in which longer-lasting shifts in food consumption are achieved as a result of significant, enduring modifications in the configurations of social practice affecting and constituting one's diet. Both concepts reflect the fundamental characteristics of practices discussed above. Modes of eating theorises how eating practices are constituted, emphasising their interrelation with other practices and their recursive, routine nature. Phased organisation also incorporates the routine and relational aspects of eating, but elaborates more specifically how the recurrent performance of eating practices engenders change over time.

The two concepts are theoretical rather than empirical. Building on sociological insights into how food consumption is achieved amidst a web of social practices (e.g. Warde, 2016), the concepts provide formal theorisation of *how*, in these terms, eating is conducted. The concept of modes of eating introduces a comparative analytic unit to practice-theoretic food research, which does not privilege particular eating events and accounts for both routine and occasional consumption. Phased routinisation theorises how gradual dietary changes occur, introducing *periodisation* to practice-theoretic food research. The concepts are thus intended to develop the analytic resources available for the sociology of food, and potentially consumption more broadly. These points are elaborated in the discussion section of the chapter.

In addition to the chapter's central theoretical contribution, it also aims to shed light on the challenges faced by efforts to introduce more 'sustainable' foods to diets in Europe and the US (the 'West'), and the substantive issue of whether, how and to what extent Western consumers may adopt insects as food. I now explain this substantive focus.

8.4 – INSECTS AND SUSTAINABLE CONSUMPTION

In the context of global population growth and anthropogenic climate change, efforts to identify more sustainable protein sources are widespread. One such proposed solution is the use of insects as human food ('entomophagy') in the West, on the grounds that insects are relatively low in fat and high in nutrients, and that their production is significantly less harmful to the environment than that of conventional Western meat animals (van Huis et al., 2013). Yet despite the suggested benefits of insects as human food, a significant question remains: will people actually eat them?

Entomophagy is globally widespread, a point which is often emphasised by its Western advocates (e.g. van Huis et al., 2013). However, the wide range of non-Western entomophagy practices are not the basis of recent European efforts (see Chapter 9), which have been shaped by interactions between academia, business and policy since around 2006 (see Chapter 5). Four

main species – mealworms, buffalo worms, crickets and grasshoppers – are sold whole, powdered, or processed into familiar product types, such as bread, cakes or pasta.[83] Processing and use of familiar products are argued to mitigate the 'yuck factor' and encourage consumption (see Chapter 9). In contrast with media representations of insect-eating as a daring or shocking activity, Western entomophagy advocates frame the practice in terms of healthiness and sustainability (e.g. van Huis et al., 2013), an orientation reflected in consumers' reported motivations (see Chapter 6). Development of familiar-looking insect-based products reflects the intended consumers: people who deliberately moderate their meat intake, but otherwise eat a largely conventional diet (see Chapter 5). Of course, for many Westerners, insect-based foods are still unusual and unappealing. However, I argue that widespread resistance to culturally unusual foods is of less immediate analytic or practical relevance than the interest of 'early adopters', who represent the entry point for novel foods into new locations (see Chapter 6).

Such considerations shaped the Insecta range of insect-based convenience foods, which are central to this chapter (see Chapter 5 for detail). One of the most prominent insect-based foods in Europe at the time of research (2015-2016), Insecta products were sold in (~550) branches of the Dutch supermarket chain Jumbo throughout 2015. The range – which included five products, such as burgers, nuggets and schnitzel – were essentially vegetarian convenience foods, except for the 14% ground-up buffalo worms or mealworms they contained.[84] Targeted at meat-reducing consumers, Insecta were produced and sold in the same manner as more conventional 'meat replacers' (*vleesvervangers*). These included plant-based burgers, sausages and chicken-style pieces, as well as schnitzel- or burger-type products – often containing nuts or cheese – which sought to imitate meat less closely.

Consumers of Insecta are the analytic focus of this chapter, which addresses the limitations of current research on Western 'consumer acceptance' of insects as food. Such research largely conceptualises acceptance of novel foods in cognitive terms, underemphasising the social and contextual nature of food consumption. Studies accounting for social context tend to be based on imaginary eating events, and research which engages people in 'actual' insect consumption is chiefly conducted in decontextualised and/or unrealistic environments (see Chapter 6).

This chapter directly addresses these limitations. It adopts a theoretical approach that can accommodate the social, practical and contextual derivation of food consumption, and empirically engages with people who have voluntarily purchased and consumed insect-based foods.

8.5 – METHODOLOGY

The research design sought congruence with a practice-theoretic account of eating in two key ways. Firstly, by taking eating practices as the locus of analysis: specifically, those into which Insecta fitted, or were supposed to fit. Secondly, by investigating 'actual' eating practices, rather than people's reported attitudes or speculations regarding future behaviour. The project received

[83] For examples, see https://web.archive.org/web/20180423135453/http://www.bugburger.se/foretag/the-eating-insects-startups-here-is-the-list-of-entopreneurs-around-the-world/
[84] The range can be viewed at https://web.archive.org/web/20170109124949/http://www.damhert.be/en/shop/producten?categorie=insecta

ethical approval from the author's university, and participants provided informed consent at all stages of the research.

Participants were recruited through cards placed in packs of Insecta sold in Jumbo during September and October 2015. Interviews were conducted with 40 participants regarding their consumption of Insecta and their other eating practices. Sampling was purposive: in keeping with the analytic objectives, participants were sought who had voluntarily purchased and consumed Insecta (see Chapter 6).

This chapter draws on follow-up research with 20 of these participants. Six to twelve months after the initial stage of research, follow-up interviews were conducted. These investigated whether and why (not) participants' consumption of Insecta had continued, the particular eating practices that Insecta had (or had not) been integrated within, and more general aspects of participants' eating practices, particularly around daily cooking and regular food shopping.

Of these 20 participants, 17 then completed a two-week food diary. Participants photographed their daily main meals and food shopping done during the two week period. The diaries sought to mitigate difficulties with recollection of mundane practices (cf. Martens, 2012) and provide visual data on shopping and cooking. They were also the basis for subsequent detailed discussion about domestic food practices, conducted within and around participants' kitchens. This 'situated' the discussion, enabling participants to point out relevant things (e.g. kitchen equipment).

Although the question of whether or not people are able to provide adequate post hoc accounts of social practices is debated (e.g. Hitchings, 2012; Martens, 2012), the diaries and interviews nevertheless provided crucial insights into how Insecta fitted into the practical reality of food provisioning and consumption. The diaries also gave insight into the rhythms and routines of mundane food practices *over time*, a point which, Warde (2016: 175, note 1) suggests, remains relatively understudied.

Of these 17 participants, some took part in accompanied shopping (n=12), cooking (n=13) and eating (n=10). Shopping was intended to be broadly representative of participants' typical shopping trips, and cooking/eating were intended to be broadly representative of participants' mundane evening meal preparation/consumption. These 'go-alongs' (Kusenbach, 2003) were intended to provide insight into participants' food practices as they were performed, to prompt discussion, and to allow elaboration of earlier remarks.

Of course, the go-alongs did not provide unmediated access to participants' 'real' food practices. My presence introduced a degree of artificiality to the proceedings, and participants were required to explain themselves during practices that would typically involve limited rational deliberation and reflexivity. Nevertheless they helped to add depth and detail to understanding of participants' food practices.

8.6 – EATING PRACTICES AND INSECT-BASED FOODS

Drawing on empirical material from the Insecta project, the chapter now introduces two concepts – modes of eating and phased routinisation – which extend practice-theoretic accounts of eating. In so doing, the chapter also explains how the constitution of the practice of eating affects the integration of novel foods into established diets. The two concepts pertain to the synchronic and diachronic aspects of food consumption respectively.

On the synchronic dimension – the current, prevailing manner of an individual's mundane eating practices – different *modes of eating* are evident, which bear upon the extent to which particular novel foods are consumed. Modes of eating are ways in which the practice of eating is organised amidst and through particular configurations of practices, both alimentary and non-alimentary. Modes of eating demonstrate the recursivity of practices: eating practices involve individual agency, but are shaped by proximate practices. Eating practices, in turn, shape other practices.

On the diachronic dimension – the stability and change of practices over time – a process of *phased routinisation* is evident. This conceptualises how meaningful, enduring shifts in eating practices are engendered by longer-lasting changes in prevailing configurations of practices, both alimentary and non-alimentary. Phases also have a bearing on the extent to which novel foods are consumed.

Both concepts are argued to have substantive and broader theoretical relevance, discussed in the closing section of the chapter.

8.7 – MODES OF EATING

This section introduces the concept of modes of eating. This builds on Warde's (2016) notion of eating as a 'compound practice'. Some social practices, such as driving, have relatively clearly identifiable boundaries and constituent elements. Others, such as business practices, involve the integration of different practices in their performance (such as the practices of taking part in meetings, emailing, and compiling reports). These are *integrative* practices (Schatzki, 2002). Eating, for Warde, is a complex practice with fluid boundaries; it is 'subject to, and also a complex corollary of, the intersecting injunctions of several relatively autonomous integrative practices' (2016: 86). Eating is thus a *compound* practice, shaped by 'adjacent, complementary, but also invasive integrative practices' (Warde, 2016: 50) such as working, leisure or childcare.

As a compound practice, eating is 'weakly coordinated and weakly regulated' (Warde, 2016: 10) and thus can be conducted in innumerable ways. *Modes of eating* theorises how performances of the compound practice of eating are organised, both for specific eating events (e.g. a birthday meal), or sequences of eating events (e.g. weekday breakfasts).

A mode of eating (henceforth 'mode') is defined as a particular configuration of (integrative) practices, both alimentary and non-alimentary, which is organised in relation to a particular teleoaffective structure. For Schatzki (2002: 80), a teleoaffective structure is 'a range of normativized and hierarchically ordered ends, projects, and tasks, to varying degrees allied with normativized emotions and even moods' that structure a particular practice. Compound practices, such as eating, also have a teleoaffective structure. That of a 'business lunch' likely differs from that of a 'romantic dinner'.

Teleoaffective structure is a distinguishing characteristic of modes because different modes may be constituted of, and conducted amidst, the same configuration of practices (e.g. work, shopping, exercise), yet have different ends or emotional valences. For example, a meal made for visiting friends on a Wednesday may be constituted by and among a similar configuration of practices as a mundane evening meal the following day, but oriented to hospitality and conviviality rather than ease and convenience. Conversely, different enactments of the same mode of eating may involve variations in the practices they are constituted of, and conducted amidst, but remain part of a particular mode of eating due to a common, distinct teleoaffective structure. For example, one may buy lunch daily from different places, while the relevant mode of eating remains 'lunchtime at work'.

The configuration of practices and teleoaffective structure that constitute a mode of eating may be particular and one-off, or recurrent. The concept of modes does not delineate time involved or degree of recurrence. Thus a meal eaten out in a restaurant for one's birthday may be considered part of a specific mode of eating, contrasted with the daily consumption of the same breakfast foods, which may be considered another mode. (The configuration of people, practices and places may be unique in the first instance but recurrent in the second.) The purpose of identifying modes is to provide a fundamental analytic unit which can enable comparative analysis, incorporating both highly routine and more fluid eating behaviours.

In keeping with the practice-theoretic conception of social life as recurrent – constantly reproduced through the repeated performance of social practices – the concept of modes is in theoretical terms confined to single eating events, yet which may be recurrently performed, thus *producing stability* or the effect of a mode enduring over a longer time (e.g. 'lunchtimes while working at Company Z'). Thus, it is possible to talk about a *prevailing mode* of eating, but it must be acknowledged that this is an emergent outcome of repeated performances of particular eating events conducted as part of the same mode, and not as a result of a mode having a distinct, enduring ontological reality outside of its constant reproduction.

The concept of modes is used here to analyse eating events involving a particular range of insect-based foods and thus does not, a priori, analytically privilege particular eating events (e.g. dinners). However, Insecta were, with one exception, eaten exclusively during evening meals, so comparison between evening meals is the primary analytic focus here. Modes are intended to be a cross-cutting analytic concept for the purposes of comparative analysis. They may be deployed to study 'modes of breakfasting', for example, or how daily practices structure differences between 'daily modes' of eating, depending on one's analytic objectives. However the present focus is how modes affect the integration of a range of novel foods into established dietary practices.

The following section illustrates how different modes are performed, and how these are constituted through particular configurations of practice (both food-related and otherwise) with particular teleoaffective structures. It then explains how modes had a bearing on the ways in and extent to which Insecta products were integrated into established dietary practices.

How modes are performed

Participants' diets generally exhibited one or two *prevailing modes* of eating. Also identifiable were *routine variations* to the prevailing mode(s), as well as occasional *planned or unplanned deviations* from the prevailing mode(s). I illustrate these concepts primarily with examples from one participant, Gijs, providing supplementary examples from other participants. Gijs, like most participants, did not routinely consume Insecta, but he offers the best single example of modes of eating.

Gijs lived alone in the suburbs of a small city. He was divorced, and had adult children who lived elsewhere with their families; his girlfriend lived in a larger city, twenty minutes away by car. He worked full-time in the region, to which he also drove. Following a high cholesterol diagnosis, he had stopped eating meat in the last year. However, he continued to eat fish twice a week, and was trying different meat replacers in his evening meals.

Gijs's evening meals were, broadly speaking, arranged into three main modes. The first, which I term the 'mundane' mode, was generally operative on weekday evenings, when Gijs ate alone at home. These meals were drawn from a limited repertoire, were often of a similar format (the traditional Dutch potato-meat-vegetable 'trinity'), and typically involved meat replacers.

The mundane mode emphasised functionality, ease and convenience. Provisioning, preparation and consumption of these meals had to fit in around Gijs's various commitments, such as going to work, dog walking, and playing sport. Sport on Tuesday evenings exerted particular influence on his evening meal, necessitating a swift meal after work which was not – in Gijs' terms – too 'heavy', and thus usually involving 'light' things like stir-fried noodles and vegetables, rather than 'heavy' things like beans and potatoes. Provisioning for mundane meals chiefly took place in conjunction with other activities, such as dog walking close to a nearby town.

Every Friday Gijs's son would visit, bringing Gijs's young grandson. Gijs would cook a simple oven-based meal that could be prepared with little time and effort, which could be left in the oven while he played with his grandson. This 'routine variation' was shaped and constituted by practices which affected Gijs's mundane mode of eating more broadly, such as work, dog walking, and food shopping. The crucial difference to 'normal' evenings was the presence of family members that Gijs wanted to spend as much time with as possible.

In contrast to the functional orientation to eating on a Tuesday before playing sport, Friday's evening meal – while substantively relatively similar, involving simple and convenient food – was oriented towards familial love and care (cf. Meah and Jackson, 2017). As such, this routine variation can be understood as a distinct but related mode to the prevailing one. Related, because of the widely shared configuration of constitutive practices; distinct, because of its discrete teleoaffective structure.

Another prevailing mode was the 'elaborate' mode generally operative when Gijs spent time with his girlfriend, either at his house or hers. This involved a more extended repertoire; the negotiation of 'menus' (Warde, 2016) between Gijs and his girlfriend; the consumption of fish and/or alcohol; eating outside; shopping in different places from normal; and selection of food based on tastiness, rather than ease of preparation or relative inexpensiveness.

The configuration of practices that constituted these meals was more fluid, involving both their schedules as well as shared trips to different places. Consequently different ingredients were found and experimented with, which occurred markedly less frequently in the mundane mode due to the relative fixity of shopping locations and the emphases on speed and convenience. The teleoaffective structure was clearly different from the mundane mode, with its functional emphasis, yet was similar to the family visit on Fridays, in the sense that in both cases food was a means of 'making love' (Miller, 1998). However, what distinguished the more elaborate mode of eating was that its specific enactments of love and care were achieved through longer, more elaborate meals (both in preparation and consumption), contra the oven dishes of the Friday family visits.

Gijs's diet also exhibited the occasional 'unplanned deviation'. For example, when returning late from a music festival in Belgium he was unable to conduct typical shopping and cooking, and so bought a ready-to-cook lasagne from a Belgian supermarket. He reported seldom eating such a product, which was more expensive than he would typically find acceptable. However his eating on this day was shaped by the practices of festival attendance and travelling, which meant he arrived home late, could not shop in his usual places, and did not have much time to cook. A specific configuration of practices thus affected and constituted eating, and had a specific teleoaffective orientation towards ease and convenience. This constituted a mode of eating, an unplanned deviation from the mundane mode.

Apropos of their main evening meals, other participants also exhibited different modes of eating. Typically these were most pronounced among participants who lived separately from their

partners, for whom a mundane domestic mode often contrasted with a more elaborate one that was operative during shared meals. Among co-resident families, a single mode tended to prevail, although others were evident, including routine variations and un/planned deviations.

Other single participants' diets exhibited clear modes. Femke, for example, had a mundane mode, shopped for on Monday evenings for her meals until Friday. Its teleoaffective structure prioritised convenience, healthiness, and affordability. By contrast, the 'Friday shop' was part of a distinct mode of eating conducted over the weekend, whose principal teleoaffective orientation was towards enjoyment. This generally accommodated more elaborate meals, indulgent ingredients, and alcohol. Planned deviations included visits to her mother's house on Sundays every few weeks, and unplanned deviations included impromptu meals or drinks with friends. Both involved different configurations of eating-related and other social practices, with different teleoaffective structures (such as family care or socialising): that is, different modes of eating.

Modes of eating and insect-based foods

For Gijs, Insecta products were a candidate for incorporation within his prevailing, mundane mode of eating, and were situated within the configuration of practices which constituted it. Indeed, this applied to almost all participants (exceptions being occasional consumption of Insecta at barbecues or other domestic social events). Yet Gijs had not eaten Insecta more than once, as he did not like the taste or the 'sponge-like' texture. Participants who, like Gijs, consumed Insecta as one-among-many meat replacers – which is to say, almost all of them – required Insecta to be superior in terms of the key selection criteria for inclusion in relevant food practices (price, taste, availability) that in practice they seldom met. At around €3,95 per pack, Insecta products were more expensive than most alternatives. Typically they were only intermittently available, and their taste was in general not highly regarded (see Chapter 6). A comparably priced plant-based range was often preferred. Although environmental and health considerations were prominent reported motivations for trying Insecta, conventional criteria (e.g. price) were operative in repeat consumption, for which Insecta was judged in relation to potential alternatives (see Chapters 6 and 9).

Occasionally Insecta products were eaten regularly (once a week, or slightly less frequently) as part of a mundane mode. Jan, for example, found their price acceptable, their taste enjoyable, and their availability consistent. Despite his long-term vegetarianism, he regarded insect consumption as ethically acceptable (see Chapter 7). Although his wife Roos ate meat, they arranged cooking in such a way that they shared most parts of a meal, and he could eat Insecta or other meat replacers while she ate meat.

In a single case Insecta was accommodated by addition of a routine variation to a prevailing mode of eating. Pieter and his wife Mirjam ate meat- and fish-based meals from a relatively limited repertoire during the week. A routine variation was their 'vegetarian day', involving a similar configuration of practices to their mundane mode (the same weekly shopping trip in a particular supermarket, work and childcare obligations, kitchen, cooking equipment and culinary competencies). The difference was that it involved the consumption of plant-based meat replacers rather than meat. Thus, in addition to involving different materials, this mode had a different teleoaffective structure to the mundane mode of eating (i.e. ethically, environmentally oriented, at the expense of the preferred taste of meat).

A second routine variation was also added: 'no meat Monday'. This was, in terms of configuration of practices and teleoaffective orientation, very similar to 'vegetarian day'. However, on this day

Pieter ate Insecta products – considered neither meat nor vegetarian – and Mirjam, averse to insect consumption, ate typical 'vegetarian day' meat replacers.

Attention to modes of eating, and how they are configured (both in terms of constitutive practices and teleoaffective structures), indicates that the integration of novel foods into established dietary practices is dependent upon, and affected by, such modes. Positioning of insect-based foods within mundane modes subjected them to relevant selection criteria (e.g. price, taste), on which they often struggled to compete; insect-based foods could be integrated into mundane modes, or new modes, but this involved processes of negotiation that were seldom undertaken.

The concept of modes helps to furnish an understanding of how routines in food consumption are constituted, relate to each other, and 'hang together'. A second analytic concept, phased routinisation, introduces a degree of historicity to the analysis.

8.8 – PHASED ROUTINISATION

Here I introduce the concept of 'phases,' conceptualising how diets are constituted through social practices. A phase is defined as a largely stable configuration of particular modes of eating (themselves modes of arranging the compound practice of eating by way of configurations of integrative practices, both food-related and otherwise). A phase thus refers to the prevailing manner in which one eats, including the mundane mode(s) and accounting for routine variations (e.g. gym attendance on Tuesdays) and occasional un/planned deviations (e.g. spontaneous drinks with a friend one evening which disturb planned eating). Although the present explanation focuses on individual diets, the concept also applies to larger social units (e.g. couples, households) who share relatively stable modes of eating organised in routinised phases.

Phases are conceptually distinct from specific time periods such as months or years (although a phase may certainly be measured in these). Rather, a phase refers to an enduring (which is to say, recurrent) configuration of practices which constitutes the prevailing manner of eating at a given point during the life course.

When there is an enduring shift in the constitution of eating (beyond routine variations), as a consequence of an enduring shift in the configuration of constitutive practices and/or teleoaffective structures (i.e. modes of eating), the phase can be said to have changed. Whereas an individual's current phase of eating may be considered a synchronic phenomenon, changes in phases are diachronic. Phases conceptualise how eating changes over time, but undergoes periods of relative stability (which is to say, the recurrence of configurations of practice which constitute the practice of eating). Eating is routinised in particular ways during a particular phase and in different ways during a different phase. Eating is thus subject to *phased routinisation*.

For example, Gijs's diet was – despite occasional unplanned deviations – relatively stable, and was shaped by everyday practices relating to living, working, exercise and relationships. However, the recurrent organisation of his diet was distinct from earlier phases, such as before he entered a new relationship (introducing routine variations) or received a high cholesterol diagnosis (affecting his mundane mode of eating.)

The term 'stability' requires qualification. Routine practices are repeated performances of a practice, involving improvisations and gradual changes in the practice's constitutive elements (Shove et al., 2012; Warde, 2016). Consequently, stability in practices is always emergent and provisional (Shove et al., 2012). Stability in a dietary phase does not, therefore, imply inertia in

its constitutive practices. Rather, it conceptualises the way in which, despite variation in the *performances* of constitutive practices, it is the *configuration* of practices that remains stable.

Changes in the mode(s) of eating that constitute an individual's diet at a given point in the life course are likely to have effects on the substantive aspect of an individual's diet, as when the birth of a child affects other household members' eating practices (Plessz et al., 2016: 112). Changes do not need to be in practices directly associated with food consumption to have a considerable effect: they may, for example, relate to a change in employment (Warde, 2016: 133–4). Phases are thus relatively fragile. In this way, they are similar to practices themselves: recurrently performed, necessarily improvised, and liable to change. A shift in the routinised performance of the practice of eating (i.e. its constitutive elements or teleoaffective structure) entails a changed mode of eating, and consequently a changed phase. Modes forge a theoretical connection between individual, improvised performances of the practice of eating and the 'higher level' analysis of prevailing dietary tendencies afforded by phases.

I now discuss two empirical examples. These illustrate how phases are constituted and change, and how shifts in phases affect the integration of insect-based foods into diets. The first example, Margot, stopped eating Insecta following a shift to a new phase of routinisation.

Shifting phases: excluding insect-based foods

Margot was a student, living in a shared house in a suburban area. She was usually in university until around 5pm on week days. She enjoyed both cooking and food shopping, and she bought food almost daily in different places across the city. She ate mostly vegetarian food, although this was a result of her upbringing (and was thus familiar) rather than deriving from explicit ethical principles. In 2015 Margot worked in a restaurant, with shifts starting at 6pm and ending between 10pm and midnight. In 2016 she changed jobs, and was always finished by 8pm.

In October 2015, Margot ate Insecta relatively often (around once a week). It fitted into her 'mundane' mode of evening meals, which involved meat replacers two or three times per week. However, by June 2016 Margot had completely stopped eating Insecta. Indeed, she ate meat replacers in general with much less frequency. A primary reason was her change in employment. Previously she had little time to prepare food between finishing university and starting work, necessitating quick and easy meals in which meat replacers (often cooked in around five minutes) featured prominently. Her new job left her evenings free, enabling her to spend much more time cooking (she estimated 1.5 hours per evening meal, on average), and thus able to make dishes from basic ingredients. She still ate meat replacers occasionally, but much less often than before.

Margot's cessation of Insecta consumption was also prompted by other considerations. By 2016 the novelty of eating insect-based products had worn off, and she reported finding the price rather high relative to alternative products. Nevertheless, the shift in phase of eating engendered by her changing employment had reduced the 'window of opportunity' for Insecta to fit into. This exacerbated the effect of Insecta's perceived inferiority to alternative meat replacers, and Margot stopped eating them.

Margot's example demonstrates how the consumption of novel food products is dependent upon propitious configurations of social practice that constitute the prevailing manner of food consumption: a particular phase of eating. Changes in practices – which may be socially, spatially and temporally dispersed and of only indirect relevance to the consumption of food – effect changes in phases of eating, which in turn affect the ways in and extent to which novel food

products are consumed. However, shifting phases are not the only operative factor. For Margot, Insecta's perceived inferiority relative to potential alternative meat replacers also contributed to her no longer consuming them.

These points are illustrated in an inverse fashion with the example of Willemijn, explained in the following section. Like Margot, shifting phases of routinisation significantly reduced the 'window of opportunity' for Willemijn to consume Insecta. Unlike Margot, however, Willemijn's fondness for Insecta – its perceived superiority relative to potential alternatives – contributed to sustained (albeit occasional) consumption.

Shifting phases: retaining insect-based foods

Willemijn was a vegetarian student living in a shared house, who considered insects to be ethically acceptable food. In September 2015, Willemijn ate Insecta 'quite often'. By September 2016, she ate them – and meat replacers in general – much less regularly.

Willemijn's earlier phase of consuming meat replacers very frequently was connected with her prevailing manner of eating at the time. During that phase, Willemijn had very stable routines that were constituted amidst and through a stable configuration of practices. She attended regular university classes and an internship; she did regular exercise deemed to require a high protein intake (possibly in accordance with contemporary discourse around the dietary importance of protein); she had lived in the same house with the same housemates for some time, and they had established shared cooking routines; her shopping routines fit in around her other practices, and were largely conducted in the same supermarket; and her cooking routines were adjusted to the social and material circumstances of her domestic environment.

However, by early 2016, the stability of this phase was affected by shifting configurations of practice. Willemijn began a relationship, which meant regular travel to another city, as well as a new mode of eating negotiated with another person. Significantly, around this time, she also suffered an injury. This obliged her to stop intense exercise, and necessitated substantial reconfiguration of eating practices to accommodate the sudden drop in necessary protein. Frequent consumption of meat replacers – of which Insecta was the highest in protein – was no longer appropriate. The injury in particular had precipitated a shift in phases of eating, which directly affected the extent to which novel food products were consumed.

In subsequent months, Willemijn's previous routines were almost completely dismantled. She finished university, and began working in a different location. She also moved house. This disturbed her established routines of shopping and shared meals, and entailed changes in the material context of food preparation (in particular, a faulty oven) that required reconfiguration of cooking practices.

Like Margot, the ways in and extent to which Willemijn consumed novel food products were shaped by shifting configurations of practice that inaugurated a new phase of eating. Like Margot, Willemijn's consumption of Insecta was negatively impacted upon by shifting phases. However, the crucial difference in Willemijn's case was that she continued to eat Insecta, albeit less frequently.

Despite the disintegration of her earlier routines, Willemijn did occasionally shop at a large Jumbo near her workplace which sold Insecta. She liked the Insecta burger, which was one of the four burger-type meat replacers she still occasionally ate. Although still 'looking for a new routine' with shopping, Insecta had become part of her new phase of eating. This was despite her

reduced consumption of meat replacers, and despite the supermarkets nearest to her new house – where she mostly shopped – not stocking the products.

While phased routinisation strongly affects the consumption of novel food products, it is not completely determinative. In Margot's case, Insecta's high price and waning novelty combined with shifting phases of eating to stop her eating the products. In Willemijn's case, the enjoyed taste of the products led to an enduring, semi-routinised place within a new phase of eating, albeit in a significantly reduced quantity.

Thus if novel food products are to be successfully integrated into diets, they must be able to 'withstand' the vagaries of phased routinisation. As with the preceding discussion of modes, such durability requires novel foods' superiority to potential alternatives on a range of basic criteria.

In sociological terms, the focus on dietary shifts conceptualised here as 'phases' is not wholly novel. As Plessz et al. (2016: 103) observe, 'biographical transitions' and progression through the life course engender shifts in food practices, intentionally or otherwise (cf. Paddock, 2017). More generally, changes in practice have been theorised as 'transitions', when configurations of elements shift, leading to alterations in practices (e.g. Shove et al., 2012).

The utility of phased routinisation as a distinct concept is that it introduces *periodisation* to the analytic vocabulary of practice-theoretic analysis of food consumption – and indeed of human activity more generally – and thus offers a new analytical resource. For example, it helps to theorise how phases are not necessarily sequential (e.g. Plessz et al., 2016), but may be cyclical or recurrent (Wahlen, 2011). Phased routinisation also sheds lights on how nascent 'normalization' of a food (Halkier, 2017) may be thwarted by shifting configurations of practice, effecting a kind of 'reversal'.

8.9 – Discussion

This chapter has introduced two analytic concepts – modes of eating and phased routinisation – which, I argue, are a fruitful means of analysing how food practices are established, maintained, interdepend, and change. Analysis of the consumption of Insecta provides empirical support for these concepts, alongside substantive data regarding the integration of novel foods into established dietary practices.

In substantive terms, the concept of modes demonstrates how the 'place' in eating practices where new foods 'fit' substantially affects whether and how they become routinely consumed. Future research might profitably explore the comparative sociologies of novel foods introduced and routinised through mundane modes versus those channelled through more elaborate modes, such as dining out (cf. House, 2018).

The concept of phased routinisation is also instructive in substantive terms, supporting other research emphasising the precariousness of sustainable or healthy diets (e.g. Paddock, 2017). It directs attention to the fragility of the 'window of opportunity' for the introduction of novel foods (cf. Plessz et al., 2016), and the precariousness of the process by which their consumption is sustained and routinised.

Both modes and phased routinisation have broader theoretical relevance, providing distinct analytic purchase compared to other concepts and approaches.

The concept of modes provides a conceptual tool for explaining how the compound practice of eating is organised. It also introduces a comparative analytic unit for practice-theoretic research

into food consumption that does not, a priori, privilege particular eating events. In relation to the routines which practice-theoretic accounts identify as central to food consumption, the concept of modes theorises how dietary routines are constituted by a diverse and dispersed range of practices, how they are organised around particular teleoaffective structures, and how they 'hang together'. Modes could be applied to the investigation of other novel foods, or other aspects of eating-related phenomena, such as waste (cf. Southerton and Yates, 2014). Although developed in relation to the notion of eating as a compound practice, the concept of modes may be compatible with conceptualisations of eating as a 'complex' or 'bundle' of practices as well (e.g. Meah, 2014a).

Phased routinisation also offers a distinctive contribution to practice-oriented theorisations of food consumption. Building on research identifying the provisional nature of diets (e.g. Paddock, 2017) and observations that changes in one's life may engender transitions in food practice (e.g. Plessz et al., 2016), phased routinisation theorises how food practice transitions are periodised, or episodic (cf. Wahlen, 2011). Phases may fruitfully be applied to other sociological analyses of the consumption of specific food products or types, as well as to research into other aspects of food practice such as eating 'well' or 'healthily'.

Beyond the theoretical resources of practice-theoretic food research, the two concepts also have broader applicability. Modes may be employed to understand and explain how other compound practices, such as work or mobility (Southerton and Yates, 2014), are organised and 'hang together'. Phased routinisation may be used to analyse other periodised transitions in practice, such as those in or out of phases of smoking, taking exercise, or transport use. Both concepts may also be relevant to other forms of consumer practice, beyond food consumption, where novel forms may be introduced. For example, the regular use of new wearable technology – such as fitness trackers – is dependent upon successful integration of such technology into complexes of social practice (e.g. working or socialising), hinting at the analytic relevance of the different modes by which such practices are organised (see Cohn and Lynch, 2017). Similarly, regular use of wearable technology is evidently constituted through a propitious, recurrent configuration of mundane social practices that – in a similar way to the food-related examples above – may be conceptualised as particular phases (see Cohn and Lynch, 2017).

In providing substantive data on the sociological basis of public acceptance of novel foods, this chapter has sought to demonstrate both the utility of practice theories for the understanding of food consumption, and the utility of food consumption for the development of practice theories. It has also introduced two new concepts which aid sociological understanding of the introduction of novel foods, and potentially of consumption practices more broadly.

Chapter 9 – Insects are not 'the new sushi': theories of practice and the acceptance of novel foods

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9.1 – CONTEXTUALISING REMARKS

This final empirical chapter builds on those preceding it in two key ways, one of which is substantive and the other theoretical. In substantive terms, the chapter explains how the key factors identified as relevant to the acceptance of insect-based food, other novel foods, and foods more generally – i.e. price, taste, availability and 'fit' with established eating practices – dynamically interact, and are related both to the production and consumption of foods. This chapter reintroduces production to the analysis, without which, it is argued, the consumption of insect-based foods – and consequently, their public 'acceptance', in broader terms – cannot fully be understood.

One of the chapter's central arguments is that the 'scripting' of insect-based (and other novel foods) exerts a strong influence on the ways in and extent to which they are consumed (cf. the discussion of 'scripting' of convenience foods in Jackson et al., 2018). That is, if novel foods are positioned as one among an array of feasible alternatives for incorporation in a particular set of eating practices, they must be either comparable or superior to other potential alternatives in terms of price, taste and availability. The chapter aims to explain why insect-based foods are unsuccessful, but also, through comparative analysis with the introduction of sushi in the United States, how a novel food might become successfully established.

The chapter sustains the deeper theoretical engagement with theories of practice initiated in Chapter 8. It applies practice-theoretic analysis to examples of the establishment of novel foods: one of which, insect-based foods, is unsuccessful; the other of which, sushi, was successful. The chapter argues that theories of practice offer potentially fruitful analytic affordances for identifying, explaining and understanding what I term the 'cultural geographies of new food' (cf. Freidberg, 2004), as discussed in Chapter 2. It also argues that a practice-theoretic approach offers a coherent way in which to apprehend the influence of both production and consumption, or supply- and demand-side factors, on the 'acceptance' of novel foods: and, indeed, on the consumption of foods in a more general sense.

For example, a practice-theoretic approach explains the establishment of sushi as a new food in the United States as a result of the pre-existence of relevant production and consumption practices, 'carried' to new locations as a result of a range of social, economic, political, technological and material factors. By contrast, insect-based foods have failed to become established due to a lack of relevant practices (either for production or consumption), and the attempted integration of insects into the sphere of practices that were developed without reference to them. This approach indicates the broad range of factors relevant to the establishment of particular foods in new places, and also the central role of production as

providing the conditions in which consumption can occur. This goes beyond the more individualistic apprehensions of novel food's acceptance outlined in Chapter 2. In comparing and understanding the (attempted) introduction of two different novel foods, the analysis is also suggested to be applicable to the study of novel foods more broadly.

This chapter investigates the consumption of insect-based foods, addressing **RQ1** ('How are insect-based foods being integrated into established practices of food and eating in the Netherlands?'), **RQ2** ('How does the integration of insect-based foods into eating practices relate to other aspects of food and eating?') and **RQ3** ('If insect-based foods are not being integrated into eating practices, why not?'). It also accounts for the production of insect-based foods, addressing **RQ5** ('What implications do the supply-side aspects of insect-based foods have for their consumption?').

9.2 – ABSTRACT

Food geographies have long grappled with the interplay between production and consumption. Theories of practice offer productive new ways of conceptualizing the mutual implication of supply and demand in shaping food consumption, yet little work has approached the subject of novel foods from this perspective. This chapter applies practice-theoretic analysis to two novel foods, aiming to demonstrate the utility of the approach for a number of substantive areas and to extend conceptual and theoretical debates within food geographies. The chapter compares sushi (a novel food successfully established in the US in the 1960s) and insects (a novel 'sustainable' protein source for Western markets, which to date has been relatively unsuccessful). Many accounts portray sushi's success as the result of marketing efforts and the role of a 'gateway dish,' arguing that insects – as 'the new sushi' – can follow this model to achieve widespread acceptance. It is argued that sushi's initial Western establishment was instead due to pre-existent practices 'carried' to a new location, where the practices' relevant constituent elements were also present. Conversely, European food insects are not clearly assimilable within pre-existing practices; instead, integration into existing food practices has been attempted. Such efforts are demonstrably problematic.

9.3 – INTRODUCTION

In the context of climate change and a rapidly increasing global population, efforts are underway across Europe and North America (henceforth 'the West') to increase the 'sustainability' of the current agri-food system. Becoming more common in this respect is the proposal that insect consumption ('entomophagy') be adopted by Western populations, of which a defining example is the report published on the subject in 2013 by the Food and Agriculture Organization of the United Nations (FAO) (van Huis et al., 2013). This argument is based chiefly on the manifold perceived benefits of insects relative to conventional food animals: for example, insects have comparable levels of protein and nutrients to cows, pigs and chickens, yet are argued to be considerably less resource-intensive to produce than those species (e.g. van Huis et al., 2013). The FAO report sparked a considerable amount of interest in the subject in academia, business, and the popular media, and a number of insect-based food products have since appeared on Western markets (e.g. Bugsolutely, 2017).

A common refrain is that insects are – or could be – 'the new sushi' (e.g. Ballingall, 2014; Watson and Treanor, 2016 - although there are many other examples). Sushi is provided as an example of a food which until relatively recently the majority of Westerners did not want to eat because it generally involves the consumption of raw fish and other culturally unusual ingredients such as

seaweed, but which has undergone a remarkable repositioning and is now widely enjoyed. "The world of entomophagy", Killingsworth (2013) argues, "is ready for its sushi moment – the normalization and subsequent integration of an unusual ingredient into the American diet through food trends." The notion that sushi provides a model for the introduction of insects as food is also reflected, albeit not always as explicitly, in some academic sources (e.g. Dunkel and Payne, 2016).

In drawing comparisons between sushi and the potential introduction of insects, 'ento-preneurs' often suggest that gaining Western acceptance of insects as food "is just about how it is marketed" (Hickey, 2015) or "comes down to nothing more than branding" (Sewitz, 2015). The idea that widespread acceptance of insects (or other unusual new foods) is largely a question of convincing or educating consumers is reflected in academic research in the area, which exhibits a distinct tendency towards methodological individualism (see Chapters 2 and 7).

Academic research in the area also suggests that disguising insects in food is likely to encourage consumer acceptance (e.g. Hartmann et al., 2015), and that integrating insects into familiar forms of food may be the most suitable way to introduce them to Western markets (e.g. Verbeke, 2015). This, indeed, is the line commonly taken by producers of insect-based foods, which tend to resemble more conventional products such as pasta or protein bars (e.g. Bugsolutely, 2017).

Manufacturers often draw explicit comparisons with sushi, arguing that their familiar-looking products will act as a pathway to wider consumer acceptance of insects as food. For example, Sewitz (2015) explains that his insect-based protein bar company are "looking to what we call 'the California Roll Effect' as we position cricket protein in the market." The California Roll is an 'inside-out' sushi roll with the seaweed on the inside and including no raw fish, held to be a 'gateway drug' introducing sceptical consumers to sushi more generally. Insects, Sewitz (2015) and others suggest, can follow this model.

This chapter argues that insects are not, in fact, 'the new sushi', and that efforts to encourage acceptance of insects through marketing or by integrating insects invisibly into conventional foods are unlikely to be successful. Analysis of how sushi became an established food in the United States (US) illustrates necessary conditions for the successful introduction of a novel food to a new location. Subsequent comparative analysis of two current attempts to introduce insects to Western diets indicates that these efforts are, in a number of crucial ways, very different to sushi. As the comparison of insects and sushi is a common fixture of entomophagy discourse, addressing it head-on offers an apt means of framing the analysis at the core of the chapter.

In the following analysis, theories of practice (Schatzki, 2002; Shove et al., 2012) are applied to the study of novel foods and how they become accepted and routinized. Beyond contributing to our understanding of this particular subject, one of the chapter's principal objectives is to demonstrate the appropriateness of practice-theoretic analysis to this substantive area. Particularly instructive, it is argued, is the ability of such investigation to go beyond abstract ideas of 'willingness to eat' novel foods such as insects (e.g. Gmuer et al., 2016). Instead, such analysis engages with the social and geographic context of food consumption in determining the 'acceptance' of novel foods: the *how*, *what*, *when*, *where* and *why* that affect food consumption outside of the psychology lab.

The chapter also seeks to extend key relevant debates within the geographies of food, particularly regarding the mutual implication of production and consumption (or supply and demand) in the positioning of particular foods (e.g. Goodman, 2002; Hollander, 2003). It is argued that theories

of practice can make a useful contribution to such debates, and to future research applications within the geographies of food, by offering a productive means of conceptualizing the production-consumption nexus that nevertheless remains attentive to the practical realities of eating. Practice-theoretic analysis of novel foods may also have much to offer ongoing debates within geographic scholarship that question the sovereignty of individual consumers in relation to food consumption (e.g. Jackson, 2016). This suggests an opportunity for productive interdisciplinary dialogue with more individually-focused research around the introduction of novel foods.

Theories of practice

Contemporary 'theories of practice' (e.g. Reckwitz, 2002; Schatzki, 2002; Shove et al., 2012) can be understood as a set of broadly related theoretical approaches to the study of society that share certain philosophical and methodological characteristics, most significantly in their location of 'the social' in social practices rather than determined by social structure or inhering in the individual social actor. Thus, to take the example of food, practice-theoretic analysis places analytic emphasis on – inter alia – the diverse and intersecting practices of shopping, cooking and eating, rather than individual attitudes or values or on the determining influence of abstract systems. Social life is conceptualised as the aggregate of innumerable interdependent practices, and practices themselves are a central object of analysis (e.g. Reckwitz, 2002).

The version of practice theory drawn upon in the present chapter is that developed by Shove et al. (2012). These authors conceive of social practices as being comprised of the interaction of three key elements: materials, competencies and meanings. Materials are "objects, infrastructures, tools, hardware, and the body itself" (2012: 23). Competencies are "multiple forms of understanding and practical knowledge" including such things as "practical consciousness, deliberately cultivated skill, or [...] shared understandings of good or appropriate performance in terms of which specific enactments are judged" (2012: 23). Meaning is "the social and symbolic significance of participation at any one moment", a collapsing into a single category of "mental activities, emotion and motivational knowledge" (2012: 23).

Each of these three factors are necessary but not sufficient conditions for the development of a particular social practice: they must all be present for a practice to develop, but can theoretically all be present without a particular practice actually developing. As Shove and Pantzar argue, "when thinking about how practices evolve, it becomes clear that *relations* between material objects and associated images [meanings] and forms of competence are of defining importance" (Shove and Pantzar, 2005: 45, original emphasis). Thus, for example, if a new food is to be consumed, it is not enough for it simply to arrive in a new place; rather, it must be integrated within the active reproduction of a practice, which is itself dependent upon the presence of other components of practice with which it may be integrated.

People do not simply participate in practices but are rather 'carriers' of them (Reckwitz, 2002), who *actively reproduce* them in the process of participation (Shove and Pantzar, 2005). If practices 'travel' to new locations it is not the outcome of direct transferral, but rather a process of reinvention in a new context (Shove and Pantzar, 2005). It is through the constant re-articulation of social practices that changes occur, but such changes are not sudden shifts: rather, they are achieved by gradual metamorphoses in practices as they are reproduced. Changes in practice are thus emergent and path-dependent (Shove et al., 2012). Practices, and the elements of which they are comprised, 'prefigure' possible courses of social action (Schatzki, 2002).

Elements of practices can be shared between different practices, meaning that changes to an element in one practice can have implications for others (Shove et al., 2012: 33). Indeed, practices are always to some extent mutually implicated. Although practices may be discussed separately for heuristic purposes, practice-theoretic research is particularly attentive to the enactment of social life as the outcome of multiple, interdependent practices. The application of this mode of social theorizing to the study of food has, accordingly, yielded a number of critical insights into the way diets are established, maintained and change.

Food and social practices

The application of theories of practice to the study of food has indicated how notions of 'consumer choice' may offer a limited understanding of food consumption. Although individual preferences and perceptions no doubt exert some influence on food intake, food consumption always occurs at the intersection of different social practices within the rhythms and routines of people's daily lives. As well as practices directly associated with provisioning and eating, these include practices which in some way have a bearing on food consumption, such as work practices, care practices, travel practices, and so on (e.g. Warde, 2016). Food consumption events may be situated within (potentially concurrent) 'meta-practices' enacted via a skein of interdependent practices, such as mothering (Molander, 2011), 'critical consumption' (Bellotti and Mora, 2016), and 'ethical' or 'environmental' food consumption (Fonte, 2013).

As Fonte (2013) notes, despite the emphasis in much practice-theoretic food studies scholarship on habit and routine, the theoretical orientation is also particularly apposite for investigating how practices change. Dietary change, whether self-directed or targeted through deliberate interventions, has been shown to involve all elements of a practice, rather than simple attitudinal shifts (e.g. Hargreaves et al., 2013; Twine, 2014). However, it is often unclear whether or not deliberate interventions, even when addressing all levels of social practice, have successfully effected long-term change (e.g. Micheelsen et al., 2014; Sahakian and Wilhite, 2014).

Research on food using theories of practice has for the most part focused on sustainable, healthy or 'alternative' food consumption. Many of the objects of study, such as alternative food networks (Fonte, 2013; Hargreaves et al., 2013), are in a meaningful sense 'new', as they represent the (attempted) introduction of novel practices of food provisioning and consumption. However, there has been little attention so far within practice-theoretic literature on *novel* foods in particular, which can be understood for present purposes as foods which, although they may be already established somewhere, are newly introduced to a particular context. Possible exceptions include the chapter presented in Chapter 7, and Micheelsen et al. (2014): however, the broadly practice-framed Chapter 7 does not make an explicit engagement with practice theory, and Micheelsen et al. (2014) focused on an experimental dietary intervention, rather than investigating novel foods within the context of mundane food acquisition practices. The present chapter extends practice-theoretic analysis to two examples of novel foods to elucidate how such foods may or may not become 'accepted' and routinely consumed.

9.4 – METHODOLOGY

The sushi section of this chapter is based on an extensive literature review and research conducted using an online newspaper archive (reported fully in House, 2018). The insect section of this chapter is based on semi-structured interviews conducted with six individuals involved in some way with the development of an edible insect sector in the Netherlands. The Netherlands has a reasonable claim to be the European 'hub' of recent research associated with the human consumption of insects (e.g. van Huis et al., 2013). It is also the centre of production for European

food insects, with a number of specialized breeders producing food-grade insects which are used in products both in the Benelux region and further throughout Europe (e.g. Kreca Ento-Food, 2017c). The individuals interviewed were involved with science, insect breeding, retail, food manufacture, and supermarket category management. Also drawn upon in this section are semi-structured interviews with 40 consumers of a range of insect-based convenience foods in the Netherlands (see Chapter 7). The research project under which all interviews were conducted was granted ethical approval from the author's university. Participants provided informed consent and all interviews were recorded and transcribed.

Analysis of interviews followed the 'general inductive model' of qualitative research (e.g. Thomas, 2006). Interview material was coded inductively and thematically using NVivo 11 software, both in relation to the theoretical orientation of the research (focusing on practices) and internally (identifying emergent themes relevant to consumption of insect-based foods) (Strauss, 2003). Categories were subsumed within superordinate categories where relevant (Thomas, 2006). Although the analytic focus on practices was an explicit part of the research design – contra orthodox individualistic approaches (see Chapters 2 and 7) – no a priori assumptions were made regarding either the substantive content or theoretical 'fit' of the data.

9.5 – INSECTS ARE NOT 'THE NEW SUSHI'

The central argument of this chapter is that insects are not 'the new sushi'. The argument has two main components. Firstly, the chapter examines the establishment of sushi in the US in the 1960s. The success of sushi at this point is argued to be because a) there were pre-existing sushi practices that could be drawn upon, and b) because the requisite constituent elements for each practice (materials, competencies and meanings) were available in the US at that time. In general terms, sushi is defined as a component of Japanese cuisine (see House, 2018). For present purposes sushi is further conceptualised as a 'bundle' of associated practices, pertaining broadly to either its consumption or production (cf. Shove et al., 2012).

This practice-based definition focuses specifically on the sushi bar format, which played a key role in sushi's US establishment (although may well extend to other culinary forms). Conceptualising sushi in this way helps to address the potential analytic difficulty posed by the occasional conflation of 'raw fish' with 'sushi' in popular discourse. From a practice-based perspective, both the US acceptance of sushi (part of a cuisine) and of raw fish (a type of ingredient typically used in that part of a cuisine) can be understood in the same terms: as the re-enactment of a bundle of practices, involving particular foodstuffs, in a new location. Through their coherent location within relevant practices, formerly unusual ingredients are made intelligible.

The second part of the analysis examines recent attempts to introduce insects as food in the Netherlands. This section examines both the introduction of insect-based convenience foods, and of whole, freeze-dried insects. It is argued that the low levels of consumption of both varieties can be understood via a comparison with sushi in practice-theoretic terms. Insect-based foods currently available in the Netherlands do not have clear a place within cuisines that could be re-enacted in a new location; rather, attempts have been made to integrate them into existing, non-insect-based food practices. In this way they fundamentally differ from sushi, whose 'new' ingredients – in particular, raw fish – had a distinct place within an appropriate, pre-established bundle of practices. Consequently, efforts to integrate insects into existing practices have encountered significant difficulties.

9.6 – SUSHI

Sushi is a component of Japanese cuisine, typically involving rice, soy sauce, fish or seafood, and nori (seaweed). Sushi's currently popular global form derives from the Tokyo version that became relatively standardized in metropolitan Japanese sushi bars in the mid-twentieth century (Issenberg, 2007). A key point in sushi's global development was its adoption by Americans in the 1950s and 1960s. From around 1959 sushi began to be sold in Japanese restaurants targeted at American customers; this was followed in around 1963 by the introduction of sushi bars in Japanese restaurants in New York and Los Angeles, targeted at both Japanese and American customers (House, 2018).

It was through the sushi bar format that sushi first appears to have become relatively widely popularized among a subset of American diners (House, 2018). As such the 'practices of sushi' associated with the introduction of US sushi bars in the mid-1960s are the analytic focus here. Although sushi bars were evidently a phenomenon on both US coasts, the illustrative analysis below draws on a case study of Los Angeles (House, 2018). I examine sushi production and consumption practices in turn, following a brief outline of what eating at a sushi bar involves.

Eating at a sushi bar

Although a post-WWII creation, the metropolitan Japanese sushi bar appears to have been the model for the US versions which were established during the 1960s (Corson, 2008; Issenberg, 2007). A sushi bar is a countertop with relatively few high stools (typically between around six and ten) at which customers sit. They watch the chef prepare dishes, have a degree of conversation and rapport with the chef which is relatively unusual compared to prevailing forms of Euro-American dining, and eat a succession of small dishes. The dishes are prepared to fairly exacting standards and tend to involve similar ingredients (such as particular fish species, rice, nori, and soy sauce). They tend to be prepared in a number of typical ways, which all tend to be framed in terms of both their aesthetic and gustatory qualities. It is possible for diners to order specific dishes; however the *omakase* mode of dining, in which the chef simply presents diners with a succession of dishes according to their own choices, is also popular.

Production and supply practices

In order for sushi to be 'accepted' by Americans in Los Angeles, it was necessary that sushi was *there*, in the first place, for diners to be able to accept. This entailed the routine enactment of sushi production practices, themselves dependent on the presence of appropriate materials, competencies and meanings.

Early US sushi bars tended to be situated within larger Japanese restaurants, many of which were long-established and relatively successful (such as Los Angeles' Kawafuku, a popular Japanese restaurant that could seat some hundreds of people). Such restaurants provided a stable site in which sushi bars could be trialled, without the risk of poor custom jeopardizing the parent business. The necessary materials for the production of sushi were available through existing food supply infrastructure and an established Japanese food supplier in Los Angeles. Issenberg (2007: 88) suggests that this company could provide everything a Japanese restaurant could possibly have needed, excepting premises and staff.

Practitioners with the requisite competencies were also required. To this end, the early sushi bars were staffed by experienced Japanese chefs, many of whom migrated to the US specifically for the purpose. These individuals 'carried' the practices of sushi production with them; the presence of the requisite materials enabled the re-enactment of those practices. Clearly, prominent

meanings regarding suitable production practices were in operation: a number of sources refer to US-based sushi chefs' glowing credentials, such as their previous employment for Japanese heads of state (e.g. United Press International, 1964).

Consumption practices

The practice of eating at a sushi bar in the US in the mid-1960s was clearly popular with Japanese Americans and Japanese business visitors to the country (Al-Jamie, 2013; Claiborne, 1967), as indeed still appears to have been the case into the 1970s (Rossman, 1972). Populations of experienced practitioners, in the shape of Japanese managerial expatriates, are suggested to have recruited American neophytes to the practice by introducing their US business colleagues to sushi bars (Al-Jamie, 2013). Contact with existing practitioners is a key way in which people become recruited to practices (Sahakian and Wilhite, 2014). Thus, both the requisite materials (sushi bars) and competencies ('carried' and demonstrated by experienced practitioners) were accessible to Americans. Further, a number of social and discursive factors provided the meanings necessary for the enactment of sushi consumption practices among white Americans.

A significant point is that the discursive context during the 1950s and 1960s was highly conducive to the acceptance of sushi. Japan was popular as a location for Hollywood films, Japanese food was reportedly popular in domestic cooking – with one contemporary commentator noting that "Oriental foods are now served in American households almost as much as the great favorite, Italian pasta of some kind" (Vanderbilt, 1965: 5) – and Japan was positioned as an exotic and desirable tourist location. As part of the latter positioning, Japanese cuisine was in general highly positively framed. There are also suggestions that 'raw fish' – or at least, fish not 'cooked' in prevailing contemporary uses of the word – was beginning to be positioned as increasingly acceptable, an example being ceviche. The 1960s also marked the beginning of a phase of modernity in which dining out, as with other forms of consumption, began to become part of the construction of individual 'lifestyles' (e.g. Featherstone and Tamari, 2006).

Taken together, these social and discursive factors hint at a context in which the enactment of sushi consumption practices was both feasible and (at least for some sections of the US population) increasingly likely, not least due to the affordances for social distinction represented by a demonstrable familiarity with Japanese cuisine (e.g. Claiborne, 1966).[85] Shove et al. (2012: 75) suggest that "mass defection [from a practice] is possible, and perhaps even likely, where practices are not consistently internally rewarding, not laden with symbolic significance and not enmeshed in wider networks." I would suggest that these principles may be operative, in an inverse fashion, with encouraging recruitment to a practice.

Indeed, it appears that sushi in the 1960s US met all of these criteria. The novel and relatively singular experience of eating sushi at a sushi bar, and its sensory and performative elements, have routinely been praised since the US establishment of that "new dine out experience" (Johnson, 1963). "A great part of the pleasure£ in eating at a sushi bar", Dwan (1974: 4) observed, "is in watching the clever-fingered chefs as they shape the beautifully precise rolls of vinegared rice and raw fish". The practice appears to have been laden with symbolic significance, then as now,

[85] Here it is worth emphasising that – while important – sushi's increasingly positive discursive framing did not, in itself, lead to the food's widespread popularity. The practice-based account advanced here conceptualises discursive framings as only one relevant aspect of changing public diets and tastes. For diets to change – and new foods to be "accepted" – the necessary competencies, materials and other meanings that constitute relevant practices must also be present, and must be dynamically integrated in performances of those practices (cf. Shove and Pantzar, 2005).

along the lines of exoticism, authenticity, and a socially distinguishing activity to participate in, and was popular with both metropolitan elites and the rich and famous (e.g. Claiborne, 1966; Issenberg, 2007). As Claiborne (1966: 11) drily observed of the mid-1960s trend for Japanese dining in New York, "Americans for whom 'chopsticks' was once a childish piano exercise [...] dine on the raw fish dishes, sushi and sashimi, with a gusto once reserved for corn flakes." Associated with dining out, sushi was likely to have been a part of other related (meta-) practices, such as business dining or the enactment of culinary adventurousness (Al-Jamie, 2013; House, 2018).

Summary

Sushi was able to become established in the US for a number of reasons, but two in particular are the most germane to the present analysis. Firstly, practices of sushi (on both the production and consumption side) already existed. Secondly, the materials, competencies and meanings necessary for the successful enactment of these practices were present.

The sushi consumption practices of visiting Japanese managerial workers and their white American counterparts may well have differed fundamentally in the meanings that partially constituted them. For the former, such practices may have been a 'taste of home'; for the latter, they may have represented a means of enacting social distinction. Nevertheless, the materials and competencies were essentially shared, and the meanings, however diverse, were evidently equally propitious to the re-enactment of the practices. Sushi consumption practices were situated within a broader mesh of interdependent practices, such as those associated with dining out.

The practice-based account of sushi points at why it was able to 'travel' to – which is to say, become re-invented in (cf. Shove and Pantzar, 2005) – a new location. Constituent practices were 'carried' to a new location (cf. Reckwitz, 2002), and the constituent elements of these practices, in turn, were available to practitioners, both old and new. The practice-based approach also indicates why an unusual ingredient – raw fish – was accepted by a population who had previously not consumed it. It was not simply presented, out of context, in a new location, but rather made intelligible through the framework of practices in which it was situated. Edibility of foods, in this account, is an achievement of practice, not a straightforward psychological repositioning of particular foods within an otherwise unchanged social landscape.

Here it is necessary to briefly discuss the California Roll. As noted in the Introduction, a number of 'ento-preneurs' consider the California Roll to be the key to Western acceptance of sushi by offering US diners "a stepping stone to eating raw fish" (Clegg, 2015: 12). However the dish is not mentioned in print prior to 1979, by which time sushi had been eaten by Americans for twenty years (see House, 2018). Ascribing widespread public acceptance of sushi to a single dish is likely to be an oversimplification. Practice-based analysis suggests that individual dishes may matter less to the acceptance of new foods than the establishment and repetition of a set of interdependent food practices that contain them, as part of which an array of new ingredients is made sense of. It is not that single dishes can 'change the minds' of consumers, but rather that consumers evidently can become gradually recruited to new food consumption practices, of which new foods are a fundamental part. Thus, as I suggest in the following section, new insect-based foods which do not have a coherent place within a broader mesh of situating practices are unlikely to become routinely consumed.

9.7 – INSECTS

Insects have been consumed all over the world for millennia. Some 2111 edible species have been recorded, which are evidently consumed in a wide range of different ways (Jongema, 2017). It is thus rather difficult to identify a 'practice of eating insects', because 'insects' are not all the same and the same species may be eaten in a number of different ways (e.g. Evans et al., 2015).

Greater specificity is afforded by the availability of only four insect species for human consumption in the Netherlands, the country of focus due to its centrality in current Western efforts to encourage entomophagy. These four species – henceforth, the 'Big Four' – are the buffalo worm, mealworm, cricket, and grasshopper. The first two species are not actually 'worms' but are the larvae of two species of darkling beetle. The 'grasshopper' is in fact the migratory locust, a species within the taxonomic family of grasshoppers which thus enjoys a more positive-sounding alternative nomenclature.

The Big Four are now the 'industry standard' food insects in Europe. Their selection as food species was the result of a number of technical, practical and arbitrary decisions following the inception of a pioneering Dutch insect breeders' association in around 2007, as well as a number of other external factors, such as legislation, that have affected the development of the Dutch insect sector. An important point concerning these species is that they were initially produced as feed for exotic pets and zoo animals, and thus their production for human food simply represents a reassigning of their intended destination. Production practices for human food draw heavily upon those extant for the animal feed market, along with their attendant technology and expertise. Although more stringent safety criteria (such as HACCP testing) have to be met for human food applications, with implications for production practices, such practices are otherwise similar to those used for the production of insects for animal feed.

Already a clear difference with sushi is evident. The fish species used in sushi, as well as the other ingredients, have been integrated into developing practices of sushi over time (e.g. Corson, 2008; Issenberg, 2007; Sand, 2015). The Big Four, by contrast, are the product of a set of animal feed production practices, which are associated with a related set of animal feeding practices. There is in general relatively little connection between these species and human food practices. The buffalo worm appears to have no recorded use as human food, and available data on human mealworm consumption does not indicate how the species is eaten (relevant research is documented in Jongema, 2017). The Dutch-bred cricket and grasshopper, although of species that are eaten more widely, have some crucial differences with existing eating practices. These are explained further below. At this juncture it will suffice to note that whereas the practices of sushi involve a range of foodstuffs (materials) that have been integrated within the practices as they have been developed, the practices of (the Big Four) insects do not exist: rather, efforts have been made to integrate the material used in practices of animal feeding into existing European human food practices, which initially developed with different materials. This, as I will show, is problematic.

The following two sections each address a different aspect of current European efforts to encourage the consumption of insects. The first, insect-based convenience foods, involves integrating insects invisibly into one specific form of familiar foods, and thus its attendant practices. The second, whole freeze-dried insects, involves integrating insects into established eating practices more broadly.

Insects and social practice 1: Insect-based convenience foods

As noted above, a prominent theme in Western commercial efforts to create insect-based food is the idea that insects should be invisibly incorporated into familiar foods. This approach, reflected in some academic work on the subject (e.g. Verbeke, 2015) is argued to mitigate against the 'yuck factor'. It also appears to be aimed at easing the integration of insect-based foods into existing diets, as it does not appear to require sharp readjustments of eating practices. To this end, insects have been invisibly incorporated into foods such as pasta, ready-to-eat bolognaise sauces, cookies, and potato chips (e.g. Bugsolutely, 2017).[86]

A prominent European insect-based food of the 'invisible' variety was the Insecta range of convenience foods, produced by the Belgian functional food company Damhert Nutrition. This range, which at the time of research included burgers, nuggets and schnitzel, were in many ways comparable to vegetarian convenience foods. They were made of similar ingredients, looked and tasted similar, and were cooked in a similar way. Their main distinguishing characteristic was the 14% ground-up buffalo worms or mealworms incorporated into the products.[87]

In the example of sushi discussed above, the unusual ingredient – raw fish – is a prominent and integral part of relevant dishes, which are themselves part of a bundle of production and consumption practices that constitute 'doing' a cuisine. With Insecta, the unusual ingredient – beetle larvae – was invisibly incorporated into food products that were part of a number of distinct but related bundles of provisioning and consumption practices, but which were developed without reference to insects. As such it was a form of somewhat clandestine integration into pre-existing practices, rather than prominent positioning within insect-specific ones. The practices that Insecta products fitted into were, broadly conceived, the practices of eating 'meat replacers'.

Meat replacers

'Meat replacers' (*vleesvervangers*) are meat-free products designed to be consumed in the place where meat would typically be used in a meal. The paradigmatic example of such foods is perhaps the 'veggie burger', but other examples of this now rather substantial range of products includes plant-based versions of sausages, meatballs and chicken pieces, as well as items such as cheese 'schnitzel'.

In practice-theoretic terms, these products are designed to be easily accommodated within established eating practices by drawing on existing culinary competencies (what kind of meals people know how to make) and materials (the other constituent parts of such meals, such as vegetables and carbohydrates, as well as existing kitchen equipment). They are also intended to fit into the fabric of existing food provisioning practices, for example by being available for purchase in the same supermarket where other food shopping normally takes place. However the meanings associated with eating meat replacers (for example, enacting a sustainable diet or care towards animals) are crucially different to those associated with the consumption of meat (for example, enacting masculinity or 'traditional' food consumption).

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[86] Also currently available are insect-based protein bars, protein powder (i.e. ground-up insects), and other derivative products such as protein drinks. I would suspect, as with the insect-based products listed at the site of this note, that the central arguments of this chapter probably apply to such foods as well. However, more research would be necessary to verify whether this is the case.

[87] At the time of writing, only the Insecta burger was still in production. High-quality photographs of the product are available at https://web.archive.org/web/20171111153739/http://glowofbeauty.nl/insectenburger/.

Insecta products were positioned as a meat replacer within production and supply practices, as well as those associated with consumption.

Production and supply of Insecta

During product development, Damhert reportedly reached an internal decision to integrate insects into familiar foods, rather than trying to imitate existing insect-based dishes from elsewhere. People seeking to reduce but not completely cease meat consumption ('flexitarians') were selected as the target market. The form of Insecta was affected by the difficulties faced in finding a willing production partner for the products: ultimately a company was identified, whose prior involvement in the production of vegetarian convenience foods (including existing expertise, equipment and an ingredient supply network) all shaped the products.[88]

In the Netherlands, Insecta products were stocked in all (~550) branches of Jumbo, a Dutch national supermarket chain, during 2015 (the number has since been substantially reduced). Insecta products were typically stocked in the same aisle as meat replacer products (or other comparable foods, such as tofu, tempeh and falafel). While acknowledging the decision to stock insect products in what is effectively a vegetarian section was "polarizing", the relevant party at Jumbo reported it seemed more coherent to stock Insecta with other "protein alternatives" than in the chicken, pork or beef sections. Market research conducted for the supermarket, which suggested that vegetarians and flexitarians may be relatively favourably disposed to the products, was reportedly also a consideration.

As a result of their production and retail practices, Insecta were 'scripted' as a meat replacer (Akrich, 1992). 'Scripting' is not equivalent to marketing: rather, it denotes the way in which objects may – either by accident or design – "configure the user in specific and practical ways" (Ingram et al., 2007: 8). Although alternative culinary applications for Insecta were not absolutely precluded, the products' inscription appears to have strongly shaped the range of practices – the "framework of action" (Akrich, 1992: 208) – into which they might be integrated (cf. Schatzki, 2002: 44–47), as it was as a meat replacer that the products were typically positioned in both food provisioning and consumption practices.

Consumption practices

Insecta's flexitarian target market was reflected in the dietary inclinations of participants. Although around a third self-defined as vegetarian, many of this subgroup ate some form of animal protein – typically fish – as well (see Chapters 7 and 8). All participants ate meat replacers at least occasionally, with most eating them regularly. Participants' practices of eating meat replacers were remarkably coherent. For the most part, they were consumed in a distinct place in a similar range of meal types (such as the traditional Dutch 'potato-meat-vegetable' meal format) where in a general sense meat may conventionally have been used.

Insecta products had often been selected from a range of meat replacers during routine shopping trips. Typically they were eaten as a direct alternative to other meat replacer products, and were generally prepared in the same way. Existing culinary competencies (e.g. regarding meat-based meals) and familiar materials (e.g. vegetables, carbohydrates, and cooking equipment) were drawn upon, as they would be during the preparation of conventional meat replacers. Other than the novelty or variety Insecta were considered to offer, the meanings around their consumption

[88] It would be useful to know whether other product forms were under consideration during the design stage, and if the constraints of a low number of willing production partners dictated that vegetarian-style convenience foods were the only possible option. Regrettably this information is not currently available.

were largely congruent with those associated with conventional meat replacers: for example, the enactment of 'ethical' diets, framed in terms of sustainability or animal welfare.

However, most people did not eat the products more than once. Some participants reported that they simply did not eat burger-type meat replacers very often, and thus saw little opportunity to eat Insecta despite otherwise being willing (the burger version being generally the only one of the range available). Although for many the format was appropriate, for most of these participants a number of serious problems with Insecta remained: they were too expensive, their availability was low and/or intermittent, and they did not taste good enough.

Thus, the example of Insecta suggests that if a new or unusual ingredient is integrated, invisibly, into a familiar and heavily 'scripted' form of food, it will tend to be used in practices associated with that form of food. Once this happens, the new food becomes one among many possible selections from an array of feasible alternatives. Consequently, without a significant reason to select the new food for use in food consumption practices rather than an alternative, it will not be used. Rationalized considerations such as the sustainability of a given food tend to be subordinate to those such as price and taste (e.g. Hoek et al., 2017; see also Chapter 7). If a sustainable food or drink option is to be selected from an array of alternatives, there are indications that it must be highly comparable in all other respects (e.g. Hoek et al., 2017; Spaargaren et al., 2013).

Practices of food provisioning are also an important consideration here. Participants' food shopping was frequently interdependent with other practices, such as those associated with childcare, education or leisure. Accordingly, food provisioning was often fragmented across a range of locations. Positioned as a meat replacer, Insecta became just one potential material in one potential shopping location, with little criteria to warrant a specific rearrangement of practices in order to acquire it. One participant, for example, said that she might buy Insecta again if at the nearest Jumbo, but that this depended on her already being on the way to visit a particular relative by car, which was a relatively infrequent occurrence. Her purchasing of meat replacers otherwise occurred as part of routine shopping in more proximate stores. In cases where participants did usually shop at a single Jumbo, the intermittent availability of Insecta, or the availability of only one type, had a similarly negative effect on its positioning as a feasible alternative meat replacer.

Summary

Unlike the example of raw fish and sushi, the attempted introduction of beetle larvae to Dutch diets via convenience foods did not draw on the practices of an established cuisine in which insects are an integral part. Rather, the products were intended to fit within the materials, competencies and meanings of existing practices in which meat replacers were eaten.

The attempt to smoothly integrate a new ingredient within the armature of existing, non-insect-based eating practices led to its positioning in a product range that was only one among a substantial array of feasible alternatives. The criteria by which particular materials are selected from this array frequently cannot be met, and the new product is not eaten.

The bundle of practices that constitutes sushi positions an array of foods, including raw fish, as edible. Furthermore, those ingredients are a prominent and distinctive part of sushi. The integration of insects into a meat replacer product removes the singularity and distinctiveness of the insect ingredient, which appears to play a part in rendering their selection as food unlikely. However, distinctiveness is not by itself a sufficient condition for the routine consumption of new foods, as the example of whole insects demonstrates.

Insects and social practice 2: Whole insects

Efforts to introduce insects to Dutch diets have not only been confined to insects' use as an invisible ingredient in familiar food types: a number of companies in the Netherlands also market whole insects for consumption either as a snack or for use in cooking. Among my participants, a handful reported having experimented with cooking the whole insects that are available. Their accounts suggest that the practice-based mode of analysis advanced above can also explain why uptake of these products remains low.

Production and supply of whole insects

In the Netherlands, the Big Four are freeze-dried and sold whole in portions of between 20-50g. They are expensive relative to other protein sources: for example, from one supplier a 50g bag of buffalo worms costs €5,79, and a 20g bag of grasshoppers costs €10,59 (Kreca Ento-Food, 2017a, 2017b). Sale is either direct to consumers online, or via physical stores. Stores include small delis and specialist food shops, as well as some branches of larger supermarkets where regional managers or franchise owners have a degree of influence over the foods stocked. It is unclear exactly how such sales are split, although one insect producer told me that their insects were sold roughly half online and half in physical stores. Whole insects in general are difficult to find: they appear to be unavailable in most cities in the Netherlands, and that when they are available, it is typically only at one retailer in a given town or city.

Consumption practices

Although the buffalo worm and mealworm lack a clear position within relevant food practices, the species of cricket (*Acheta domesticus*) and grasshopper (*Locusta migratoria*) bred in the Netherlands are both eaten in various non-European places. For example, the cricket is a popular food in certain regions of Thailand (e.g. Halloran, Roos, Flore, et al., 2016) and the grasshopper is consumed in a number of African countries (e.g. Anankware et al., 2016). Expanding focus slightly to accommodate comparable species yields another range of relevant practices, such as the consumption of *chapulines* – grasshoppers – in Mexico. These insects are from the same taxonomic family (*Acrididae*) as the Dutch variety, and are eaten primarily as a snack, but also as a condiment or ingredient in larger meals (e.g. Cohen et al., 2009).

Despite the potential existence of relevant consumption practices for some Big Four species, there are crucial differences between the Netherlands and elsewhere. One pertains to the material properties of Dutch food insects, which are freeze-dried. This appears to be something of a global novelty, and has implications for their use in preparation and eating practices (i.e. there appear to be no comparable established insect consumption practices from elsewhere involving freeze-dried insects). Another key difference concerns the practices by which Dutch food insects are supplied and purchased. As noted above, this involves their acquisition from online stores, a handful of specialist retailers, or events such as food fairs. These are evidently not typical sites of mundane food consumption, in contrast with non-European examples of the sale of whole insects for food (e.g. Halloran, Roos, Flore, et al., 2016).

It could potentially be argued that Dutch-bred grasshoppers may be used in broadly equivalent food practices based on those already existing elsewhere, such as those involving the consumption of *chapulines* in Mexico. However in Europe there appears to be little connection with such 'traditional' or 'authentic' insect consumption practices, either in popular discourse or

among my participants' accounts.[89] This relates, I would argue, to the absence of these practices in Europe more generally. Such absence is not simply a lack of public awareness of relevant practices. Rather, it is an absence of both the constitutive elements of these practices (materials, competencies and meanings) and of a population of practitioners who routinely integrate these elements through the performance of practices. In a similar vein to the example of Insecta, the general approach to the consumption of whole insects in the Netherlands – that is, of producers, advocates and potential consumers – is one in which they are integrated into existing European culinary practices.

Integrating insects into existing food practices

In order to ease the integration of insects into Western diets, advocates and companies have produced recipe collections on the subject (e.g. van Huis et al., 2014) and published online recipes (e.g. Duurzaam Insecten Eten, 2017). Drawing on familiar forms of food, these recipe books appear aimed at helping people to integrate a new material into diets by drawing on existing competencies and appealing to the meanings of sustainability and healthiness prominent in pro-insect discourse.

Only one of my participants had attempted to make an insect dish (a mealworm curry) using a recipe she found online. This was unsuccessful, because she felt that the material properties of the insects (particularly their small size) made them unsuitable for use in a meal format that usually involved larger pieces of meat or vegetables. The same participant regarded the small, crunchy insects as more closely resembling a snack food, and so had finished the remaining mealworms as a snack in front of the television.

Another self-confessedly 'foodie' couple I spoke with, who spent upwards of an hour each day cooking their evening meal, had bought a pot of buffalo worms several months previously but had not attempted to cook with them. They, too, thought that materially the worms seemed rather snack-like, and reported that they had neither the ability nor inclination to integrate them into a meal, despite being both interested in the idea of entomophagy and frequently engaged in cooking meals 'from scratch'.

A different participant had obtained some buffalo worms at a food fair. She occasionally ate these on top of toast with brie and honey, due to her assessment that they seemed closest to nuts in terms of taste and texture. Other than this, she reported not really knowing what to do with them.

Summary

It is not enough for a new food to simply 'appear' in a new location (particularly if it is expensive and difficult to find). Rather, it must be part of a *practice* if it is to be eaten beyond occasional experimental consumption, and the other relevant components of that practice must be present. As Shove et al. (2012: 57) note, "competence, material and meanings are often so closely related that if one element should travel [to a new context] alone [...] it is likely to remain dormant until joined by others capable of bringing it into the frame of a living practice." Clearly the publication

[89] The idea of "authenticity" in relation to food (as elsewhere) is inherently complicated and problematic (e.g. Jackson, 2013)(e.g. Jackson, 2013). A food's authenticity may best be conceived as being achieved relationally and through particular strategies, rather than signifying a "truly" originary dish or cuisine of some sort. Nevertheless, appeals to authenticity are commonly invoked in the positioning of "ethnic" foods in the West, a strategy which – while acknowledging the potential problems associated with cultural appropriation – is arguably a logically coherent approach to the positioning of insects as food.

of insect recipes is alone insufficient to account for the competencies necessary for the establishment of new insect-eating practices in the Netherlands.[90]

The above examples indicate some attempts to integrate insects into existing culinary practices, which face similar difficulties as the inclusion of insects in a meat replacer product. That is, the practices of making a curry, snacking, or eating brie on toast could all equally be conducted with tofu, potato chips or nuts respectively. In these examples, insects are again positioned among an array of feasible alternatives: but why, if insects are of questionable suitability, more expensive, and much more difficult to acquire, would they be selected? Again it is worth emphasizing that food consumption does not occur in a vacuum, but is rather situated within a skein of interdependent provisioning practices. Thus if insects are to represent a feasible alternative material for the practices of making curry or snacking then they must at least be obtainable within the shopping practices (and other interdependent practices) associated with provisioning for those modes of consumption.

To a significant degree the form of a food shapes its consumption. With the example of Insecta, the strength of its 'scripting' as a meat replacer was evidently somewhat problematic; with the whole insects, their *lack* of 'script' is equally problematic. These insects appear to be situated *outside* of relevant food practices, in contrast with routinely consumed foods. As both examples of insect-based food suggest, integration of insects into existing culinary practices, developed independently of their insect ingredients, is manifestly rather difficult.

9.8 – DISCUSSION

The analysis of sushi indicated that for new foods to become integrated into diets in a new location, a bundle of relevant practices is necessary, as is the presence of the requisite materials, competencies and meanings. Situated within the framework of relevant practices, new foods become culturally intelligible. The existence of practices in which new foods are an integral part, rather than an optional extra, is important. Further, a 'gatekeeper' population, already acquainted with and engaging in the relevant food practices, is evidently a significant help.

The examples discussed above indicate that a lack of insect-specific consumption practices leads to the attempted integration of insects into other practices, developed without reference to them. This is manifestly rather unsuccessful, chiefly because integration of novel ingredients into existing practices leads to the positioning of new foods as one among an array of feasible alternatives based on criteria (e.g. price, taste, availability) which the new foods appear largely unable to meet.

Of course, when sushi first 'arrived' in the US, it too had to be selected from an array of feasible alternatives as part of practices of dining out. (Sushi was, for many years, mostly unavailable in contexts other than Japanese restaurants). Why have sushi when you could have steak? Here I repeat my argument that the practice of eating sushi was internally rewarding, laden with symbolic significance, and enmeshed in wider networks (cf. Shove et al., 2012: 75). Thus, from among the array of feasible alternatives that were the other restaurants in Los Angeles or New

[90] Here it is important to note that even the materials (insects) for the practice have not really "travelled", as they are fundamentally different (i.e. freeze-dried) than their counterparts in insect consumption practices in other locations. This point provides a further indication as to why, from a practice-theoretic perspective, insect consumption has failed to catch on in the Netherlands.

York during the 1960s, there were several positive reasons to select a sushi bar above other possible locations for the enactment of the practices of dining out.

If insects were to be the new sushi, a range of criteria would need to be met. A nominally 'authentic' cuisine would need to be identified which made significant use of insects. Those insects would need to be available in a new location, as would a population of practitioners versed in the creation and consumption of the insect-based cuisine. Sites of production and consumption would need to be established, which would require a stable customer base in order to ensure their survival; based on the example of sushi, it appears these may need to be of a novel, singular variety, as the sushi bar was in the US during the 1960s. The insect-based cuisine itself would also probably need to be singular and distinctive; it could not just be an existing cuisine with insects invisibly added, but would rather need to foreground its insect component.

It would seem that Mexican cuisine might offer a way to encourage entomophagy in this fashion, at least for such efforts in the US. In the context of the huge US popularity of Mexican food, enterprising US-based restaurateurs have now begun to sell notionally 'authentic' tacos with *chapulines* (e.g. Carman, 2016). To do so is to draw explicitly on the established insect consumption practices of Oaxacan cuisine (e.g. Cohen et al., 2009). However, I would suggest that there are nevertheless some potential problems with this approach.

One such difficulty is that Mexican cuisine has become popularized in the US without reference to insects; thus the use of *chapulines* in Mexican dishes, while arguably an 'authentic' manoeuvre, may well encounter the problems associated with integrating new ingredients into established cuisines discussed above. Another is that Mexican food "continues to be regarded as a thoroughly vernacular cuisine" (Martínez-Cruz, 2016: 247), and thus, perhaps due to the endurance of "the contamination effect of low class association" (Ray, 2017: 44), has not become consecrated as a form of haute cuisine to the extent that sushi has in America. It seems possible to suggest that 'high status' association may be important in the repositioning of foods that are widely considered to be inedible, although this would require verification. Beyond sushi, another example might be the framing of viscera as part of eating 'nose to tail' in fashionable metropolitan restaurants in the UK (e.g. Rayner, 2007), rather than as a something associated with the industrial working classes (e.g. Houlihan, 2003).

The above analysis has problematized the notion of a 'gateway dish' that is evident in some accounts of insect-based food products. There is a lack of evidence that sushi was popularized through a gateway dish, and it seems unlikely that insects will be either. Attention to the social practices of eating suggests that if new foods are to be successful they must be integrated into established eating practices, rather than simply judged, in an abstract sense, as 'acceptable'.

This chapter has sketched two distinctive practice-based modes by which novel foods may be introduced. First is what might be termed the 'full spectrum' mode, in which a cuisine (conceived of as a bundle of practices), and its attendant array of new ingredients, is re-enacted in a new location. Second is the 'single ingredient' approach, in which a new food is incorporated into existing food practices by drawing heavily on extant elements of comparable or proximate practices, and in which the new food's successful integration depends on its positioning as a superior material in relation to feasible alternatives. Further research could profitably attend to other examples of novel foods in order to establish, for example, the extent to which the 'single ingredient' mode of introduction is ever actually effective. Although constraints of space preclude exploration of this topic here, I would suggest that foods such as sugar and tea are examples of individual foodstuffs whose initial uses as novel foods in the West appear to have been based

upon pre-existing practices from regions in which they were already established (Ellis et al., 2015; Mintz, 1985).

While established social theory and work within the 'new cultural geographies of food' (Freidberg, 2003) offer valuable analytic insight into processes relating to recent and emerging food innovations, such foods bring new conceptual and methodological challenges (e.g. Sexton, 2018), and their analysis may stand to benefit from fresh theoretical perspectives. Theories of practice have been fruitfully applied to food consumption in broad terms (e.g. Warde, 2016) as well as the more specific question of dietary change (e.g. Hargreaves et al., 2013). I would argue that the cultural geographies of *new* food – an area which, in the light of current efforts to encourage sustainable food alternatives, appears to be of ever-increasing relevance – stand to benefit from the application of a practice-theoretic 'lens' to their field of study. Such an approach furnishes a conceptual account of eating which can account for food's place at the intersection of production and consumption while also attending to the practical reality of food consumption: points which are of perennial salience to the geographical study of food, 'speak' to established debates in the field (e.g. Goodman, 2002), and may offer a fruitful theoretical basis for future research.

Particularly relevant is the practice-theoretic emphasis on the routinisation of food consumption, which is a significant question both for conceptual accounts of the establishment of dietary practices and the substantive area of more sustainable foodways. Within recent cross-disciplinary research investigating the potential of Western insect consumption, these points have hitherto remained largely unacknowledged. Practice-theoretic research into emerging food innovations thus also appears to offer an avenue of productive dialogue with other disciplinary traditions into the complex matter of how new, more sustainable ways of eating may be achieved. In light of the purported benefits of insects and other 'alternative proteins' vis-à-vis the objective of sustainable public nutrition, such a research agenda is likely to be of enduring importance.

Chapter 10 – Concluding discussion

10.1 – INTRODUCTION

This thesis investigated public acceptance of insects as food in the Netherlands. Over the course of five empirical chapters (framed in relation to current entomophagy literature and key debates within the geographies of food), five research questions relating to the overall objective of the thesis were addressed. The empirical chapters explored both the consumption and production of insect-based foods in the Netherlands, elaborating how these aspects were related to each other and to the broader objective of public acceptance.

Regarding consumption of insect-based foods, the thesis asked 'How are insect-based foods being integrated into established practices of food and eating in the Netherlands?' (**RQ1**), how this relates to other aspects of food and eating (**RQ2**), and if insect-based foods are not being integrated into established diets, why not (**RQ3**).

Each of the five empirical chapters helped to answer these research questions. Chapter 6 provided the broadest overview of the subject, illustrating how consumption of insect-based foods was dependent upon their fulfilment of a range of conventional food-related selection criteria (e.g. price, taste, availability) as well as their level of dietary 'fit' (into meal types, or into broader webs of eating practice). Chapters 8 and 9 examined aspects of dietary 'fit' in more detail. Chapter 9 argued that the uptake of insects as food is hampered by a lack of relevant culinary practices that could help to 'make sense' of insects, and that the integration of insects into conventional food types means that they become only one among an extensive array of feasible alternatives. Chapter 8 directed attention to the dietary 'place' of insect-based foods, arguing that their dietary positioning as a mundane 'meat replacer' has a significant (negative) impact upon their likelihood of being eaten. Chapter 7 investigated how the acceptance of insects as food was closely related to broader dietary ethics around animal welfare and the environment, and Chapters 5 and 9 highlighted the crucial influence of supply-side factors on the (non-) consumption of insect-based foods.

Regarding production of insect-based foods, the thesis asked 'How have the insect-based foods currently available in the Netherlands been developed?' (**RQ4**), and sought to establish the impact of these supply-side aspects on insect-based foods' consumption (**RQ5**).

These questions were principally addressed by Chapter 5, which provided an account of insect-based foods' development in the Netherlands and explored the implications of this for the foods' consumption. The questions were also addressed by Chapter 9, which in comparing insect-based foods with sushi highlighted the crucial linkages between production and consumption in the successful establishment of novel foods.

This concluding discussion chapter elaborates the **key findings** of the thesis (Section 10.2). These findings are addressed thematically, drawing together material from each of the five chapters and indicating links to established debates.

I first argue for an **expanded notion of 'consumer acceptance'**. I return to the argument – introduced in the first chapter – that a more expansive concept of 'public acceptance' may be necessary to fully appraise why novel foods do or do not become successfully established. I suggest that those retaining the term 'consumer acceptance' must nevertheless accord greater analytic emphasis to factors beyond individual psychology. As part of this argument, I discuss

consumer acceptance and the diffusion of innovations. This draws on my suggestion (e.g. Chapter 6) that the focus of research on the introduction of novel foods should be on willing 'early adopters', rather than on general populations. I elaborate this argument in relation to 'diffusion of innovations' research (Rogers, 1983; Shelomi, 2015), indicating how that approach may be fruitfully combined with theories of practice to understand why novel foods (do not) become successfully established.

In the context of these arguments, I turn to a discussion of **public acceptance of insects as food in the Netherlands**. This section summarises the key findings, relating both to production and consumption, which directly address the overall subject of the thesis. As part of this section I discuss **ethical dimensions of insects as food**, addressing three key points: ethics and public acceptance, indicating how the ethical dimensions of insect-based foods (e.g. sustainable, absented from animal welfare concerns) partially constitute public acceptance; food, ontology and ethics, suggesting that insects and other alternative proteins raise important questions about the ontology and ethics of novel food; and sustainability, which elaborates a problematic area relating to edible insects: positioned primarily as an 'ethical' alternative to meat, they are typically consumed instead of plants.

I then move on to two more general areas of discussion which the thesis has contributed towards. The first of these addresses **integrating production-consumption** in novel food research. I summarise key findings about the mutual implication of production and consumption in relation to public acceptance of insects as food in the Netherlands, explore the implications of this for research on novel foods more broadly, and connect the issue with existing academic debates.

The following section, **edibility as social practice**, indicates how the thesis has provided grounds for a new theorisation of edibility – that is, the process whereby 'things become food' (Roe, 2006b) – as an achievement of social practice. I situate this within relevant academic debates, and indicate how these ideas may be taken forward in future research.

Following the discussion of key findings, I discuss the **contributions of the thesis** (Section 10.3). This discussion is split into four sections: I discuss, in turn, implications for food geographies, for entomophagy research, for business, and for policy.

The chapter concludes with a brief synoptic discussion of the central findings (Section 10.4). This is framed in terms of the global food security agenda, in relation to which the thesis was initially positioned and towards which the thesis aims to make a substantive contribution.

10.2 – KEY FINDINGS

Towards an expanded notion of 'consumer acceptance'

In Chapter 1, I explained the idea of Western 'consumer acceptance' of insects as food that is prevalent in the entomophagy literature. This can be understood as the degree to which the prospect of eating insects is judged appealing, as part of which a range of sociodemographic and psychological variables (such as food neophobia, age or gender) are examined.

Chapter 1 also introduced my alternative conception of 'public acceptance' of insects as food. This emphasised the relevance of particular 'publics' that emerge in relation to particular issues (in this case, consumption of insect-based foods), rather than whole populations. The concept directs attention to the ways in which 'acceptance' of novel foods is not just psychological, but is also social, practical and contextual. It also emphasises the role of production, as well as consumption, in shaping 'acceptance'.

I propose that in future research on the geographies of novel food, the concept of 'public acceptance' is employed. This enables research to account for the wide range of factors beyond the individual which are relevant for the establishment of novel foods in new contexts. However, the term 'consumer acceptance' will no doubt remain dominant in the entomophagy literature. Indeed, for researchers to remain part of ongoing scholarly debates around insects as food, the term needs at the very least to be employed as a keyword in academic papers (cf. Chapter 6). As such, I argue for an expanded notion of consumer acceptance, informed by the findings of the present thesis.

As far as this can be encapsulated in a single definition, I would suggest that consumer acceptance be understood as the ways in and extent to which insect-based foods (or other novel foods) become routinely consumed, as part of which all directly relevant factors are accounted for.

Attempts to arrive at universal definitions are fraught with difficulty: for example, how to define what 'directly relevant factors' are? Might they include the founding of an agricultural university in the central Netherlands in 1918, which 95 years later produced a report on the consumption of insects (van Huis et al., 2013)? On a similar note, the identification of analytically relevant factors is clearly related to one's epistemological commitments. For example, consumer acceptance research based on the Theory of Planned Behaviour (Ajzen, 1991; e.g. Menozzi et al., 2017) is not likely to identify sociological factors as directly relevant to consumer acceptance, because they are not emphasised within that approach. As such, I would suggest that directly relevant factors are identified through an attunement of research design to three central characteristics of consumer acceptance. These are closely related but conceptually distinct.

Firstly, consumer acceptance is multifaceted. It does not just involve individual cognition or decision-making, but rather includes a host of extra-individual factors. These may, for example, be social, practical, economic, technological or discursive. This list is not exhaustive; it is the principle of multidimensionality that is theoretically generalizable and more broadly applicable, not the list of relevant factors.

Secondly, consumer acceptance involves distributed agency: to the extent that novel foods are accepted, this is also the result of actions broadly on the 'supply-side' (including those of EU-level regulators, for example), and not just the outcome of an attitude-intention-behaviour sequence on the part of consumers.

Thirdly, consumer acceptance is relationally achieved. The positioning of novel foods as acceptable or 'edible' involves diverse entities across the production-consumption nexus, which affect and shape each other. Relevant entities include more-than-human actants, who may also shape the production and consumption of novel foods.

Beyond these three key principles of consumer acceptance, another key area merits consideration in future research. This is the question of the appropriate target group for research and intervention around novel foods.

Consumer acceptance and the diffusion of innovations

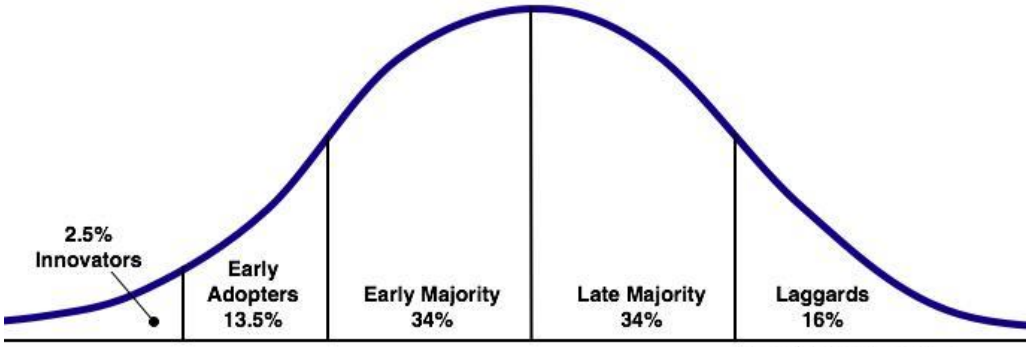
In Chapter 1, I explained that current entomophagy research tends to regard 'consumer acceptance' as a general issue: that is, whole populations are viewed as the relevant focus of research. I also argued, as part of a more expansive conceptualisation of 'public acceptance' (discussed above), that *specific* sub-populations should instead be the focus. This section is framed in terms of 'consumer acceptance' to indicate the relevance of its arguments across

different epistemological approaches. Whether researchers conceptualise acceptance in terms of 'consumers' or 'publics', it is necessary for analyses to consider sub-groups of consumers, rather than entire populations.

For insect-based foods, the relevant focus should be the small group of those who are already willing to eat new foods. It is this group who, in the short term, really 'matter' for both researchers and commercial actors interested in the introduction of novel foods. Historical evidence suggests that novel foods become established among small segments of a population first – whether they be metropolitan elites (Ellis et al., 2015) or ethnic minority groups (Charles, 2002) – before diffusing further (see Chapter 6).

Although this point is largely unrecognised in current entomophagy research, it is hugely prominent within the sociology of innovations (and other allied disciplines) more broadly. Rogers' (1983) influential work on the diffusion of innovations conceives of a 'diffusion curve' (Figure 1), in which innovations are first adopted by a small proportion of 'innovators', then a slightly larger proportion of 'early adopters'; these groups are then followed by the 'early majority' and 'late majority', and finally the 'laggards'.

Figure 8 – The diffusion curve [91]



Source: https://chrismaloney.files.wordpress.com/2010/04/diffusion-of-innovation-adoption-curve.jpg

A crucial point regarding the diffusion of innovations is that it is not inevitable: 'failed' innovations, which do not proceed past the initial stage(s) of diffusion, seem to be in the majority (e.g. Goldenberg et al., 2001). For innovations to successfully diffuse, they must meet certain criteria: 'relative advantage' over alternatives; compatibility with users' beliefs or needs; low complexity; 'trialability'; and observability (Rogers, 1983: 210–240).

As my empirical chapters have shown, insect-based foods in the Netherlands had little to no demonstrable 'relative advantage' over a wide array of feasible alternative foods, given they were not deemed superior in terms of price, taste or availability. Further, their low availability contributed to their low 'trialability'. Their compatibility with existing eating practices was limited, and the findings indicated that a significant market for the products was a rather specific group of consumers who were mostly vegetarian but were happy to eat insects. The whole insects

[91] Rogers' (1983: 247) 'diffusion curve' is based on his finding that the diffusion of innovations tends to follow a standard distribution pattern. He divides this standard distribution into 'ideal types', suggesting that 'innovators' are roughly the first 2.5% of people to adopt an innovation, 'early adopters' are the next 13.5% of people to adopt an innovation, and so on. Of course, the diffusion of specific innovations may not closely follow this model. It is intended to illustrate a broadly identifiable pattern in innovation diffusion, and to act as a means of classifying different groups based on the rate at which they take up innovations.

studied were subject to a further difficulty, in that participants lacked the culinary competencies, or access to established culinary practices, into which the insects could be coherently incorporated. This point connects with Rogers' theory in terms of the culinary 'complexity' of the products.

In connecting work on the diffusion of innovations with my empirical findings I am building on the work of Shelomi (2015), whose application of the theory to Western entomophagy remains among the most insightful studies published in the area. Although not based directly on empirical work, Shelomi's (2015) paper reviewed and analysed a broad range of available evidence from within and beyond the entomophagy literature. In his view, insect-based foods are a 'failed innovation', because they do not meet Rogers' (1983) basic criteria for successful innovation diffusion. My thesis has provided empirical support for this view, demonstrating the analytic insight offered by a diffusion of innovations approach – which, despite the relatively abstract nature of Rogers' (1983) theory, closely reflects the practical reality of insect-based foods in the Netherlands – and vindicating Shelomi's (2015) arguments. Further, the evident importance of interactions between spatially and temporally dispersed sites of production, provisioning and consumption reflects arguments that the diffusion of innovations is fundamentally spatial (Hägerstrand, 1968).

The thesis' arguments regarding the diffusion of innovations have significant implications for entomophagy research and commercial efforts in the area, both of which are discussed in the relevant sections below. In the context of the present discussion, I emphasise the need for future research – whether framed in terms of 'consumer' or 'public' acceptance – to acknowledge the properties of the innovation itself (both in literal and sociological terms). The idea that a successful innovation must have 'relative advantage' over alternatives resonates with my arguments regarding insect-based foods vis-à-vis an 'array of feasible alternatives' developed in Chapters 8 and 9. Factors such as price, taste and availability tend to be underemphasised in current entomophagy research; diffusion of innovations studies, and my own data, suggest that they are of defining importance.

Indeed my findings indicate that theories of practice may be productively applied to future research on the diffusion of innovations (including, but not limited to, novel foods). Despite its evident analytic utility at a relatively high level of abstraction, Rogers' work is predicated on a model of innovation diffusion as primarily communicative, conceptualising the spread of innovations at the level of interpersonal recommendation (e.g. 1983: 312–346). A more integrative, practice-theoretic approach, such as that sought in Chapter 9, would conceive of innovations as socially embedded, and reliant for their diffusion upon a) the existence of relevant practices; b) the constitutive elements of those practices; and c) the presence of experienced practitioners, who may 'recruit' new practitioners. This could enrich understandings of how it is exactly that innovations diffuse in a way that does not privilege individual cognition or decision-making, emphasising instead the crucial role of the 'site(s) of the social' (Schatzki, 2002). Theories of practice help us to understand *how* innovations become established among the routine enactment of social life; diffusion of innovations helps us to trace the broader *trends* of diffusion throughout society.

Public acceptance of insects as food in the Netherlands

The study's principal aim, on which its key research questions were based, was to investigate public acceptance of insects as food in the Netherlands: further, it sought to explain to what extent such acceptance existed, and what the core dimensions of acceptance were.

In accordance with the framing of the study – both theoretically and in relation to established debates around the geographies, history and sociology of food – it did not attempt to elucidate a general 'level' of public acceptance in the Netherlands, and/or to connect this with particular groups or socio-demographic variables (cf. Verbeke, 2015). Instead, it sought a deep understanding of the ways in and extent to which insect-based foods currently available in the Netherlands were integrating with established eating practices there. 'Acceptance', in this sense, referred to the degree of fit with established eating practices, and the extent to which the insect-based foods were becoming routinely consumed.

The core finding was that insect-based foods are not becoming routinely consumed: indeed, most people who had tried them only ate them once. This was because the factors that motivated trial consumption (curiosity, health or environmental motivations) were generally only sufficient to encourage first-time consumption.

Repeat consumption was affected by a number of conventional factors: price, taste, availability and 'fit' with established eating practices. If insect-based foods were to be routinely consumed, it relied on their superiority to potential alternative foods (chiefly plant-based meat replacers). As they typically could not compete on these criteria, they were seldom eaten regularly.

Of these conventional factors, the basic empirical criteria – price, taste and availability – underpinned and constituted the notion of dietary 'fit', which was both complex and theoretically and substantively multidimensional. 'Fit' is not a singular thing: insect-based foods (and indeed foods of any type) do not simply 'fit' or 'not fit' with people's diets. The inherent complexity of the 'compound practice' of eating necessitates that routinely consumed foods 'fit' on a number of dimensions, which relate to the constitution of diets among and through a web of social practices. These dimensions were a key analytic focus of the thesis, and were explored extensively throughout the empirical chapters.

In Chapter 5, insect-based foods' 'fit' with established diets was conceptualised in terms of a relational production-consumption network: diverse actors on each 'side' were argued to shape the ways in and extent to which the products were consumed. In Chapter 6, 'fit' was considered in relation to domestic eating practices on different scales, including 'fit' with evening meal repertoires (both within and between meals) and the ways in which the constitution of meals – into which insect-based foods had to integrate – were affected by the webs of social practice constituting the practice of eating. Chapter 7 highlighted the ethical and ontological aspects of insect-based food practices, in which terms 'fit' with diets entailed the foods' consumption in a rather specific form of ethically-oriented diet, informed by a comparable range of ethical and ontological assumptions ('fit' with 'full' vegetarianism or carnivorousness is thus problematized). Chapter 8 addressed the question of 'fit' explicitly in terms of social practice, introducing the concepts of 'modes' and 'phases' to theorise how diets were constituted at the intersection of diverse social practices, and how insect-based foods (did not) fit into those. In Chapter 9, 'fit' was conceptualised in terms of cuisine, and whether or not insects (and other novel foods) had a coherent place within an established set of culinary practices (cf. Halkier, 2010).

Explaining the very low public acceptance of insects as food is, as such, not easily reducible to a handful of simple points. Although the need for improvements to the price, taste and availability of the foods is relatively straightforward to explain, the sophisticated nature of 'fit' with eating practices indicates the complexity of efforts to introduce novel foods. 'Fit' is not a variable with fixed properties, but rather is shaped by the ways in which diets are constituted through and among webs of social practice (both alimentary and non-alimentary.) Thus while future research

into public acceptance of novel foods should investigate how 'fit' operates and is constituted, researchers should remain aware of the inherent complexity of the concept.

Although the foundational criteria of price, taste, availability and 'fit' with established eating practices are at the centre of my account of public acceptance of insects as food, my research indicates that these factors should not simply replace psychological characteristics or socio-demographic variables as the organising principles of research. Instead, I have argued for a more robust conceptualisation of what 'acceptance' actually involves. As discussed above, the concept of 'public acceptance' may represent a suitable alternative to the prevailing notion of 'consumer acceptance', but in both cases the multifaceted, distributed and relational aspects of 'acceptance' should be acknowledged. This type of account may enable the theoretical generalisation of the findings, and their speculative application (in the light of a considerable body of supporting historical evidence) to other novel foods.

Ethical dimensions of insects as food

The thesis has identified a prominent 'ethical' dimension to public acceptance of insects as food. This is evident in three key areas, explored in this section. First, I discuss ethics and public acceptance, indicating how the positioning of insects as a more ethical food choice relates to their acceptance as food. Second, I discuss food, ontology and ethics, considering the implications of insects and other alternative proteins for the ontological and ethical aspects of food consumption. Third, I discuss sustainability, highlighting the problematic relation between the positioning of insects (as a sustainable alternative to meat) and their consumption (as an alternative to plants).

Ethics and public acceptance

Public acceptance of insects as food has, at present, an inescapably ethical dimension. By this I refer specifically to dietary ethics primarily regarding the environmental impacts of food consumption (cf. Emontspool and Georgi, 2017), but also in relation to animal welfare (e.g. Chapter 7). Both of these ethical aspects were manifestly important factors encouraging the consumption of insect-based foods. This ethical dimension should not, however, be included in a definition of public acceptance at the abstract level. The environmental-ethical orientation of people currently experimenting with insect-based foods would not necessarily be reflected in other people's acceptance of them, particularly if the foods were to successfully diffuse more widely. Similarly, the consumption of other novel foods – such as sushi (e.g. House, 2018) – may not demonstrate this explicit ethical orientation. Nevertheless the ethical dimension is currently an important consideration in terms of contemporary public acceptance of insects as food in the Netherlands.

It is, however, worth highlighting that the ethical dimension of contemporary insect-based foods in the Netherlands is fundamentally relational: their positioning as an 'ethical' food, like their positioning as an 'edible' food, involves the activity and 'enrolment' of actors on both the supply- and demand-side. This point, I would suggest, applies to other 'ethical' foods as well, such as Fair Trade products (e.g. Goodman, 2004). Thus although an ethical dimension is not a *necessary* or *universal* part of my abstracted notion of public acceptance, applicable in all contexts, I would suggest that in areas where it *is* operational, it is always relational. The same applies to edibility, which I discuss in a dedicated section below.

Food, ontology and ethics

Another key ethical dimension pertains to the finding (elaborated in Chapters 6 and 7) that vegetarianism – and other diets that are 'ethically oriented', at least in terms of animal welfare or environmental issues – are inherently complex, and have a complicated relationship to animal life. This is due to ambiguities in the ontological apprehension of animal life, the complicated and contingent nature of the production of foods, and their positioning (through the production-consumption nexus) as edible. This point has implications for our understanding of public acceptance (as discussed above), but also, as Chapter 7 argues, for our understanding of the constitution of 'ethical' eating practices in a more general sense. Both of these areas entail attention to the relational constitution of production-consumption, and to the intersection of practical and ethical intelligibilities (and their ontological dimensions). Elsewhere, scholars have begun to investigate the relationship between food, ethics and ontology (e.g. Tuminello, 2016); this area is likely to be of significant relevance in relation to the introduction of novel foods (e.g. Stephens and Ruivenkamp, 2016; van der Weele and Driessen, 2013). In the light of potentially large-scale shifts in the Western agri-food system, the question 'are insects animals?' is not a trivial one.

Sustainability

The second aspect of insect-based foods' 'ethical' dimension is their purported sustainability. Indeed, many of the participants in the present research were motivated – at least initially – to consume insect-based foods by concerns about the impact of their diets on the environment. Insect-based foods are positioned as a sustainable food choice both at a product level (the packaging of Insecta products included the phrases 'Go Green – High Protein' and 'Eco Food Step') and a discursive level (e.g. Duncan, 2013; Howard, 2015; van Huis and Oonincx, 2017): indeed, sustainability is a principal aspect of Western efforts to promote entomophagy in general (e.g. van Huis et al., 2013).

However, insects' advantages in this respect are generally articulated in comparison to conventional meat. Infographics comparing insect protein with chicken, beef and pork are a defining characteristic of advocacy and commercial discourse in the area (e.g. Egelhoff et al., 2014; Exo, 2018; Roberts, 2017). Yet the insect-based foods investigated during the present thesis were (with one exception) not consumed in place of meat. The Insecta convenience foods were generally consumed instead of plant-based alternatives, and in a number of cases represented the introduction of animal-based products into vegetarian diets where they had previously been excluded. The whole insects studied were consumed in very low quantities, but were generally eaten as well as, rather than instead of, other protein sources.

Of course, plant-based diets are not automatically more sustainable than meat-based ones. Western consumption of plant products such as avocados, for example, has been argued to cause significant environmental damage (e.g. Martindale, 2016), and US research has suggested that some meat-based diets may have less climate impact than completely vegan ones (Peters et al., 2016). While replacing meat with insects may be beneficial in environmental terms, insects are unlikely to be as sustainable as typical plant-based meat alternatives (e.g. soy-, wheat- and plant-based veggie burgers) (MilieuCentraal, 2015).

The consumption of insect-based convenience foods instead of plant-based alternatives is likely to be attributable to the design, form and mode of provisioning of the insect-based products, which 'scripted' their use in this way (see Chapter 5). Nevertheless, given that the Insecta products appear to have been one of the most widely-available insect-based foods, and that a similar approach is taken with other products elsewhere in Europe (e.g. Agence France-Presse,

2017; Bug Foundation, 2018), the question of whether insects prepared in this way really represent a sustainable alternative protein is of enduring relevance (Tan and House, 2018).

Indeed, to the best of my knowledge the only insect-based product that attempts to offer a direct replacement to conventional meat is a range of bolognaise sauces from Canada (http://onehopkitchen.com/). The wide range of insect-based foods that are currently available in the West do not appear to represent a viable alternative to meat: instead, companies offer insect-based versions of products such as potato chips (https://chirpschips.com/), cakes (https://www.daretoeat.dk/), pasta (http://www.bugsolutely.com/), bread (Forsell, 2017), salt (https://www.cricketflours.com/product/cricket-salt/), apple juice (http://insektkbh.dk/) and cocktail bitters (http://www.critter-bitters.com/). These products, I would suggest, are probably doing little to mitigate the environmental impacts of meat consumption. In any case, the findings of this thesis suggest that such products' routine consumption probably requires their superiority to an array of feasible alternatives in terms of the key criteria discussed above.

Similar points may be extended to the plethora of insect-based protein products now available, which include protein bars, pills and powder (e.g. http://www.ronzo.pl/produkty/). The arguments advanced in Chapter 9, in which attention is directed to the need for novel ingredients to be positioned in an appropriate place in dietary practice, suggest that these may be more successful than insect-based foods. Their customer base is focused on the consumption of abstracted forms of protein for instrumental purposes, and thus these products are arguably less subject to some of the considerations (taste, preferences of co-residents, emplacement within the practices of a particular cuisine) that insect-based foods are. However, in relation to the ethical question which motivates this discussion, the advantages of insects as a protein product are also unclear. Is it more sustainable to farm insects for protein foods, for example, than whey (a by-product of cheese production, and a popular protein supplement)?

Attempting to answer such questions is beyond the scope of the present thesis, and to do so would require systematic comparative research (offering scope for future research projects building on the current findings). However, in the light of research questioning the relative sustainability of insect production (e.g. Lundy and Parrella, 2015), it does not seem unreasonable to suggest here that the inclusion of insects does not automatically entail the sustainability of the varieties of food discussed above. Consequently, these foods' purported ethical benefits (vis-à-vis the environment) relative to alternatives are not guaranteed. It does not require a life cycle analysis to question whether the addition of tropical insect species (which require heating throughout rearing) to products such as potato chips, which otherwise would not contain them, really represents a feasible opportunity to reduce Western meat consumption.

These points are raised and discussed here due to the framing of insects as a sustainable protein. Although the primary focus of the thesis has been on a detailed geographical and sociological understanding of the establishment and routinisation of novel foods, it behoves us as critical social scientists to consider the 'bigger picture': particularly, I would argue, since the notional ethical advantages of insect-based foods are such a prominent theme within their production and consumption practices. Future research, I suggest, should critically engage with the largely univocal discourse regarding the benefits of insects as food.

Integrating production-consumption

A central argument in the present thesis is that both production and consumption are important in the establishment of novel foods (cf. House, 2018). In addition to this general point, and the

indication of its applicability to the notion of public acceptance sketched above, it is worth briefly clarifying the relevance of this argument for dietary transitions in a broader sense.

I have argued that there is no 'grand architect' behind the production of insect-based foods; instead, the production network from which they arose is characterised by complexity, contingency and mutual influence. Further, as I note above, production and consumption are mutually implicated in the success or failure of insect-based foods: as well as, I would suggest, that of other novel foods or innovations in a more general sense. Ultimate power does not lie with either producers (broadly conceived, including actors such as lab scientists, processors, manufacturers and retailers) or consumers; acceptance of foods is relationally achieved.

It is useful to consider these arguments in the light of work on 'sustainable transitions' more generally. Shove and Walker (2007) are critical of the literature on sustainable 'transition management' because it implies that such transitions to more sustainable modes of consumption can indeed be managed. Such transitions, they suggest, are not the result of a body of governing actors, influencing practices from 'outside':

> We [...] contend that when dealing with transitions in everyday life, it is misleading to imagine or suppose the existence of sources or forces of influence that are somehow external to the reproduction and transformation of practice. Instead of figuring out how to involve more or different stakeholders in an externalized process of design, the more substantial challenge is to understand how consumers, users and practitioners are, *in any event*, actively involved in making and reproducing the systems and arrangements in question.
>
> Shove and Walker, 2010: 475, original emphasis

Shove and Walker's (2010) example of the congestion charge in London provides a useful empirical illustration of this point. The successful introduction of that scheme, they suggest, involved the active and ongoing participation of the public. It could quite easily have failed, had it been rejected by motorists; as it was, the active participation of the public ensured it was – in a particular sense, and up to a particular point – a successful 'sustainable transition'. Even though the initiative was introduced by the UK government, its success or failure was not entirely the responsibility of the government, but rather was achieved relationally with the involvement of the public. A comparable but inverse example is offered by the unsuccessful public smoking ban in Greece (Stamouli, 2017), in which widespread lack of public 'enrolment' into a particular health intervention led to the intervention's failure (see Chapter 5).

These ideas are important when thinking about how (at least nominally) more sustainable practices of insect consumption may be achieved. The prevailing logic among the network of actors on the supply-side of food insects in the Netherlands appears to be one of "if we build it, they will come". These actors, it appears, have been operating under a shared assumption that the technical achievement of large-scale insect production, of whatever species, will lead more or less automatically to widespread consumption. (It should be noted that the importance of price and taste in encouraging repeat purchase is starting to become evident in producers' accounts – e.g. Green, 2018 – although there is still a significant emphasis on the need to 'scale up').

What has gone largely unaccounted for is that such a transition *also* involves the consumers themselves: to the extent that this is acknowledged, it tends to be couched in terms of 'the

market' not being 'ready' (as one of my supply-side participants noted).[92] This, I argue, is broadly equivalent to 'blaming the consumer' for problems such as food waste or safety (cf. Evans, 2011; Meah, 2014b). The fact that by not buying insect-based foods, consumers are failing to act in accordance with the wishes of the supply-side actors, is not the 'fault' of the consumers: it is as much the responsibility of producers, who need to create insect-based foods that meet certain basic criteria (see above) if they are to expect people to actually eat them.

More detailed exploration of the implications of this point, both for business and policy, is undertaken in Section 10.3 below.

Edibility as social practice

The findings presented in this thesis – and in particular, the cross-cutting arguments articulated above – have provided an opportunity for theorisation of what it is that makes food 'edible'. I argue that the edibility of foods – that is, their location within in the "cultural categories of what can and cannot be eaten" (Long, 2004: 32) is an achievement of social practice.

Things 'become food' (Roe, 2006b) on single occasions as a result of their emplacement within the framework of eating practices (such as the consumption of otherwise 'inedible' things, such as tree bark, in times of hardship, e.g. Muscolino, 2011). Things become part of "the cultural categories of what can and cannot be eaten" – that is, they become 'generally understood' as food in relation to eating practices (Welch and Warde, 2017) – as a result of their *routine integration* into the framework of eating practices. It is through such emplacement and routinisation, I indicated in Chapter 9, that novel foods or new ingredients become 'culturally intelligible'. I argue that although it is theoretically possible for a new ingredient to become integrated into established eating practices, or to have 'new' practices developed for the purpose, that the historical evidence suggests a distinct, alternative tendency: that is, the successful establishment of a new food is generally attended by the 'importing' of a relevant bundle of practices in which the food may be coherently situated, and for which the other necessary practice elements are present.

The argument that edibility can be understood as an achievement of social practice, as I indicated briefly in Chapter 2, resonates with sociological and anthropological work that connects social life, systems of classification, and social ontology. Giddens (1984) argues that social practices, repetitively conducted, are a source of ontological security.[93] Anthropological work offers theoretical affordances for the connection of such ideas with the construction of edibility. For Douglas, ontological work is performed through social rituals to categorise entities as clean or unclean, pure or dangerous; such rituals "create a reality which would be nothing without them" (1966: 77). Mol's (2002) 'praxeological' work conceives of ontology in similar terms, explicitly connecting its production and maintenance to social practice. Of specific relevance to my argument are studies in which the category of 'meat' is shown both to be produced through practice and ontologically multiple: containing, in one example, plants (Yates-Doerr, 2015a; Yates-Doerr and Mol, 2012). I argue that edibility is also an achievement of practice. To conceive

[92] This phrase is repeated relatively often in the entomophagy world (e.g. Pezzato, 2015), reflecting the widespread understanding of dietary change as being the sole or primary responsibility of a lumpen group of 'consumers' reacting to changes in the marketplace.
[93] As Robert Aickman (2008: 26) observes, "[c]onventions are, indeed, all that shield us from the shivering void".

of it in this way may offer a productive way in which to apprehend the success or failure of novel foods, as well as processes of dietary change more broadly.

My aim here, in the context of the present discussion, is simply to indicate the area of edibility and social practice as an area for further theoretical and empirical work: many questions remain. How to account, for example, for the disjuncture between generally recognised categories of edibility and personal dislikes, or allergies? Is food in the supermarket that one habitually does not purchase 'inedible'? Which competing definitions of edibility currently exist, and is it possible to reconcile them? To develop these ideas fully here goes beyond the substantive remit and practical scope of the thesis. However, elaboration of these ideas into a general sociological account of edibility is my primary task in the immediate future, and will form the basis of my ongoing research agenda.

10.3 – CONTRIBUTIONS OF THE THESIS

This section highlights the contributions of the thesis to four different areas: food geographies, entomophagy research, business and policy.

… for food geographies

In Chapter 2 I discussed a number of relevant debates within the geographies of food. The findings of the thesis extend and contribute towards these debates. For example, an integrative approach to theorising the production-consumption nexus has been a prominent aim of food geographies (e.g. Goodman, 2002), and is shown to be of enduring relevance here. In particular, the thesis has demonstrated the analytic utility of both actor-network and theories of practice approaches in understanding public acceptance of novel foods.

Theories of practice, it is argued, have much to offer geographic research on food. As noted in Chapter 9, their application to the investigation of novel foods can advance understanding of the social geographies underpinning large-scale dietary change. The findings have also provided an analytic basis for the development of new conceptual tools (see Chapter 8), which may be applicable in studies of food and eating beyond novel foods, and indeed the geographies of consumption more broadly. Theories of practice also help to balance the individualistic bias evident in consumer acceptance literature (addressed in more depth below).

Future research into novel foods using theories of practice could investigate, for example, the difference – both in substantive and theoretical terms – between foods which are introduced in the 'single ingredient' mode, and those which accord with the 'full spectrum' approach (see Chapter 9). Equally useful would be research into the establishment of 'ethnic' cuisines in new places using a practice-theoretic lens. Such research, for example, could investigate the comparative fortunes of particular cuisines as a means of enhancing both substantive and theoretical knowledges about how foods 'travel'. Existing studies suggest the utility of theories of practice as an explanatory tool in this respect. For example, Morris' (2010) analysis of the dearth of Māori restaurants in New Zealand hints at the applicability of a practice-theoretic lens, noting as it does the role of competing leisure practices, unequal distribution of resources, and the pervasiveness of a negative cultural framing of Māori food practices. The success or failure of particular 'ethnic' cuisines is not just associated with the relative size of the ethnic population in question, but also particular "social imaginaries" (Cook et al., 1999: 223) and the presence of conducive elements on both the supply- and demand-side (Fonseca and Malheiros, 2004). A focus on practices of 'ethnic' food consumption can help to analytically integrate these diverse factors (cf. House, 2018).

However, theories of practice are not the only integrative approach that offers a fruitful analytic lens for the study of novel foods. Certainly other geographic approaches would have much to offer, such as a visceral geographies approach to the relational nature of taste vis-à-vis individual eaters and their embodied connection with social and political forces. Another fruitful approach is the actor-network mode of analysis adopted in Chapter 5, which can highlight the complexity and contingency of food production-consumption networks in shaping acceptance of novel foods. As with the practice-based approach to the diffusion of innovations sketched out above, actor-network analysis helps to account for the role of spatially dispersed sites of production, provisioning and consumption in the construction of edibility and the shaping of diets.

There are clearly opportunities for fruitful actor-network inspired analysis of the development of alternative proteins, which could foreground the role of materiality and the more-than-human. For example, senior representatives from De Vegetarische Slager (a producer of plant-based meat analogues) and Meatless (a producer of 'hybrid meat') have cited the role of the BSE crisis in their disillusion with meat (both ethically and commercially) and thus its relative centrality in the development of their meat replacer products (De Vegetarische Slager, 2017; Leenaert, 2017). This implies a productive avenue of research into the role of distributed agency in food production and dietary change, and indicates the role of the more-than-human in those respects.

The findings have also contributed to debates around taste, disgust and the visceral within geography and cognate disciplines. As discussed in Chapter 2, a number of key literatures highlight the production of taste (both in a 'public' and 'personal' embodied sense) at the intersection of social, geographical and historical forces. However, as debates on 'visceral geographies' argue, taste is not unilaterally determined or the product of a dialectical exchange between sovereign bodies and a reified 'social'. Rather, the tasting body and the social are mutually constitutive. The present findings, and other work I have completed during the course of this thesis (House, 2018), provide empirical support for these ideas. Chapter 5 traced the relations and mutual influence within production-consumption networks, highlighting the mutual implication of taste, visceral responses, political economy, food production and supply arrangements, and the more-than-human. Chapter 9 illustrated the mutual shaping of public taste – in both successful and unsuccessful senses – and the social contexts of food production-consumption. Future research into the geographies of (novel) food could profitably extend such enquiry, tracing the ways in which the visceral dimension is implicated in the ways in and extent to which (novel) foods are consumed, and/or large-scale dietary change is effected.

The findings also extend debates around the consumption of 'exotic' foods, particularly those that highlight the important role of the mundane contexts of food provisioning, preparation and consumption in which the exotic becomes part of established foodways. All five of the empirical chapters dealt to some extent with the role of mundane eating contexts in 'domesticating' novel food products, but Chapters 8 and 9 offered perhaps the clearest expression of how the lived reality of food practices both affords and precludes the routine consumption of unusual new foods. Chapter 5 also considered how supply-side efforts to reduce the unusualness of foods both helped and hindered their consumption, indicating tensions between the exotic and the mundane that cannot be simply and deliberately overcome. Future research, I argue, should pay careful attention to the sites and practices of mundane food consumption, both in relation to entomophagy and the geographies of novel food more broadly. While it may be tempting to focus on the 'yuck factor', it is evidently the rather more prosaic aspects of eating that ultimately affect whether novel foods will succeed.

Here it is worth re-emphasising my argument (see Chapter 2) that the geographies of novel food represent an important and potentially fruitful new research agenda. While investigating the geographies of novel food necessitates continued engagement with established debates, it may also entail new conceptual and methodological approaches. Similarly, research in the area may require the application of existing approaches to new substantive areas, as well as their further theoretical development.

The findings indicate a number of productive areas of enquiry in this respect. The adoption of an integrative epistemology is useful in understanding and explaining dietary change and the establishment of new foods, and theorising the production-consumption nexus in terms of both networks and practices may be fruitful. Investigation of novel foods can help to test and refine the conceptual tools available to geographers regarding how eating practices are established, maintained, interdepend and change (e.g. Chapter 8).

A salient area for investigation is the intersection of ethics, ontology and practice in relation to the geographies of novel food (e.g. Chapter 7). This, as noted above, connects established debates regarding the ethical, visceral and geographic (e.g. Whatmore, 2002) with similar questions posed by the introduction of novel foods and food technologies (e.g. Sharp et al., 2015; Stephens and Ruivenkamp, 2016; van der Weele and Driessen, 2013). Given the substantively novel or culturally unusual nature of many proposed novel food sources (such as in vitro meat or fish heads), research into the geographies of novel food must consider the ways in which diverse aspects such as the visceral, domestic and political-economic are linked and mutually constitutive.

Another productive avenue of enquiry may be efforts, such as that sketched out above, to arrive at a systematic theorisation of edibility. Although there are already a number of theoretically diverse efforts in this area, as noted in Chapter 5, they tend to be somewhat partial. A thoroughgoing account of edibility may prove useful as a basis for future research.

… for entomophagy research

The epistemological blind spot

Literature reviewing undertaken during Chapter 6 and subsequently (Chapter 1) has indicated a significant and persistent epistemological 'blind spot' in current entomophagy research. Studies based on methodological individualism do not, in either philosophical or practical terms, adequately account for the influence of extra-individual factors on public acceptance of insects as food. Most of the limitations of current entomophagy research relate to this blind spot. The best way to address this, I would argue, is with the application of different theoretical and epistemological approaches to the question of consumer acceptance, the likes of which I discussed above. In this section I briefly outline the key ways in which the epistemological blind spot is limiting consumer acceptance research, and suggest what will need to be done to address these areas.

Information provision

A wealth of evidence from the food and nutrition literature shows that information provision is inadequate to change diets (e.g. Frewer et al., 2003; Lambert et al., 2002). Information provision is also manifestly insufficient to encourage people to start eating insects. Although this has been acknowledged in the entomophagy literature (e.g. Hartmann et al., 2015; Tan et al., 2015, 2016), as has the notion that the role of taste or availability of insect-based foods might be important in attaining acceptance of insect-based foods (e.g. Deroy et al., 2015; Shelomi, 2015), arguments regarding the central role of information provision and attitudinal change in achieving consumer

acceptance of insects are prominent (e.g. Chapter 6), and remain central in many studies (e.g. Barsics et al., 2017; Kostecka et al., 2017). Such efforts (both in advocacy and academia) are of limited applicability if no insect-based foods are available which fulfil the central criteria of popular foods (i.e. foods which are judged superior to alternative products in terms of price, taste and availability, and which have a coherent place within a set of eating practices).

'Hidden is best'

Another of the difficulties posed by the epistemological blind spot is the endurance of the 'hidden is best' hypothesis, discussed in Chapter 1 (e.g. Caparros Megido et al., 2016; Gere et al., 2017). As my findings indicate, hiding insects in food may be helpful in mitigating aversive reactions to whole insects, but it becomes problematic in the context of routine consumption of foods.[94] Disguising insects in products which are otherwise conventional vegetarian convenience foods leads to their positioning among a wide array of feasible alternatives. Given that they are evidently unable to compete on the central criteria by which foods are selected (price, taste, availability, fit with eating practices), they are seldom eaten again.

The 'hidden is best' hypothesis, as such, is shown to be relevant only in a limited sense: for trial consumption, and for repeat consumption only to the extent that the products are considered superior to potential alternatives in most other respects. As I suggest in Chapter 6, a more direct engagement with insects in food may increase the positive reasons for selecting insects rather than something else. As Chapter 9 argues, it is precisely such distinctiveness and singularity that was operative in the successful establishment of sushi in the United States.

This is not to say that insects should *not* be hidden in foods, but simply that, if this course of action is taken, serious consideration needs to be given to the other more conventional aspects of the foods, significant among which is the foods' place relative to potential alternatives. The argument is logically generalizable to other insect-based foods. For example, the invisible incorporation of insects in potato chips may help to overcome the 'yuck factor'; but if conventional plant-based alternatives are cheaper and more easily available, are the insect-based products likely to be regularly selected?

It should be noted that disguising insects may well be appropriate if the target product type is characterised by the invisible inclusion of abstracted protein, as is the case with the protein foods discussed above. In this case, provided the insect-based versions were judged comparable or superior in terms of price, taste and availability, there is no theoretical reason (beyond the 'yuck factor') why they would be less likely to be consumed than alternatives. However, conventional food products are arguably different, because they are generally not consumed exclusively for their protein content.[95]

Broad consensus around the 'hidden is best' hypothesis is not, I argue, the consequence of an underlying truth about the best manner in which to introduce insects as food. Rather, it is the product of a prevailing epistemological tendency in consumer acceptance research. The

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[94] Hiding insects in familiar foods is comparable to the 'health by stealth' approach to health interventions, in which foods are reformulated to achieve health goals. This is argued to increase the healthiness of diets without requiring a reconfiguration of eating practices (e.g. Combet et al., 2014).

[95] Some companies produce 'cricket powder', i.e. ground-up crickets. This is principally targeted at the protein foods market, but there are also suggestions that the powder could be used in conventional meals (e.g. https://www.cricketflours.com/cricket-flour-recipes/). While such ideas may be motivated by an admirable desire to improve the sustainability of Western diets, they are, I would suggest, rather unrealistic.

epistemological uniformity of consumer acceptance literature is problematic, because it leads to the entrenchment of certain principles (such as the 'hidden is best' hypothesis) and a lack of emphasis on other important areas (such as the social and contextual shaping of food's acceptance). The immediate implication of this for research in the area is a need for more epistemologically and methodologically diverse research, and a strong need for research which engages with people who have actually consumed insect-based foods in a context other than a psychology lab or food fair.

This epistemological uniformity – and its consequent effect on the scientific literature – is also problematic in a more applied sense, because it may be leading product development in a direction which does not account for the factors that encourage repeat consumption. This, I should clarify, is speculation: however, the wide variety of products containing hidden insects hint at the idea's pervasiveness, indicating at least a prima facie connection between the academic literature and the prevailing orientation in commercial production of insect-based foods.

To be sure, critique of the 'hidden is best' hypothesis does not imply that visible insects will be more acceptable: my own findings indicate that they are eaten even less frequently than insect-based convenience foods. The argument made in Chapter 6 – that a more direct engagement with visible insects may be a way to ensure the singularity, distinctiveness and thus appeal of insect-based foods – is predicated on their successful integration within a coherent framework of culinary practice, an idea elaborated further in Chapter 9. (It should once again be emphasised, however, that not all insects are the same, and that efforts to integrate insects within a relevant framework of culinary practice must necessarily be species-specific.) My aim in the present discussion is to explain how the prominence of 'hidden is best' indicates the application of a singular epistemological approach to a complex social area, and has negative implications in both in a scientific and commercial sense.

A critical perspective

Although the current entomophagy literature has provided some useful insight into various aspects of Western consumer acceptance of insects as food, it has remained somewhat agnostic about some of the 'bigger' issues relating to the area: for example, it has yet to fully engage with the questions of *why* insects are, or should be, considered as a sustainable alternative protein source (although see J Evans et al., 2017; Waltner-Toews and Houle, 2017).

One of the objectives of the present thesis is to apply a critical perspective to the study of Western entomophagy. To do so, I would suggest, is to pose questions about the way in which insects are being positioned within Western markets, and whether or not such activities are likely to represent meaningful change. My discussion above regarding the problematic nature of the designation of insect-based foods as sustainable is one example of this type of issue: in this section, I discuss two further examples.

Firstly, and in the light of recent efforts towards the development of 'alternative proteins' (see Chapter 1), it is necessary to consider to what extent insects represent an 'alternative' protein source. In a reflection of Sexton's (2017) analysis of plant-based proteins, the present findings have indicated that insect-based foods are only a 'disruptive innovation' to the extent that they facilitate the redistribution of capital among relatively powerful supply-side actors (cf. Müller et al., 2016). They do not represent an existential threat to established agri-food networks, or the prevailing logic of capitalist accumulation. Despite the superficial difference of insect-based foods, the examples investigated here largely represent 'business as usual'. Although this question did not empirically motivate or organise the thesis, it is worth considering in the light

of work on alternative modes of food provisioning and consumption, which (as discussed in Chapter 2) are a contemporary concern within human geography. A relevant example is the debate around 'conventionalization' of organic food in California (e.g. Guthman, 2004), which highlights the need to consider processes by which 'alternative' foods become integrated into dominant systems of provision.

Another important area which does not tend to be interrogated in current entomophagy research concerns the ways in which the sector (including academia, business and policy) came to be as it is. The recent history of the sector, as I suggest in Chapter 5, has significant implications for the acceptance of insects. However, despite the importance of factors such as species choice for public acceptance of the resulting insect-based foods, such factors tend not to be explored in the entomophagy literature.

For example, Tan's (2017) insightful work investigates the different psychological aspects of consumer acceptance of a range of mealworm-based preparations, considering these findings in comparative cultural context. However she does not ask *why* mealworms are being used in the first place, whether they are a sufficient proxy for 'insects' in a general sense (although she does approach the question in more general terms as part of Evans et al., 2015), and whether they should in fact be being used at all. She concludes that they are largely unsuitable as a Western food source due to the problems represented by their cultural inappropriateness, but does not investigate the ways in which mealworms have come to be positioned as an alternative protein in the West in the first place.

To do so is admittedly a sociological question, and thus it would be rather unfair to identify this as an oversight on her part when it was clearly beyond the remit of her psychological research. Nevertheless, as I have attempted to show, the question is an important one, and has significant ramifications for the extent to which insects are accepted as food in the West. As I have argued, diverse actors within a supply-side network are equally as implicated in attempts to ensure public acceptance as the public are themselves. Thus the question of why mealworms are not culturally appropriate is not just about their sensory or culinary properties; it also raises the question of why mealworms, rather than other insects (with a coherent place within an established set of culinary practices), were selected as a food insect species in the first place. This, as I argued, is due not only to the path dependence, complexity and contingency of the supply-side network, but also because the decisions made within that network were primarily technical, rather than culinary.

A substantial majority of the entomophagy literature does not engage with such questions, instead taking the existence of the Big Four, as 'the' Western food insect species, as axiomatic. In a certain practical sense this is reasonable: product development research (which is arguably what many of the academic studies in the area represent) must conduct investigation using the materials and tools at its disposal. The difficulty with this is that those materials – the Big Four – appear to be fundamentally unsuitable for human food applications in the West. Indeed, this point is one of the key, practical recommendations that may be taken from the thesis.

… for business

The key findings of the thesis are not only important in a purely academic sense. They have a range of practical implications, which will be significant considerations for those interested in producing, promoting or retailing insects as food.

The first of these is that disguising insects in food products may not be the 'best' way to achieve public acceptance. As I have argued, the idea that 'hidden is best' is based on a partial body of research, and does not account for many of the factors that encourage the routine consumption of foods. It is beyond the remit of this study to offer alternative substantive approaches to the production of insect-based foods, but I would suggest that – following the example of sushi – efforts to produce insect-based products or dishes should focus on their sensory appeal, their distinctiveness and singularity, and their emplacement within a coherent set of culinary practices.

The second point is closely related to this. That is, in future an approach should be taken to the introduction of insect-based foods that is primarily culinary, rather than technical. It is not enough to focus on insect products that are simply the easiest to make, or which use the most reproductively predictable and easiest to rear species. While these latter factors may be important for the lower price and increased availability that insect-based foods probably require for their success, they are not alone sufficient to encourage repeat consumption. Neither, for that matter, are ideas about healthiness or sustainability. Insect-based foods are *foods*, first and foremost; their other attributes contribute towards their 'relative advantage' to potential alternatives, but are not the sum total of that advantage.

Third, and again related to the above comments, is that producers should not assume that 'if we build it, they will come'. Achieving the commercial availability of insect-based foods is a complicated and difficult process, but it is not sufficient to achieve widespread uptake. Products should be designed (including species selection) with basic criteria for routine consumption in mind (price, taste, availability, and the multidimensional 'fit' with established eating practices).

Fourth, producers of insect-based foods should consider whether their products really are better for the environment than meat, and if not, how this may be achieved. If insects are to fulfil their potential as a sustainable alternative protein, they need to be eaten *instead of meat*, rather than as well as meat or instead of plants (bearing in mind the caveat regarding unsustainable plant consumption discussed above.) Few insect-based foods appear to be realistically positioned in this way (a notable exception being the insect-based bolognaise sauces produced by the Canadian firm One Hop Kitchen).

Fifth, the production of insect-based foods should not be rushed. Haste appears to have been a defining characteristic of the Western edible insect sector; it is not coincidental, I suggest, that insect-based foods are yet to be widely adopted. A comparison with plant-based meat analogues, which are currently enjoying considerable commercial interest, is instructive. As Doering (2017: n.p.) observes,

> The manufacturers [of plant-based meat analogues] have been careful not to rush out a product before it's ready, fearing a premature debut could turn off meat connoisseurs or conjure up comparisons to the frozen, hockey puck-shaped veggie burgers that have defined the space for years.

I would suggest that a similar degree of caution and patience is also advisable in the development of insect-based foods. Otherwise, the existence of a plethora of largely unpopular products may generate an unfavourable impression of insect-based foods, which may ultimately have rather serious consequences for their public acceptance.

Sixth, supermarkets (or other retailers) should bear in mind their considerable influence in shaping the positioning and consumption of insect-based foods. The decision to stock Insecta

among a selection of chiefly plant-based 'meat replacer' products evidently had an impact on the type of consumers that bought Insecta, as well as the way they were consumed. Although this was in part directed by the 'scripting' of the products themselves, many consumers came across Insecta while browsing in the plant-based aisle. Thus it is possible that locating insect-based foods among meat products may affect the way they are positioned and consumed.

Lastly, the efforts of producers, promotors and retailers should focus on willing 'early adopters', not on whole populations. Instead of trying to achieve the highest possible number of consumers (as in the 'hidden is best' example), efforts should draw out the distinctive, appealing aspects of insect-based food, focusing on achieving the repeat consumption of a small but committed group.

… for policy

The thesis has also highlighted some important areas that policymakers should be cognisant of when considering the use of insects in efforts to achieve 'sustainable food transitions'.

Policymakers should consider the sustainability credentials of insects (see above): do they really represent a sustainable protein source? The evidence in this area is limited, and the findings of this thesis indicate that, to the extent that insects are consumed, it tends to be either a) as well as meat or b) instead of plants. Thus the relative advantage of insects, compared to plant-based foods and/or meat reduction, should be seriously considered. More research into the sustainability of insects as food would be profitable.

It is important to consider where agency lies in effecting sustainable dietary transitions: such transitions are not entirely the responsibility of consumers. Indeed, for widespread uptake of insect-based foods to work, it is likely that they will need to be relatively cheap, tasty and available. Policymakers may have no direct influence over the products available, but may affect the regulatory and practical context in which they are produced and consumed. If meat was more expensive, for example, and/or alternative proteins were subsidised, insects may represent a more feasible food source. In the context of the 'meat crisis', the benefits of using insects as food relative to other policy options should be systematically investigated.

Another relevant policy area is regulation, including key aspects such as distribution and safety. Although there is now policy harmonisation in these areas for EU member states (see Chapter 5), policy in non-EU countries should be formulated in light of developing research, for example in key areas such as potential allergenicity of insect species. In the context of Brexit, such considerations will be important for UK policymakers. Although in coming years the production and consumption of insect-based foods in the UK will cease to be directly regulated by the European Food Safety Authority (EFSA), it is unclear at this stage whether or not the UK will continue to follow the EFSA procedure for approving and regulating novel foods. As Dobermann et al. (2017) note, lack of EFSA ratification procedures may offer more legislative freedom for the UK. However, it is likely that UK producers and suppliers will still need to comply with European regulations if they wish to trade with the EU. Current policy in Belgium, for example, stipulates that any insects sold for food must have been produced in accordance with EU food regulations (Federal Agency for the Safety of the Food Chain, 2014).

The above points apply to sustainable dietary transitions more broadly. Policy-relevant considerations are the extent to which a proposed alternative protein (or other novel food) is more sustainable than existing alternatives; the role of the 'supply-side' (involving policy and regulators, as well as producers and suppliers) in facilitating and managing dietary transition; and a sustained engagement with the full range of policy alternatives in addressing the Western overconsumption of meat.

10.4 – CONCLUSION

This thesis has investigated public acceptance of insects as food in the Netherlands. The central finding is that insects have very low public acceptance in the sense of current routine consumption, and consequently are not a feasible food source there (and by extension, much of the Western world). This is for two key reasons.

Firstly, the species selected for human food applications are unsuitable for the purpose. They were chosen for technical reasons, rather than culinary ones, and are not likely to be widely consumed in new areas (other than as an occasional novelty product) because they lack a coherent place within 'already existing' food practices, established elsewhere, which can be drawn upon.

Secondly, the insect-based foods produced in the West fail to meet certain key criteria for the successful establishment of novel foods. Other than their lack of a culturally intelligible place within eating practices, they cannot compete on the dimensions of price, taste and availability, relative to the foods with which they are positioned as a direct alternative.[96]

A further consideration is that current insect-based foods probably do not represent a sustainable alternative protein source to conventional meat. This is because, to the extent that insects are consumed, it is either as an additional protein source or an alternative to plants (with some consumers considering insects an exception to long-established dietary proscriptions regarding the consumption of animals.) The widespread comparisons of insects with meat which form the basis of pro-entomophagy discourse are, as such, largely inapplicable.

For insects to fulfil their purported role in Western efforts to mitigate anthropogenic climate change, species would have to be selected that could be reared sustainably in the West. These would need to have a coherent, distinctive and appealing place in culinary practices, and represent an alternative to meat rather than plants. The other elements of the relevant culinary practices would also need to be in place, and the insects would need to be produced at sufficient scale to ensure low price and high availability.

Until such a time as this is achieved, insects are unlikely to be frequently consumed in the West. This means that the role of insects in mitigating the effects of the 'meat crisis', discussed in Chapter 1, is likely to be limited. I would suggest that other efforts to address Western overconsumption of meat – such as the use of fiscal measures and/or public procurement – are likely to be more effective. In the current circumstances, insects are unlikely to make a substantial contribution to 'feeding the world' in the foreseeable future.

[96] While these considerations are relevant to the human consumption of insect-based food, they may be less relevant to the incorporation of insects in animal feed. This may be an area where the use of insects has greater potential, in the immediate future, as a Western protein source.

Appendices

APPENDIX 1: PARTICIPANT INFORMATION SHEET (PHASE 1, ENGLISH)

Information sheet | Customer experience of insect-based foods

What is the purpose of the research project?

The research investigates the experience of Jumbo customers who have tried **at least one** of the products in the **Damhert Insecta** range of insect-based foods, sold at Jumbo stores nationwide.

Who is conducting the research?

The research is being conducted by researchers from the University of Sheffield (UK) and Utrecht University (NL). Please note that for this reason we would like to conduct some of the interviews in **English**. When we contact you to arrange an interview, we will ask if you are happy to be interviewed in English.

Why should I take part?

Your participation will help Jumbo to understand its customers' needs and will ensure that your opinions about these new food products are heard. By taking part you will also help to advance knowledge about the use of insects as a source of food, which is an area currently being taken very seriously by the scientific community. This study offers participants the opportunity to be part of some of the first research in this important area.

If I take part, what will it involve?

We would like you to take part in a **single interview** of around 30—60 minutes. This will take place at a time and place convenient for you. This could be at any time during the day or evening, and could also take place at a weekend if you prefer. We suggest that meeting in a public location, such as a café, would be best—the coffee will be on us! We are also able to conduct some interviews by telephone. When we contact you to arrange an interview, we will ask which method you would prefer.

What's in it for me?

In addition to the opportunity to help advance knowledge about insects as food, we are offering all participants who are selected for an interview a payment of **€20** for taking part. Please note that payment will only be made on **completion** of the interview.

Are there any risks to taking part?

There are no extra risks that you need to be aware of as a result of taking part in this research.

Will my participation be kept confidential?

Absolutely—all responses will be anonymised, and all interview transcripts and recordings will be stored in encrypted, password-protected files.

What if I agree to participate but then decide I no longer want to take part?

You are free to leave the research at any time. No data from withdrawn participants will be used.

Please contact Jonas House—j.a.house@uu.nl—if you have any questions.

APPENDIX 2: PARTICIPANT CONSENT FORM (ALL PHASES, ENGLISH)

Consent form

Title of project: Food and eating practices in the Netherlands and the UK: how do insect-based foods fit in?
PhD researcher: Jonas House
Institution: University of Sheffield (UK)
Supervisors: Professor Peter Jackson, Dr Megan Blake
Contact email: jhouse1@sheffield.ac.uk
Contact telephone: +31 (0) 6225 78523 (Netherlands) / +44 (0) 7729 352500 (UK)

Before we begin this interview, I (the participant) agree to the following:

- All personal information relating to me will be kept in a password-protected file separate from all recordings, transcripts and notes from these interviews. Once this consent form has been digitally stored the original will be destroyed.
- This interview will be audio recorded. Any recordings, transcripts or notes relating to the interview will be kept in password-protected files separate from any personal information.
- All recordings, transcripts and notes will be kept under a false name (alias) assigned by the interviewer. I will not be identified or identifiable in any reports that result from the research.
- I am not required to answer any questions that make me feel uncomfortable.
- If I do regret any answers given, it is my right for that information to be excluded from the project.
- I have not been forced into helping with this project and my participation is entirely voluntary. I can withdraw from participation at any time.
- Any recordings, transcripts or notes made from my participation in this project may be re-used for future research.

Research participant full name: _____

Contact details: _____

Research participant signature:_____ Date: _____

Jonas House's signature: _____

APPENDIX 3: PARTICIPANT INFORMATION SHEET (PHASE 1, DUTCH)

Informatieblad | **Klantenervaringen met insectenproducten**

Wat is het doel van dit onderzoeksproject?

Dit onderzoek betreft de ervaringen van Jumbo-klanten die **tenminste één** van de producten in het **Damhert Insecta** assortiment van insectenproducten hebben geprobeerd.

Door wie wordt dit onderzoek uitgevoerd?

Het onderzoek wordt uitgevoerd door onderzoekers van de University of Sheffield (Engeland) en Universiteit Utrecht (Nederland). Om deze reden zouden we graag een deel van de interviews in het **Engels** afnemen. Als we contact met u opnemen om een afspraak voor een interview te maken, zullen we vragen of u het goed vindt in het Engels geïnterviewd te worden.

Waarom zou ik deelnemen?

Door uw deelname leert Jumbo de voorkeuren en behoeften van haar klanten kennen in dit nieuwe voedselsegment. Bovendien vergroot u de kennis over het gebruik van insecten als voedselbron, wat momenteel een onderzoeksgebied is dat heel serieus genomen wordt in de wetenschap. Dit onderzoek geeft u de kans deel te zijn van één van de eerste onderzoeken in dit belangrijke onderzoeksgebied.

Wat staat me te wachten als ik deelneem?

Als u besluit deel te nemen, willen we graag **één interview** bij u afnemen dat plaatsvindt op een voor u handige tijd en locatie. Dit kan overdag zijn, 's avonds, of zelfs in het weekend als dat u het beste uitkomt. Het kan het beste zijn af te spreken op een openbare plek, zoals een café – de koffie is voor onze rekening!

Krijg ik er wat voor?

Naast het feit dat u de kans krijgt de kennis over insecten als voedselbron te vergroten, geven we deelnemers die zijn geselecteerd voor een interview een bedrag van **€20,-** als vergoeding voor deelname. Dit bedrag wordt pas overhandigd **na** afname van het interview.

Zijn er risico's verbonden aan mijn deelname?

Aan deelname aan dit onderzoek zijn geen extra risico's verbonden waar u zich bewust van hoeft te zijn.

Wordt mijn deelname vertrouwelijk behandeld?

Uiteraard – alle antwoorden worden geanonimiseerd. Verder worden alle transcripties en opnames opgeslagen in versleutelde en met wachtwoord beschermde bestanden.

Wat als ik instem met deelname, maar later beslis dat ik toch niet wil deelnemen?

U bent vrij om uw deelname stop te zetten op elk moment. We zullen geen gegevens gebruiken van deelnemers die zijn gestopt.

Als u vragen heeft of meer informatie wilt kunt u contact opnemen met Jonas House – j.a.house@uu.nl

APPENDIX 4: PARTICIPANT CONSENT FORM (ALL PHASES, DUTCH)

Toestemmingsformulier

Projectnaam: Voedsel en eetpraktijken in Nederland en Engeland: Hoe past insect-gebaseerd voedsel daarin?
Hoofdonderzoeker: Jonas House
Instituten: University of Sheffield (UK), Universiteit Utrecht (NL)
Supervisors: Professor Peter Jackson, Dr Megan Blake
Contact e-mailadres: jhouse1@sheffield.ac.uk
Contact telefoon: +31 (0) 6225 78523 (Nederland) / +44 (0) 7729 352500 (UK)

Voordat we beginnen aan dit interview, geef ik mijn toestemming voor het volgende:

- Alle persoonlijke informatie over mij zal in een met een wachtwoord beschermd bestand worden bewaard, apart van de opnamen, transcripties en notities van het interview. Zodra dit toestemmingsformulier is gedigitaliseerd zal het originele exemplar vernietigd worden.
- Dit interview wordt audio-opgenomen. Opnames, transcripties en notities van het interview zullen in met wachtwoorden beschermde bestanden worden bewaard, apart van persoonlijke informatie.
- Alle opnamen, transcripties en notities zullen worden bewaard onder een valse naam (alias) die door de interviewer wordt toegewezen. Ik zal niet geïdentificeerd worden of identificeerbaar zijn in verslaglegging volgend uit dit onderzoek.
- Ik be niet verplicht antwoorden te geven op vragen waar ik me ongemakkelijk bij voel.
- Als ik spijt krijg van antwoorden die ik geef, is het mijn recht dat deze informatie wordt verwijderd en het gebruik ervan het project wordt uitgesloten.
- Ik ben niet gedwongen om deel te nemen in dit project en mijn deelname is volledig vrijwillig. Ik kan mijn deelneming op elk moment terugtrekken.
- Opnames, transcripties of notities die gemaakt zijn door mijn deelname in dit project mogen hergebruikt worden voor toekomstig onderzoek.

Volledige naam deelnemer: _____

Contactgegevens: _____

Handtekening deelnemer:_____ Datum: _____

Volledige naam onderzoeker: _____

Handtekening onderzoeker: _____

APPENDIX 5: FOOD DIARY GUIDANCE SHEET (PHASE 2)

Food diary

I'd like you to keep a rough 'food diary' of your main meals each day for two weeks, as well as any food shopping you do. You don't need to write anything down: just take a few pictures each day if possible. For example, these could be of your food shopping when you get home with it, and your main meal as it is being cooked / when it is ready.

I will contact you after a week to see how the food diary is going. After the two week period is complete, I will contact you again to arrange a meeting for us to discuss the photos. On completion of the meeting you will be paid **€30**.

I've included the questions below as prompts to help you decide what to photograph – you can of course take pictures of other things as well.

Please let me know if you have any questions in the meantime. You can contact me via email (jhouse1@sheffield.ac.uk) or phone (0622578523).

What did you eat for your main meal today?
Who made it?
Who did you eat it with?
Did you shop for food today? What did you buy?

APPENDIX 6: PARTICIPANT INFORMATION SHEET (PHASE 3)

The University Of Sheffield.

Public acceptance of insects as food in the Netherlands

PhD researcher: Jonas House
Institution: University of Sheffield (UK)
Supervisors: Professor Peter Jackson, Dr Megan Blake

Purpose of the research project

My main focus is in how the insects and insect-based foods that are on sale for human consumption in the Netherlands are being integrated into people's diets. I've been looking at food and eating practices of people that consume these foods more generally, to try and understand how insect-based foods and other novel foods (such as meat substitutes) fit in. I'm also interested in talking to people involved with the production, distribution and retail of insect-based foods in Europe and elsewhere to understand the development of current products, and indeed the sector more broadly.

Why have you been chosen to take part?

You have been invited to take part because you've been involved in some way with the production, distribution or retail of insects as food.

Do you have to take part?

No – participation in the research is entirely voluntary. You are able to withdraw at any time.

What will happen if you take part?

If you decide to take part, I'd like to interview you either in person or via Skype. The interview will be recorded and transcribed. If you are willing, I may ask if we can conduct a follow-up interview as well. Participation in both is voluntary.

Are there any risks to taking part?

There are no extra risks that you would need to be aware of as a result of taking part in this research.

Will my participation be kept confidential?

Recorded material and interview transcriptions will be stored separately under password protection. Recordings and transcriptions will be anonymised, and any research notes made will not refer to you by name. Any use of your responses in my thesis or subsequent publications will be anonymised.

What will happen to the results of the study?

The results of the study will be primarily be used for the completion of a PhD thesis. The results may also be disseminated through conference papers, articles in academic journals, book chapters and blog posts. All of these results may be available publically – please ask if you have any questions about this.

Who can I contact if I have further questions?

If you have any further questions please do not hesitate to contact me (Jonas House).

Email: jhouse1@sheffield.ac.uk **Telephone**: +31 (0)6 22 57 85 23

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