



Explicit and implicit attitude toward an emerging food technology: The case of cultured meat



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ABSTRACT

Cultured meat is an unfamiliar emerging food technology that could provide a near endless supply of high quality protein with a relatively small ecological footprint. To understand consumer acceptance of cultured meat, this study investigated the influence of information provision on the explicit and implicit attitude toward cultured meat. Three experiments were conducted using a Solomon four-group design to rule out pretest sensitization effects. The first experiment ($N = 190$) showed that positive or negative information about cultured meat changed the explicit attitude in the direction of the information. This effect was smaller for participants who were more familiar with cultured meat. In the second experiment ($N = 194$) positive information was provided about solar panels, an attitude object belonging to the same sustainable product category as sustainable food products such as cultured meat. Positive information about solar panels was found to change the explicit attitude in the direction of the information. Using mood induction, the third experiment ($N = 192$) ruled out the alternative explanation that explicit attitude change in experiment 1 and 2 was caused by content free affect rather than category based inferences. The implicit attitude appeared insensitive to both information or mood state in all three experiments. These findings show that the explicit attitude toward cultured meat can be influenced by information about the sustainability of cultured meat and information about a positively perceived sustainable product. This effect was shown to be content based rather than merely affect based. Content based information in a relevant context could therefore contribute to the commercial success of cultured meat.

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1. Introduction

The basic idea of cultured meat is that animal meat is grown using a bioreactor instead of an animal (Edelman, McFarland, Mironov, & Matheny, 2005; Tuomisto & de Mattos, 2011; van der Weele & Tramper, 2014). Cultured meat is an emerging technology that can contribute considerably to the growing need for more high quality protein at lower environmental costs than conventional meat (see for example, Boland et al., 2013). Provided the

technology becomes successful, near endless supplies of cultured meat may be produced with a relatively small ecological footprint (Mattick, Landis, Allenby, & Genovese, 2015; Tuomisto & de Mattos, 2011). Cultured meat, then, could (partly) replace the conventional meat production with its large ecological footprint (Fiala, 2008; Steinfeld et al., 2006). The success of cultured meat will depend to a large extent on consumer attitudes toward the product (Datar & Betti, 2010), because consumers' attitudes influence their product choices (Armitage & Conner, 2001).

Attitudes are psychological constructs that in a broad sense consist of the evaluation of an object (Eagly & Chaiken, 1993). A person can either retrieve a stored evaluation, or construct an evaluation through cognitive elaboration of relevant information (Fazio, 2007; Gawronski & Bodenhausen, 2006). When a stored evaluation is retrieved this is often automatic and without reasoning. Automatically retrieved evaluations without reasoning are called implicit attitudes (Fazio, 2007; Gawronski & Bodenhausen, 2006). An evaluation constructed through

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cognitive elaboration of available information, including that provided by implicit associations, are expressed as an explicit attitude (Gawronski & Bodenhausen, 2006).

Explicit attitudes have primarily been measured using self-report scales (Hendrick, Fischer, Tobi, & Frewer, 2013). Self-report scales typically report explicit attitudes, because filling out the scales requires cognitive elaboration (Bohner & Dickel, 2011; Eagly & Chaiken, 2007; Gawronski, 2007; Greenwald & Nosek, 2008). Implicit attitudes on the other hand, are measured with response time based measurement methods (Gawronski, 2007). The time required to connect an attitude object to an evaluation, indicates how closely the attitude object and the evaluation are implicitly associated (Hofmann, Gawronski, Gschwendner, Le, & Schmitt, 2005; Wittenbrink & Schwarz, 2007).

Implicit and explicit attitudes play different roles in decision making (Ayres, Conner, Prestwich, & Smith, 2012; Greenwald, Poehlman, Uhlmann, & Banaji, 2009; Perugini, 2005; Richetin, Perugini, Adjali, & Hurling, 2007). Implicit attitudes are more predictive for spontaneous behavior, whereas explicit attitudes are more predictive for deliberate behavior (Perugini, 2005). For well-known objects that are unambiguously positive (or negative), the automatically activated implicit attitudes and the more elaborately reasoned explicit attitudes are likely to be similar (Greenwald et al., 2009). For objects that have both positive and negative associations, implicit and explicit attitudes may differ. For example, racial or gender stereotyping research consistently finds that implicit attitude measures show a stereotypical response, while explicit attitudes do not (Cunningham, Nezlek, & Banaji, 2004; Kawakami & Dovidio, 2001; Wittenbrink, Judd, & Park, 1997).

In contrast with well-known objects, unfamiliar attitude objects, such as cultured meat, are not related to well-developed stored attitudes (Fazio, 2007; Fazio, Sanbonmatsu, Powell, & Kardes, 1986). The absence of a well-developed stored attitude toward an unfamiliar attitude object requires people to construct an explicit attitude on the spot, based on whatever information is provided. Provided information together with knowledge people have about the unfamiliar object allows them to create an attitude based on cognitive elaboration (Achterberg, 2014; Lusk et al., 2004; McComas, Besley, & Steinhardt, 2014).

The implicit attitude toward an unfamiliar attitude object is likely based on the most accessible associations, which are activated in response to the unfamiliar attitude object (Wyer, 2008). If the unfamiliar attitude object involves unnatural, or immoral interventions, an automatic disgust response, or a so-called 'yuck' response, is to be expected (Haidt, 2001; Schnall, Haidt, Clore, & Jordan, 2008). Previous research has argued for the existence of such a 'yuck' factor for cultured meat (Pluhar, 2010) and has found this response in interview studies (van der Weele & Driessen, 2013; Verbeke, Marcu, et al., 2015). In spite of the claim that the 'yuck' factor is largely automatically activated, no study on cultured meat used measurement methods aimed at measuring automatically activated responses.

Even without any information, people seem able to make sense of unfamiliar attitude objects. In order to make sense of an unfamiliar attitude object people must access some existing knowledge in their memory. This existing knowledge likely originates from an existing category of objects similar to the unfamiliar attitude object. The provision of information can facilitate the connection between the unfamiliar object and the existing category, enabling people to make sense of the unfamiliar object (Gentner, 1988; Gregan-Paxton & Moreau, 2003). As the provided information adds on existing knowledge, the effect of new information will be smaller when more information is already stored in memory. Once the unfamiliar object is related to an existing category, implicit and explicit attitudes toward the unfamiliar object are inferred from the attitude

toward the category prototype (Kardes, Posavac, & Cronley, 2004; Ranganath & Nosek, 2008; Ratliff, Swinkels, Klerx, & Nosek, 2012). These inferences can be based on content or content free affect (Fiske & Pavelchak, 1986).

Depending on the information the explicit and implicit attitude toward an unfamiliar attitude object can relate in different ways. Information about an unfamiliar attitude object can provide new knowledge that adds propositions about the unfamiliar object, which become apparent in the explicit attitude toward that object (Gawronski & Bodenhausen, 2006). This results in the following hypotheses:

H1a: Information related to the unfamiliar attitude object will change the explicit attitude in the direction of the valence of the information.

H1b: The effect of information provision on explicit attitude change is smaller for people who are more familiar with the unfamiliar attitude object.

Information may also support categorization of the unfamiliar attitude object into an existing category of similar objects. This categorization can activate category based implicit associations. These implicit associations may inform the explicit attitude toward the unfamiliar attitude object and thereby increase the relation between the explicit and implicit attitude (Gawronski & Bodenhausen, 2006). This will be explored in the current study.

To investigate the effect of information provision on the explicit and implicit attitude toward an unfamiliar attitude object, the attitudes before and after information provision need to be compared. The pretest measurement may however, influence participants' sensitivity to experimental stimuli and thereby influence the outcome of the posttest measurement (Campbell & Stanley, 1966). This pretest sensitization effect has been illustrated in various fields within the social sciences (Willson & Putnam, 1982). Awareness of the pretest sensitization effect may be especially relevant when measuring attitudes toward attitude objects that are unfamiliar to participants, because participants in the pretest are made aware of their limited knowledge about the attitude object making them extra motivated to pay attention to new information. In order to rule out pretest sensitization effects, a Solomon four-group design can be used, which makes it possible to compare the effect of information between participants that did or did not have a pretest (Solomon, 1949).

2. Experiment 1

In experiment 1, we explored the effect that positive or negative information about cultured meat had on the explicit attitude toward cultured meat, by providing new knowledge that should add to the existing limited knowledge structure of cultured meat. Most participants were unfamiliar with cultured meat because at the time of the experiment no products had become commercially available on the consumer market and because cultured meat had only limited press coverage. This made cultured meat an unfamiliar attitude object with a limited knowledge structure.

2.1. Material and methods

2.1.1. Participants and design

A Solomon four-group design, with an experimental 2 (positive versus negative information about cultured meat) x 2 (pretest versus no-pretest) between subjects design was conducted. For each individual, the implicit and explicit attitudes toward cultured meat were measured. Participants were Wageningen University students who spoke fluent Dutch. They received a two euro university cafeteria voucher. Data of 203 participants were collected in the fall of 2012. Thirteen participants were excluded from the

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