



# A qualitative exploration of the factors underlying seniors' receptiveness to entomophagy



Gael Myers\*, Simone Pettigrew

School of Psychology and Speech Pathology, Curtin University, GPO Box U1987, Perth, WA 6845, Australia

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## ABSTRACT

Entomophagy presents a novel approach to securing a nutritive and environmentally sustainable food source to meet the needs of a growing and ageing population. To date, research exploring the receptiveness of Western consumers towards entomophagy has focused on younger age groups and there has been little examination of the views of older adults. The aims of this study were to (i) explore the factors associated with older people's attitudes towards entomophagy and (ii) identify strategies to encourage seniors to adopt the practice. Interviews were conducted with 77 Western Australian seniors aged 60 years and over. The average age of the interviewees was 73 years and most were female ( $n = 67$ ). Reflecting the lack of promotion of entomophagy as a desirable eating behaviour, there were very low levels of awareness of the environmental and nutritional advantages of this practice. Most of the interviewed seniors saw entomophagy as a disgusting practice that was incompatible with their cultural beliefs and values, however a small group viewed it as a novel and potentially enjoyable experience. The findings suggest that strategies to target the former group could focus on overcoming the disgust reaction, such as by disguising insects in food and providing guarantees of food safety. Consumption in the latter group could be facilitated by improving knowledge and skills relating to the preparation of insect-based foods. Strategies to increase entomophagy in the Western world need to consider the unique views of different consumer groups towards the practice.

## 1. Introduction

The global population of adults aged 60 years and older is expected to more than double over the next 30 years, alongside gradual growth in the total population (United Nations, 2017). It is predicted that by 2050, adults aged 60 years and over will constitute nearly one-quarter of the population in all major areas of the world except Africa (United Nations, 2017). In Australia, the setting for the current study, there were almost 5 million people aged 60 years and over in 2016, representing 21% of the total population (Australian Bureau of Statistics, 2017). As the population grows, there will be increasing pressure on food systems to produce higher volumes to meet demand (Alexandratos & Bruinsma, 2012; Belluco et al., 2013; Charles et al., 2010). To meet this demand into the future, it is important to consider the environmental sustainability of current food production practices (Garnett, 2013; Giovannucci et al., 2012), along with the particular food needs and preferences of older adults as they are increasingly represented in the global population.

While conventional meats such as beef and lamb are good sources of high-quality protein, the production of these foods can impact

negatively on the environment (Charles et al., 2010; Pimentel & Pimentel, 2003). Entomophagy, the consumption of insects, presents a novel approach to increasing food yields at low environmental cost (Anankware, Fening, Osekre, & Obeng-Ofori, 2015; Yen, 2009). While the specific nutritional composition of insect meat varies considerably across the almost 2000 identified species of edible insects (Payne, Scarborough, Rayner, & Nonaka, 2016; van Huis et al., 2013), in general it is nutritionally comparable to meats from conventional types of livestock (Banjo, Lawal, & Songonuga, 2006; Belluco et al., 2013; Ramos-Elorduy et al., 1997; Rumpold & Schlüter, 2013; Zielińska, Baraniak, Karaś, Rybczyńska, & Jakubczyk, 2015). Rearing insects for food produces fewer greenhouse gases and uses less land compared to producing conventional meats (Oonincx et al., 2010; Premalatha, Abbasi, Abbasi, & Abbasi, 2011). As many insects can be reared on organic waste products, such as manure and food scraps, entomophagy can contribute to environmental sustainability through the conversion of bio-wastes into high-protein food products (Rumpold & Schlüter, 2013; van Huis et al., 2013). Finally, insects have rapid reproduction rates and a high feed conversion efficiency, meaning that each unit of feed will yield a greater amount of protein from insects compared to

\* Corresponding author.

E-mail addresses: [gael.myers@curtin.edu.au](mailto:gael.myers@curtin.edu.au) (G. Myers), [simone.pettigrew@curtin.edu.au](mailto:simone.pettigrew@curtin.edu.au) (S. Pettigrew).

many conventional types of livestock (Nakagaki & DeFoliart, 1991; van Huis, 2013).

Although entomophagy is common in many areas of the world, including parts of Asia, Africa, and Latin America, the consumption of insects for food is relatively unusual in the Western world (Anankware et al., 2015; van Huis, 2013). Western consumers typically consider entomophagy to be a disgusting practice that is inconsistent with prevailing cultural norms (Hartmann, Shi, Giusto, & Siegrist, 2015). In particular, insects are commonly viewed as a marker of dirt and pestilence (Looy, Dunkel, & Wood, 2014). While strong negative reactions to insect consumption are common, the novelty of insects as a food may also raise curiosity in some consumers (House, 2016). Most research reporting on the perceptions of entomophagy among Western consumers has focused on younger adults, with little investigation of the views of older adults. When the views of seniors have been considered, it has been as part of mixed-age studies where older adults often represent only a small proportion of the total participant group (Caparros Megido et al., 2014; Hartmann et al., 2015; Hartmann & Siegrist, 2016; Lensvelt & Steenbekkers, 2014; Tan et al., 2015; Verbeke, 2015).

People of different ages can exhibit different food preferences and motivations. For example, both qualitative and quantitative studies show that older people tend to be more concerned with healthiness, 'naturalness', and environmental sustainability when making food choices compared to younger age groups (Chambers, Lobb, Butler, & Traill, 2008; Lea & Worsley, 2008; Mingioni et al., 2016). Generational differences in dietary practices have been attributed to varying childhood food experiences (Host, McMahon, Walton, & Charlton, 2016) and substantial changes to the food environment over time (Kearney, 2010). As such, there may be inconsistencies in perceptions of entomophagy between age groups.

The promotion of entomophagy to Western consumers presents a potential strategy to improve the environmental sustainability of current food consumption patterns. However, little is known about strategies that are likely to be effective in encouraging adoption of this dietary practice, especially among older people. The aims of the present study were to (i) explore the factors associated with older people's receptiveness to entomophagy and (ii) identify potential strategies to increase the uptake of entomophagy among seniors.

## 2. Materials and methods

The data for this study were collected as part of a larger project investigating seniors' food-related attitudes and behaviours (Pettigrew, Worrall, Biagioni, Talati, & Jongenelis, 2017). Interviews were conducted with 77 Western Australians aged 60 years and over. Initially, eight seniors were recruited via advertisements on community radio, flyers, and community newspaper advertisements to become data collectors. The data collectors received face-to-face training in interview techniques and were provided with an interview guide detailing topics to be covered. Each data collector was provided with a smart phone with audio-recording functionality to record their interviews. Data collectors were encouraged to be flexible in the ordering of topics, ask open-ended questions, and use a funnelling technique in which broad topics were first introduced and then further detail accessed via specific follow-up questions (Gorden, 1969). In addition to receiving written and verbal instructions, the data collectors were interviewed by a member of the research team to model appropriate interviewing techniques. These interviews were included in the final data set. At the completion of the training, the data collectors were encouraged to invite word-of-mouth contacts, acquaintances, and friends to be interviewed for the study. The only restriction for inclusion in the study was being aged 60+ years.

The interview guide included prompts relating to individuals' views on insect consumption in general and as a strategy for increasing seniors' protein intake. These were asked as part of a broader set of questions relating to current and historical eating patterns, food

purchasing behaviours, sources of nutrition information, and beliefs about barriers to and enablers of seniors consuming a healthy diet.

Data were collected over an 11-month period from April 2015 to February 2016. Interviews were conducted within interviewees' homes to create a comfortable setting that encouraged individuals to answer questions openly and honestly. The average duration of the interviews was 33 min (range 12–74 min). Ethics approval for the project was granted by the Curtin University Human Research Ethics Committee. An information letter about the study was provided to each interviewee, and a consent form was signed prior to the commencement of each interview.

The interview audio files were transcribed verbatim and imported into NVivo 11. For the purposes of the present study, the sections of each interview relating to entomophagy were first read through several times to develop familiarity with the content. An emergent coding process was then undertaken by a single coder to allow the coding hierarchy to evolve in accordance with the interview content. Along with the demographic nodes, parent nodes were developed for the three major areas of discussion – experiences with entomophagy, views on entomophagy, and strategies to increase entomophagy. The content of these parent nodes was then coded into sub-nodes that emerged inductively during the coding process and reflected the seniors' top-of-mind thoughts on this issue (Thomas, 2016). Examples of these sub-nodes include media, travel, the experiences of family and friends, cultural norms, disgust, parallels with other meats, survival, experience, environment, nutrition, disguise, and food safety. Interrogation of these nodes and the use of NVivo's text and matrix search functions facilitated the identification of themes that were then discussed by the authors to refine the analysis. Finally, a model was developed to show the relationships between the different areas of discussion and provide a summary of the study findings (see Fig. 1). Illustrative quotes are included throughout the results, with descriptors provided with each quote as follows: PX (participant number), M/F (gender), and X (age in years).

The average age of the interviewees was 73 years (range 60–100 years) and most were female ( $n = 67$ ). When asked to provide information on the presence of any diet-related illness, 40 seniors (52%) identified one or more conditions. The most commonly noted illnesses were arthritis ( $n = 17$ ), osteoporosis ( $n = 12$ ), dyslipidaemia ( $n = 9$ ), hypertension ( $n = 6$ ), and diabetes ( $n = 6$ ).

## 3. Results

### 3.1. Experiences with entomophagy

Many of the interviewed seniors were aware that insects are edible and are consumed in various parts of the world. They described the different ways they had learnt about entomophagy, with the media being most frequently cited. Some of the interviewees described documentaries, reality television programs, news reports, and books they had viewed that referred to the consumption of insects. In particular, several of the interviewees described a recent news story about a man who had survived being lost in a remote area of Western Australia by consuming ants.

I've seen them on the television in Thailand, the markets and the cockroaches and things that they cook.  
(P42, F, 79)

That poor fellow in the bush. I mean, I suppose if you're desperate you would [eat ants].  
(P10, F, 76)

Other ways in which the interviewees had come into contact with entomophagy were through travelling to other countries, interacting with Aboriginal Australians who follow a more traditional diet, living in other countries, and the vicarious experiences of family and friends.

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