Research report

Is the desire to eat familiar and unfamiliar meat products influenced by the emotions expressed on eaters’ faces?

S. Rousset, P. Schlich, A. Chatonnier, L. Barthomeuf, S. Droit-Volet

Abstract

The aim of the present study was to test if the social context represented by eaters’ faces expressing emotions can modulate the desire to eat meat, especially for unfamiliar meat products. Forty-four young men and women were presented with two series of photographs. The first series (non-social context) was composed of eight meat pictures, four unfamiliar and four familiar. The second series (social context) consisted of the same pictures presented with eaters expressing three different emotions: disgust, pleasure or neutrality. For every picture, the participants were asked to estimate the intensity of their desire to eat the meat product viewed on the picture. Results showed that meat desire depended on interactions between product familiarity, social context and the participant’s gender. In the non-social context, the men liked the familiar meat products more than the women, whereas their desire to eat unfamiliar meat products was similar. Compared to the non-social context, viewing another person eating with a neutral and a happy facial expression increased the desire to eat. Furthermore, the increase in the desire to eat meat associated with happy faces was greater for the unfamiliar than for the familiar meat products in men, and greater for the familiar than for the unfamiliar meats in women. In the presence of disgusted faces, the desire to eat meat remained constant for unfamiliar products in all participants whereas it only decreased for familiar products in men.

Keywords: Eating; Emotion; Meat; Faces; Familiarity

Introduction

The sensory aspects of foods elicit emotional reactions of pleasure or disgust that are often considered as major reasons for the choice and the preference of foods (Eertmans, Baeyens, & Van den Bergh, 2001; Meiselman & Rivlin, 1986; Rozin, 1990). Dislike of a food thus leads to its rejection. However, according to Rozin and Fallon (1980), three psychologically meaningful categories explain food rejection: distaste, danger and disgust. Distaste is produced by the dislike of the appearance, taste or smell and/or texture of food. Danger is associated with the harmful consequences of ingestion. Disgust is generated on both ideational grounds and the distaste produced by contamination or by the intake of inedible foodstuffs.

Food avoidance, a related but different topic concerns the process of rejection of unfamiliar food. This is related to neophobia, the reluctance to try unfamiliar foods, and the willingness to taste familiar rather than unfamiliar foods (Pliner & Hobden, 1992; Pliner, Latheenmaki, & Tuorila, 1998). Among the causes of neophobia are the fear of experiencing a bad taste and/or of being poisoned, as well as the fear of new experiences, more closely related to personality traits. Regardless of the case, reactions to unfamiliar animal foods, particularly meats, would also be mediated by the strong basic emotion of disgust (Pliner & Pelchat, 1991). To decrease neophobia, the authors proposed either to force exposure to an unfamiliar food in order to confirm or not the expectation of unpalatability (Pliner, 1982; Pliner & Hobden, 1992; Zajonc, 1968;
Zajonc, Markus, & Wilson, 1974), to associate this food with pleasant or familiar tastes by conditioning, or to provide information about these foods (Martins, Pelchat, & Pliner, 1997). To date, however, the possibility of decreasing or increasing neophobia in the social context by the presence of another person or other people expressing different emotions towards the unfamiliar food products has been rarely empirically studied.

Since Lewin (1958), study in the power of the social context has been demonstrated on the change in eating habits, notably concerning disliked foods such as beef heart, sweetbread and kidneys. This author tested the influence of two types of intervention (individual and group) on housewives. In the individual case, only 3% of the women as opposed to 32% in the group case actually tried these meats. Although several factors explained these results, Lewin emphasized the influence of the social group and the difficulties of individuals to differentiate themselves too much from the group. As he said, the individual is likely to change only if the group changes (Lewin & Grabbe, 1945).

The effect of social influence in the domain of eating is now well known (for a review see Herman, Roth, and Polivy (2003)). Notably, modelling studies suggested that the presence of others may facilitate or inhibit intake, depending on how much the model(s) eat(s). For example, Rosenthal and McSweeney (1979) showed that when a model ate either 40 or 10 crackers, participants ate more when paired with a high-consumption confederate than when paired with a low consumption confederate. The presence of others influences not only the amount of food eaten, but also the choice of the consumed food, as shown by Birch (1980). In her experiment, a ‘target’ child preferred vegetables A to B, while all of the other children at the same table preferred vegetables B. During four successive meals, the two vegetables were offered. When the target child serves himself first, he generally chooses vegetable A (in 80% of the cases). On the other hand, when he serves himself last, he tends to imitate the others and chooses vegetable B in 67% of the cases. Birch did not draw any conclusions from the respective effects of simple exposure to the vegetables, the emotional context of the meal or the mimicking of behaviour. As regards the impact of modelling on willingness to eat novel foods, Harper and Sanders (1975) showed that more children were willing to taste a novel food if the adult model tasted it first than if it was only offered. Moreover, when adult participants were exposed to eater models who ostensibly chose novel foods among familiar and unfamiliar foods, participants were more often inclined to choose novel foods than when they viewed models choose familiar foods (Hobden & Pliner, 1995). In their works, Birch (1980), and Harper and Sanders (1975) did not control the influence of emotions expressed by the children’s or adults’ faces on the target child’s willingness to taste the vegetables or the novel food. Conversely, Hobden and Pliner (1995) obtained their results while showing models who expressed neutral faces during the choice and tasting of food products.

In non-specific nutrition-related domains of research, it is well known that the perception of emotions expressed by faces plays an important role on our own emotions (Adolphs, Damasio, Tranel, Cooper, & Damasio, 2000; Decety & Chaminade, 2003; Gallese, 2003). Indeed, ‘emotional contagion’ results from conscious appraisal, but also from more automatic mechanisms inaccessible to awareness, such as the automatic imitation of facial expressions in others (Hatfield, Cacioppo, & Rapson, 1994). The recent embodiment theories of cognition hold that the encoding of incoming emotional information involves an internal simulation of the perceived entities (e.g., imitation of the facial expression) with all of its physiological implications such as matching of emotional state (see Barsalou, Nidenthal, Barby, & Ruppert, 2003; Niedenthal, Barsalou, Winkielman, Krauth-Gruber, & Ric, 2005, for a review). For example, in an fMRI study, Phillips et al. (1998) showed that the perception of facial expression of disgust produced activation of the anterior insula, directly involved in the physiological reaction of disgust. In the same way, Adolphs, Tranel, and Damasio (2003) reported on patients with damage affecting the insula who clearly showed selective impairment in recognizing facial expressions of disgust and in their sensitivity to disgust. Since the discovery of the mirror-neuron system (Gallese, 2005), there is now evidence that observing or just imagining a person in a particular emotional state automatically arouses this state with all of the somatic and associated sensory-motor responses (Craig, 2002; Rizzolati, Fadiga, Fogassi, & Gallese, 2002; Singer et al. 2004).

In short, the different studies described above suggest the important power of social context on the amount of food eaten and on the evaluation of liking or disliking food products, especially in the case of rejection of unfamiliar food and, more particularly, unfamiliar meat. The aim of the present study was thus to investigate the possibility of changing the participants’ desire to eat a food product by the presence of other people expressing and arousing different specified emotions. More precisely, we tested how emotional facial expressions (pleasure, neutrality and disgust) affect the participants’ desire to eat four familiar and four unfamiliar meat products. We expected that eaters’ faces expressing pleasure would increase the desire to eat meat, compared to those expressing neutrality and disgust, and inversely for the faces expressing disgust. Considering the rejection of novel food, we hypothesized that the participants should have less desire to eat unfamiliar than familiar products. Furthermore it might be possible that the change in desire to eat would be greater for unfamiliar than for familiar meat products because participants did not have any previous sensory experience with these new foods that would influence the importance of emotional context in the changes in neophobia. Finally due to an in-group advantage (Durrett & Levin, 2005), i.e.,
the tendency to imitate more members of our own group, we also assumed that the gender of the eaters might influence the responses of the participants.

Method

Participants

In December 2004, a convenience sample was recruited in Clermont-Ferrand (France) through advertising in the local newspapers, TV and displays in stores (supermarkets). Among the subjects who phoned, 95% agreed to participate in the experiment. Eighty-eight young people, 44 men and 44 women, were recruited outside of our laboratory, with a mean age of 24.5 (SD 2.9). The mean body mass index (BMI) for men and women was 22.5 (SD 2.9) and 20.1 (SD 2.4), respectively. Participants were not receiving medical treatment for any progressive illness. They received a payment of €20 as compensation.

Materials and their validation

Pictures

The stimulus set consisted of eight pictures of meat products and 18 of the emotional facial expressions of models (three men and three women expressing pleasure, neutrality and disgust). All the pictures were taken with a digital camera (Canon Power Shot G3, 4.0 Mega pixels, objective lens 7.2–28.8 mm 1:2.0–3:0) with a high-angle shot in order to show large objects in detail. These photographs were selected from a larger set of photographs on the basis of two pre-tests, one for the meat products and the other for the emotional expressions of the models. For each pre-test, additional participants were recruited as explained below.

Pre-test of pictures of meat products

Two categories of meat products were tested: unfamiliar versus familiar meat products. Four unfamiliar beef products were prepared by a technical centre (Association de Développement de l'Institut de la Viande): ‘dry ham’, ‘cooked sausage with vegetables’, ‘cooked sausage with 5% fat’, and another ‘cooked sausage with 15% fat’. Four familiar pork products were purchased in a supermarket. They were bacon, dry sausage, cooked sausage and pistachio galantine. These food products were displayed on a simple white plate placed on a table covered with a beige tablecloth (Fig. 1). These eight photographs had been previously assessed by 24 participants with a mean age of 26 (SD = 4, 13 women and 11 men). Each participant rated each photograph on perceived familiarity and classified meat products into one of the three meat types (fresh meat, processed pork and offal). Familiarity was assessed on a seven-point scale (from 0, “not familiar at all”, to 6, “extremely familiar”). The ANOVA (effect of products nested according to the category: unfamiliar vs. familiar products on the ratings of familiarity) shows that the familiarity scores of the four familiar meat products were higher than those of unfamiliar meat products: 4.3 vs. 2.1, p = 0.03. Moreover, the familiar and unfamiliar meat products were classified by 93% and 75% of participants as processed meat, respectively.

Pre-test of pictures of facial expressions

Ten models, five men (mean age: 24) and five women (mean age: 25) with a standard body mass index between 19 and 25 were recruited for the photographs. Sixty photographs of these ten subjects showing three different emotional expressions—neutrality, disgust and pleasure—were taken twice under standard conditions (Fig. 2). These photographs were then evaluated by 21 additional participants (ten men and 11 women, mean age: 25 (SD = 3). Photographs were presented in random order to the participants. They rated each face on the basis of nine emotional expressions: anger, disgust, fear, sadness, guilt, surprise, interest, satisfaction and pleasure (Ekman, Levenson, & Friesen, 1983). The term ‘without emotion’ was also added to the nine emotional expressions to illustrate neutrality. For each emotion, the participants responded on a seven-point scale (0, “the face does not express this emotion”, to 6, “the face strongly expresses this emotion”).

Fig. 1. Examples of familiar and unfamiliar meat products.
A principal component analysis (PCA) computed on the covariance matrix was carried out with the mean intensities of emotional words for each photograph. The first two axes of the PCA accounted for 94% of total inertia, i.e., the information generated by all of the data (Fig. 3). The right part of the first horizontal axis was explained by “satisfaction”, “pleasure” and “interest”, which were opposed to “fear”, “sadness” and “guilt” (the left part of the first axis). The second vertical axis opposed “disgust” and “anger” at the top, to “neutrality” at the bottom. “Surprise” was poorly represented on the plot. In that emotional space, three distinct groups of faces appeared. The faces expressing pleasure were located on the right, those expressing neutrality at the bottom, and those showing disgust in the top left corner. This result clearly showed that the participants easily identified the three types of emotions mimicked by the models. Certain emotional face pictures (W1P2, M5P2, W5P2, W1N2, M5D2, M3N1, W5D2, W4D1, M5D1, W1D1 and M1D1) located between the groups were less clearly identified. The results of the analyses of variance (eater’s face nested according to gender) for each emotion confirmed that there were significant differences in pleasure and disgust scores given to the 20 faces expressing pleasure and disgust, $F(18, 400) = 5.1, p < 0.0001$ and $F(18, 400) = 20.4, p < 0.0001$ for pleasure and disgust, respectively. However, there was little difference in the 20 neutral scores distinguishing neutral faces, $F(18, 400) = 1.5, p = 0.09$. The gender of the
photographed eater did not have a significant effect on the evaluation of disgust, $F(1, 18) = 0.02$, $p = 0.89$, pleasure $F(1, 18) = 0.97$, $p = 0.34$ or neutral expression, $F(1, 18) = 0.13$, $p = 0.72$.

Table 1 shows the scores of the faces that best expressed disgust, neutrality and pleasure, and that did not differ between themselves in each emotional category. We therefore eliminated M5 because of its lower score of expressiveness of disgust (2.1), W4 because its disgust score was slightly lower than those of the other subjects (4.3), and M3 and W5 because their pleasure scores (3.9 and 4.5) were lower than those of the others.

After the six eaters were selected on the basis of their validated emotional expressions (Fig. 2), photographs of their body seated at a table in front of a plate containing one of the eight meat contents were taken and subsequently attached to their heads using Photoshop (Fig. 4).

### Table 1

Intensity of emotions perceived from the six eaters that best expressed disgust, neutrality and pleasure

<table>
<thead>
<tr>
<th>Emotional expressions</th>
<th>Pleasure</th>
<th>Neutrality</th>
<th>Disgust</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Selected eater Men*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1</td>
<td>5.1</td>
<td>1.6</td>
<td>3.7</td>
</tr>
<tr>
<td>M2</td>
<td>4.1</td>
<td>1.7</td>
<td>3.0</td>
</tr>
<tr>
<td>M4</td>
<td>4.3</td>
<td>1.6</td>
<td>3.6</td>
</tr>
<tr>
<td>Selected eater Women*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W1</td>
<td>4.9</td>
<td>1.5</td>
<td>3.8</td>
</tr>
<tr>
<td>W2</td>
<td>5.3</td>
<td>1.3</td>
<td>3.8</td>
</tr>
<tr>
<td>W3</td>
<td>5.3</td>
<td>1.0</td>
<td>3.7</td>
</tr>
</tbody>
</table>

*The first two characters indicate the sex (M for men and W for women) and the code (no. 1, 2, 3 or 4) of the selected eater.

### Procedure

Subjects other than those used in the pre-tests participated in one session at the laboratory, each between 11:00 am and 2:00 pm or between 6:00 pm and 8:00 pm. They were only instructed that they had to watch meat pictures and to assess their desire to eat the products shown on the picture. Each participant was presented with two series of pictures on a computer, the order of the series being counterbalanced across subjects. The first series was composed of the eight meat products (four familiar and four unfamiliar). The second series included 48 pictures, i.e., two eaters (one man and one women chosen from among the six selected eaters and not always the same, depending on the participants) for the three emotional expressions (disgust, neutrality and pleasure), and this for the eight meat products. Within each series, pictures were presented in random order. For each picture, the participants assessed the intensity of their eating desire on a vertical and non-structured scale (from the bottom, “I have no desire to eat”, to the top “I have a great desire to eat”). Scores varied between 0 and 10. Both the pictures and the eating desire scale were presented on the same screen. After the participant scored his/her evaluation, the next screen appeared.

### Statistical analyses

We used three models of analysis of variance (repeated measurements GLM procedure of SAS), considering the successive evaluations of meat pictures by a given subject as repeated measurements. The first one was performed on the data of the first series of pictures (meat products in a non-social context). It was a $2^*2$ ANOVA run on the eating desire scale value (from 0 to 10) with participant’s gender as a between-subject factor, familiarity (familiar vs. unfamiliar) as a within-subject factor, and with their interaction. The four different meat products were
considered as replicates within each familiarity level. The following three analyses (2*2*2 ANOVAs) were carried out on the data with the same two factors (participant’s gender, familiarity), and an additional within-subject factor, i.e., the two-picture series: meat presented in the non-social and a one-out-of-three social context (neutral, pleasure or disgust expressions). This was done in order to test the effect of facial expressions in each emotional condition. In this analysis, the scores given to the pictures showing male and female eater models were averaged. In order to better understand interactions, we used other ANOVA models. For example, we performed an ANOVA with context and familiarity as within-subject factors and gender as a between-subjects factor, for each type of product (familiar vs. unfamiliar). Moreover, for each gender and level of familiarity, we carried out a repeated measures one-way ANOVA to determine the effect of context. The last four-way ANOVA (3*2*2*2) aimed to compare the three emotional facial expressions and assessed the impact of eater model and participant’s gender on meat eating desire, as well as product familiarity and their interactions.

**Results**

**Influence of participant’s gender and product familiarity on the desire to eat meat in a non-social context**

The repeated measures analysis of variance showed two main effects: product familiarity, \( F(1, 86) = 91.2, p < 0.0001 \), indicating that the familiar products elicited more desire to eat than the unfamiliar products (the first two bars in Fig. 5a and b). However, there was also a main effect of the participant’s gender, \( F(1, 86) = 3.8, p < 0.05 \), as well as a significant familiarity x gender interaction, \( F(1, 86) = 4.0, p < 0.05 \). This interaction indicated that the gender difference in the desire to eat meat products was greater for the familiar meat products, \( F(1, 86) = 6.0, p < 0.01 \), than for the unfamiliar products, \( F(1, 86) = 0.9, p < 0.4 \) (Fig. 5a and b). Thus, men wanted to eat meat products more than women, but only in the case of familiar foods.

**Comparison of the non-social and social context on the desire to eat meat**

**Non-social vs. social contexts: neutral faces**

Repeated measures analysis of variance showed two marginally significant effects of the participant’s gender and of the context without significant interaction between these two factors, \( F(1, 86) = 3.6, p < 0.06, F(1, 86) = 3.3, p < 0.07 \) and \( F(1, 86) = 0.15, p < 0.7 \), respectively. Moreover, the context x familiarity and the context x participant’s gender x familiarity interactions were significant, \( F(1, 86) = 5.6, p < 0.01, F(1, 86) = 16.3, p < 0.0001 \), respectively. To analyse this significant three-way interaction, we ran two-way ANOVAs with context and participant’s gender as factors for each product type taken separately.

For the familiar products, we observed a significant context x gender interaction, \( F(1, 86) = 4.7, p < 0.05 \). This interaction was due to the gender effect obtained in the non-social context, \( F(1, 86) = 6.0, p < 0.01 \), but not in the neutral social context, \( F(1, 86) = 1.8, p < 0.2 \) (the first four bars in Fig. 5a). Taking each gender separately and considering familiar products, the desire of men to eat in the presence of a neutral face did not significantly differ from the desire to eat in the non-social context, \( F(1, 43) = 2.4, p < 0.2 \) (the first and third bars in Fig. 5a). The same result was observed in women, \( F(1, 43) = 2.5, p < 0.2 \) (the second and fourth bars in Fig. 5a).

For the unfamiliar products, only the social context effect was significant, \( F(1, 86) = 8.5, p < 0.001 \). Regardless of the participants’ gender, the desire to eat unfamiliar meats was higher when presented in the neutral social context than in the non-social context (the first four bars in Fig. 5b).

**Non-social versus social contexts: faces expressing pleasure**

The main effects of social context and product familiarity were highly significant, and that of participant’s gender just significant: \( F(1, 86) = 14.4, p < 0.001, F(1, 86) = 14.4, p < 0.001 \) and \( F(1, 86) = 4.0, p < 0.05 \), respectively. However, the context x familiarity interaction, as well as the context x familiarity x participant’s gender interaction were also significant: \( F(1, 86) = 3.95, p < 0.05, F(1, 86) = 14.9, p < 0.001 \). When the products were familiar, men liked them more than women, as seen above in the non-social condition, \( F(1, 86) = 6.0, p < 0.01 \), but this gender difference disappeared when presented in a pleasant social context, \( F(1, 86) = 2.4, p < 0.2 \) (the first two bars and the fifth and sixth bars in Fig. 5a). For men, the context did not influence the desire score, \( F(1, 43) = 0.15, p < 0.7 \) (the first and fifth bars in Fig. 5a), whereas for women, the pleasant faces increased the scores compared to the non-social context, \( F(1, 43) = 7.46, p < 0.01 \) (the second and sixth bars in Fig. 5a). Conversely, when the products were unfamiliar, there was no significant gender difference in the non-social context, \( F(1, 86) = 1.8, p < 0.2 \) (the first two bars in Fig. 5b). However, the gender difference appeared when meats were presented in a pleasant social context, \( F(1, 86) = 4.0, p < 0.05 \) (the fifth and sixth bars in Fig. 5b). Moreover, the changes in desire to eat unfamiliar meat products in the presence of other people expressing pleasure compared to the non-social context was greater in men than in women: \( F(1, 43) = 15.8, p < 0.001 \) and \( F(1, 43) = 4.5, p < 0.05 \), respectively.

**Non-social versus social contexts: faces expressing disgust**

The main effects of participant’s gender, social context and their interaction were not significant: \( F(1, 86) = 2.8, p < 0.1, F(1, 86) = 0.1, p < 0.8 \) and \( F(1, 86) = 0.9, p < 0.4 \), respectively. However, the context x familiarity and context x familiarity x participant’s gender interactions were highly significant: \( F(1, 86) = 9.3, p < 0.01 \) and \( F(1, 86) = 12.3, p < 0.001 \). For familiar products, we observed
a significant gender × context interaction. As for neutrality and pleasure, there was a significant difference between men and women in the non-social context, with women having less desire to eat meat in this latter condition, but not when meats were presented in a disgust social context, $F(1, 86) = 1.2, p<0.3$ (the seventh and eighth bars in Fig. 5a). This was due to the decreased desire of men to eat familiar meat in the presence of disgusted faces, compared to the non-social context, $F(1, 43) = 9.8, p<0.01$, whereas the women maintained their lower desire to eat meat, $F(1, 43) = 0.17, p<0.7$. In contrast, no effect of gender, context or their interaction was significant in the case of the unfamiliar products. Thus, for the unfamiliar products, the desire to eat meat remained low both in and not in the presence of faces expressing disgust.

**Comparison of the three emotional facial expressions on desire to eat meat in the social context**

The main effects of emotional facial expressions (neutrality, pleasure and disgust) and of product familiarity were highly significant on the desire to eat, $F(2, 172) = 13.3, p<0.001$ and $F(1, 86) = 78.5, p<0.0001$, but the participant’s gender and eater’s gender had no major effect. No two-way, three-way or four-way interactions

---

Fig. 5. Effect of the neutral, pleasant and disgust social contexts compared to the non-social context on the desire to eat (a) familiar meats and (b) unfamiliar meats in male and female participants. (Mean ± Confidence Interval: 95%). – – – Line showing men’s desire to eat in non-social context. – – – Line showing women’s desire to eat in non-social context.
were significant except the familiarity × eater’s gender interaction, $F(1, 86) = 5.6, p<0.05$. Thus, in the social context, regardless of the facial emotion perceived, the familiar meat products were preferred to unfamiliar meat products (means 4.8 vs. 3.1). As expected, the two-by-two face comparison showed that the disgusted faces produced lower eating desire scores than those expressing pleasure (means 3.7 vs. 4.2), $F(1, 86) = 14.6, p<0.001$ or neutrality (means 3.7 vs. 3.9), $F(1, 86) = 11.1, p<0.001$. In contrast, the faces expressing pleasure increased the level of eating desire, compared to neutral facial expressions (means 4.2 vs. 3.9), $F(1, 86) = 11.8, p<0.001$. Moreover, the significant familiarity × eater’s gender interaction indicated that regardless of the participants’ gender, unfamiliar meat products received a higher eating desire score when a male eater was shown (means 3.2 vs. 3.0), $F(1, 86) = 8.77, p = 0.004$, whereas no difference between male and female eaters was observed for the familiar products (means 4.8 vs. 4.8), $F(1, 86) = 0.03, p = 0.86$.

**Discussion**

In the non-social context, the present study showed that the desire to eat meat was greater in men than in women in the specific case of familiar meat products. This lower desire in women might result from either disgust towards sensory characteristics of meat or be related to health, weight and/or ethical concerns (Audebert, Deiss, & Rousset, 2006; Kubberød, Ueland, Roodbotten, Westad, & Risvik, 2002; Lea & Worsley, 2002; Rousset, Deiss, Juillard, Schlich, & Droit-Volet, 2005). Indeed, some women reported disliking meat for its red colour, presence of blood and the flesh that reminded them of dead animals (Kubberød, Dingstad, Ueland, & Risvik, 2006; Lupton, 1996; Mooney & Walbourn, 2001). However, our study revealed that when the meat products were unfamiliar, the desire to eat meat also decreased in men who generally liked meat, to the point that there was no longer any observable difference between women and men in their eating desire. This result was consistent with those showing that lower liking is often observable for unfamiliar foods and particularly unfamiliar meat products (Pliner & Hobden, 1992; Pliner & Pelchat, 1991; Pliner et al., 1998).

It is of particular interest that our study suggested that the perception of another person’s face modified the desire to eat meat in both men and women. The present study revealed that the observation of an unknown eater, even if expressing a neutral emotion, increased the desire to eat meat, and this to a greater extent for unfamiliar meat products. Watching another person eating was thus sufficient to increase the desire to eat. This result is consistent with the modelling studies in which the model’s behaviour (who ate more or less) influenced the amount of food eaten by the participant who imitated the model’s behaviour, independent of whether or not the participant was on a diet or hungry (Goldman, Herman, & Polivy, 1991; Rosenthal & McSweeney, 1979). Although our study deals with the desire to eat and not with the amount of food eaten, it provided results consistent those of studies showing the widely observed inclination of individuals to eat in the same way as others did. According to Leary, Tchividijian, and Kratzerberger (1994), social intake norms may be a strong determinant of eater’s behaviour, probably stronger than physiological signals (hunger, satiety). However, as stated by Herman et al. (2003), the modelling effects remain a mystery.

The main contribution of our study was to demonstrate that not only the presence of the eater models but the emotion that they expressed affected the participants’ desire to eat. Indeed, the participants wanted to eat the meat products more when they viewed the models with expressions of pleasure than with neutral expressions. Conversely, they had less desire to eat meat products when the models showed expressions of disgust rather than neutral ones. Thus, the pleasure faces could have suggested to the participants that the food tasted good, and the disgusted faces could have suggested that the food tasted bad. Consciousness of such information should increase or decrease individuals’ willingness to taste foods. However, as explained in the introduction, a more automatic and less conscious process could also be involved. According to embodiment theory, the observation of emotions expressed by other people’s faces induced the physiological reactions associated with this emotion in the individuals (Barsalou et al., 2003; Niedenthal et al., 2005). As suggested by Dimberg (1982, 1990), the perception of positive and negative facial expressions induces spontaneous mimicry that in turn produces the corresponding emotional state and influences the emotional attitude towards the context. Thus, via an imitation process, the facial expressions of others play an important role on our own emotions (Adolphs et al., 2000; Décy et Chaminade, 2003; Galáse, 2003). Further investigations using electromyography methods are now required in order to test whether eater models’ facial expressions induce facial reactions in the participants. Such a study might prove that the emotion perceived in other people modulates the emotion elicited by the food products themselves.

Our study also suggested that the influence of facial expression on the desire to eat depended on the type of food products and on the participant’s gender. In the case of familiar meat products, compared to the eating desire assessed in the non-social context, our results revealed that positive emotion increased the desire to eat in the subjects expressing a low eating desire (i.e., women), and the negative emotion decreased this desire in the subjects expressing a high eating desire (i.e., men). However, the desire level in the presence of pleasant faces did not change when the subjects (i.e., men) already liked the products. In the same way, the desire level in the presence of disgusted faces did not change when the subjects (i.e., women) disliked them.

Regarding the desire of eating unfamiliar products in the non-social context, the scores were similarly low in men
and women (lower than 3 out of 10). In the social context of faces expressing pleasure, the scores given by men and women were improved. However, men increased their scores more than women. Thus, in a non-familiar situation of unfamiliar food, men were more influenced by positive facial information than women were. This raises the question of the stronger inclination of men to follow the group than women in the case of unfamiliar food products. On the one hand, Klesges, Bartsch, Norwood, Kautzman, and Haugrud (1984) found that social facilitation of eating (increase in eating in the presence of others) is generally stronger in men than in women. Moreover, one study by Hobden and Pliner (1995) showed that when participants had to choose between a novel and a familiar food product, men chose novel foods more often than women, which is consistent with our data. The behaviour of men towards unfamiliar food may also be associated with their lower risk perception in general. Men are less afraid, assess most risks lower and worry about them less than women (Fagerli & Wandel, 1999; Williams & Hammitt, 2001). Another plausible reason might be that men may be more prone to test unfamiliar meat because they like meat in general. In contrast, women were more influenced by positive emotions for familiar rather than non-familiar meat products. Because they did not like meat a lot, they might have had little desire to try unfamiliar meat.

Surprisingly enough, the present study also suggested that the social influence on the desire to eat meat products varied as a function of the gender of the model observed. Indeed, regardless of the participant’s gender, unfamiliar meat products were judged as more desirable when the other person eating these products was a man instead of a woman. Few studies of social learning in humans have considered the roles played by the gender of the individual (Choleris & Kavaliers, 1999). As regards human eating behaviour, Mory, Chaiken, and Pliner (1987) showed that participants ate less when the eating companion was of the opposite sex. Moreover, Pliner and Chaiken (1990) showed that women ate less when the eating companion was a man and when he was most desirable. Their behaviour may be attributed to an attempt to convey an impression of femininity. However, no study has yet focused on the gender effect on desire/consumption of an unfamiliar food. In the case of animals, Kawamura (1959) studied the transmission of unfamiliar behaviours in Japanese monkeys, which suggested the existence of social constraints on the channelling of socially mediated learning. When a unfamiliar behaviour was invented by an adult male and subsequently acquired by the dominant male, its transmission through the group was faster.

In conclusion, our study showed the influence of social context on desire to eat meat products. Moreover, this influence differed according to the familiarity of the concerned food, the desire to eat meat products in a non-social context and the participant’s gender. Men were more easily influenced than women by the social context of pleasure in the case of unfamiliar meats, for which the desire score was low in a non-social context. In contrast, the social influence was stronger for women on their desire to eat familiar rather than unfamiliar meats. Thus, it might be easier to improve their desire to eat meat by using social influence rather than by creating unfamiliar meat products. Future research should seek to determine the effect of facial expressions on the desire to eat a wider range of foods such as palatable versus less palatable food products. Further experiments should be done to compare the impact of emotion and social context not only on the desire to eat, but also on food liking in relation to consumption.

Acknowledgments

We are grateful to Benjamin Charpy for his valuable photographic work, to E. Juillard for her technical assistance, and to Stephanie Meritet and Alexandra Tabouji-Beji (graduate students in ‘Statistics and data treatment’) for the statistical analyses. This work was supported by two grants, one from the Regional Council of Burgundy and INRA DADP, and the second from the Agence Nationale de la Recherche (ANR Blan06-2-145908 FaceExpress).

References


