



The effect of communication and implicit associations on consuming insects: An experiment in Denmark and Italy



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ARTICLE INFO

Article history:

Received 24 July 2015

Received in revised form

22 January 2016

Accepted 3 February 2016

Available online 6 February 2016

Keywords:

Consumer

Entomophagy

Insects

Communication

Implicit association test

ABSTRACT

It has been widely noted that the introduction of insects in Westerns' diet might be a promising path towards a more sustainable food consumption. However, Westerns' are almost disgusted and sceptical about the eating of insects. In the current paper we report the results of an experiment conducted in two European countries—Denmark and Italy—different for food culture and familiarity with the topic of eating insects. We investigated the possibility to foster people's willingness to eat insect-based food through communication, also comparing messages based on individual vs. societal benefits of the eating of insects. Communication proved to be effective on intention and behaviour, and the societal message appeared to be more robust over time. The communication effect is significant across nation, gender, and previous knowledge about the topic. In addition, we investigated the impact of non-conscious negative associations with insects on the choice to eat vs. not eat insect-based food. Implicit attitudes proved to be a powerful factor in relation to behaviour, yet they did not impede the effectiveness of communication.

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1. Introduction

Ecological footprint is the load imposed on nature by a population or an individual, and it can be expressed as the portion of Earth's surface which is necessary to sustain the resource consumption and waste by that population or individual (Wackernagel & Rees, 1996). Food consumption—and meat consumption in particular—account for a large part of the ecological footprint of people with a carnivorous diet (FAO, 2005, 2006). In most countries, developed or not, livestock and fish are an important source of proteins. According to FAO (2006), 70% of all agricultural land and products are destined to livestock, and this measure in absolute terms has to double between 2000 and 2050 (from 229 million tonnes to 465 million tonnes) in order to satisfy the increasing world demand. Feeding the more and more demanding world population will determine an unsustainable pressure on land, oceans, water and energy. Therefore, the environmental issues, in particular those connected with cattle

breeding, need prompt attention, and alternative protein sources could be promoted, such as algae (Fleurence, 1999), vegetables and mushrooms (Asgar, Fazilah, Huda, Bhat, & Karim, 2010) and mini-livestock (Paoletti, 2005).

Among the different possible protein sources, recent research has been showing a growing interest in the introduction of edible insects into the Western diet, which could be a solution to environmental and nutrition world problems (Looy, Dunkel, & Wood, 2014; Rumpold & Schlüter, 2013).

According to the FAO (2006), the benefits of the introduction of insects in the human diet are twofold. On the one side, there are individual benefits stemming from the excellent nutritional profile of many edible insects (Rumpold & Schlüter, 2013). For example, the oils extracted from several insects are richer in unsaturated fatty acids than meat, and frequently contain Omega 3, the nutritional importance of which is well recognized for human health, mainly for the healthy development of children and infants (DeFoliart, Dunkel, & Gracer, 2009).

On the other side, there are relevant societal benefits, in terms of feed conversion efficiency, greenhouse gas emissions, freshwater consumption, food waste reduction, animal welfare, and prevention of zoonotic infection risk (van Huis et al., 2013). For example,

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species such as mealworm larvae, crickets and locusts compare favourably with beef cattle in their GreenHouse Gas (GHG) emissions (lower by a factor of 100). Insects are a more environmentally friendly source of animal protein also in terms of urine and manure production, energy depletion and land use (Oonincx et al., 2010; Oonincx & de Boer, 2012).

Despite all these individual and societal benefits, several studies show people's generally low willingness to introduce insect to the Western diet (Vanhonacker, Van Loo, Gellynck, & Verbeke, 2013; Verbeke, 2015), and there is still a lack of research about the psychological drivers and barriers which influence the willingness to eat insects. The discrepancy between the benefits of eating insects and the aversion of Westerners toward them suggests an important research question: Is it possible to positively affect the individual intention to eat insect-based food through communication of the individual and/or societal benefits connected to this new form of food consumption?

The idea of changing food preferences and aversions through communication has a prominent role in consumer behaviour research in relation to a large array of topics and disciplines (Aldridge, Dovey, & Halford, 2009; Larson & Story, 2009). However, few studies have addressed the issue of encouraging people in the Western countries to accept entomophagy, and while the educational experiences that have been carried out have increased the awareness of entomophagy, they did not significantly affect attitudes (Looy & Wood, 2006; Wood & Looy, 2000).

Therefore, our major aim was to investigate if it would be possible to positively affect people's willingness to eat insect-based food through communication (Del Giudice, La Barbera, Vecchio, & Verneau, 2015), also comparing different communication messages (individual vs. societal benefits of eating insect). To the best of our knowledge, the current study is the first to investigate this possibility with an experimental methodology. In addition, if an effect on intention occurs, we aim to test its stability over time, and to evaluate its transmission to actual behaviour. Also these two points have not been investigated before.

Previous research has highlighted the significant effect of several factors, such as gender and familiarity with the topic. We studied the main effect of these two factors, and of different nationality of the participants in the experiment as well. Moreover, we also explored the moderating role of the same factors on the effectiveness of communication.

It is also important to note that, although scholars have underlined the role of affective and non-conscious psychological processes as the basis of the aversion to insects as food, research has empirically studied the drivers and barriers only in terms of deliberate/explicit processes (Strack & Deutsch, 2004), using self-report measures. Therefore, it will be crucial for a more comprehensive understanding to explore the implicit processes as well, and we do address this issue in the current study using a measure of implicit associations (Greenwald, McGhee, & Schwartz, 1998).

In recent years, research in social psychology has focused on automatic or implicit processes, which are assumed to affect behaviour by operating outside of conscious awareness (Banaji, 2001; Bargh & Ferguson, 2000; Blair, 2001). Strack and Deutsch (2004) distinguish the *impulsive system* and the *reflective system*: In the latter, the link between cognitive beliefs and behaviour is mediated by reasoning, behavioural decision and intention; in the former, implicit associations between categories and concepts (such as “insect” or “elderly”, and “bad” or “good”) take place, which are directly linked to behaviour.

Recourse to implicit measures, in addition to traditional ones, has been shown to improve the prediction of behaviour (Greenwald, Poehlman, Uhlmann, & Banaji, 2009; Vantomme, Geuens, DeHouwer, & DePelsmacker, 2006). The most commonly

adopted and reliable instrument developed to tap into implicit association is the Implicit Association Test (IAT - Greenwald et al., 1998).

In the next section, we provide a brief overview of the existing research on the eating of insects, then we describe the procedure and results of an experiment conducted in Denmark and Italy—two European countries different in terms of food consumption characteristics and culture—for addressing the questions discussed above.

1.1. Why are insects not eaten in western countries?

The practice of eating insects, known as entomophagy, is an old-age phenomenon, well documented also in Europe during the Greek and Roman ages (Bodenheimer, 1951). Nowadays, insects are an important protein sources in several areas of Central and Western Africa, South East Asia, and Central and South America (Bahuchet & Garine, 1990; Zent & Simpson, 2009).

Western consumers' willingness to introduce insects and/or insect-derived proteins into their diet is generally low, and insect-based food is regarded with scepticism and disgust (Vanhonacker et al., 2013). From a psychological point of view, “Deeply embedded in the Western psyche is a view of insects as dirty, disgusting, and dangerous” (Looy et al., 2014). Disgust about something is a cultural construction, which is socialized to all members of a group, and indicates clearly the physical or cultural threat related to some object or action (Herz, 2012; Mignon, 2002). Disgust can also be easily generalized from one entity to others through contamination (Rozin & Fallon, 1987). Because Westerners tend to have a stereotyped and undifferentiated perception of insects (Kellert, 1993), the association of some insects with feces and decaying matter could have led to psychological contamination of all insects, making the entire category disgusting (Looy et al., 2014).

At the group level of analysis, food-related practices are part of the socialization of children, and contribute to the foundation of one's own cultural identity (Fieldhouse, 2013; Kiefner-Burmeister, Hoffmann, Meers, Koball, & Musher-Eizenman, 2014). Food practices shared by a group or a community also contribute to define its identity and distinguish it from other groups. Research has shown, for example, that different groups choose a subset of the edible substances available to consolidate and distinguish their identity, and often ridicule the outgroup food habit (Pyke, 1968; Diamond, 1992). Westerners' tend to consider the eating of insects as a primitive people's practice (Ramos-Elorduy, 1997), and use insect metaphors in relation to social groups which are seen as “less human” (i.e., de-humanized, see Haslam, 2006). Therefore they cannot eat insects without feeling threatened in their own identities and self-esteem.

There have been few studies that addressed consumers' attitudes towards eating insects or insect-based food. In a recent study in Belgium, Vanhonacker et al. (2013) found a very low willingness to eat insects. In a study conducted in the Netherlands (de Boer, Schöslér, & Boersema, 2013), 79% of participants indicated the insect-based snack as the one they would least like to taste, compared to other snacks based on environmentally-friendly proteins, such as hybrid meat, lentils, beans, and seaweed. Recent studies (Hartmann, Shi, Giusto, & Siegrist, 2015; Schöslér, de Boer, & Boersema, 2012) also showed that food products with processed (not visible) insects – such as pizza with insect proteins or cookies based on cricket flour – were evaluated better than other options with visible insects by Western people. This difference between processed and not-processed insects was not relevant in the case of Chinese people instead.

Scholars have identified several factors affecting individuals' willingness to eat insect based food. Gender and age are relevant

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