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Looks like chicken: Exploring the law of similarity in evaluation of foods of animal origin and their vegan substitutes

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ABSTRACT

Eighty omnivorous college students (four groups of 20) given chocolate milk, macaroni and cheese, chicken tenders and meatballs, or vegan substitutes for those four foods, were told either that they were eating the animal products or vegan substitutes. We expected the subjects who were told that they were eating vegan foods to rate those foods as less familiar and therefore expected them to be less willing to try them. We also thought that the subjects would expect those foods to taste worse and be more dangerous and disgusting, particularly the "flesh foods" and their vegan substitutes (chicken tenders and meatballs). Prior to eating the products, no difference was found in ratings of familiarity, willingness to try, anticipated distaste, danger, or disgust between those subjects shown the products of animal origin and those shown the vegan substitutes for those products nor between subjects told they were viewing animal or vegan products. However, there were differences between the meatball and the other foods on these measures regardless of what they were told about them (animal or vegan). All meatballs were rated as less familiar and more disgusting than the other foods and more dangerous than the chicken tender. Subjects expected the meatballs to taste worse than the other foods and were less willing to try them. Once they tasted the products, they rated the taste of the foods they were told were vegan better than those they were told were of animal origin. Vegan products that resemble animal products are responded to similarly to their animal counterparts as predicted by the law of similarity, one of the laws of sympathetic magic.

Introduction

Humans are omnivores and eat many different foods including both animal and plant products. Although many foods of both types are widely accepted, rejection of both types of food items is common. Rozin and Fallon (1980) proposed three categories of reasons for food rejections: sensory-affective reasons (distaste), anticipation of bodily harm (danger), and ideational factors (inappropriate and disgust).

The rejection of a food based on sensory-affective reasons occurs when the subject expects the food to possess negative sensory qualities such as a bad taste, texture or odor. This is called "distaste." Distaste is a common reason for rejection of plant-based foods (Glasson, Chapman, & James, 2010; Lucan, Barg, & Long, 2010) possibly in part because of the presence of bitter components in many plants (Drewnowski, Henderson, & Barratt-Fornell, 2001). However, distaste has not been found to be a primary reason for rejection of animal-based foods (Kubberod, Ueland, Tronstad, & Risvik, 2002; Mooney & Walbourn, 2001).

If a subject anticipates some unpleasant consequence following consumption of the food, the rejection is categorized as dangerous (Rozin & Fallon, 1980). In the case of "danger", subjects expect that some bodily harm, either short term (e.g., gastrointestinal distress) or long-term (e.g., heart disease) will result if they consume the food. Foods rejected for this reason are not necessarily expected to taste bad (Fallon & Rozin, 1983). Rejection due to danger often comes from food allergies (Rozin & Fallon, 1980). Although many danger-based food rejections occur to plant-based food because of food allergies (e.g., peanuts, gluten), rejection of animal-based foods due to danger is also common (Martins & Pliner, 2005). Gastrointestinal distress due to consumption of dairy products occurs in many people due to lactose intolerance. In addition, eating of animal-based foods has been associated with an increase in heart disease and weight gain and these foods are often rejected for these reasons (Lea & Worsley, 2002; Mooney & Walbourn, 2001).

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Ideational factors can result in two kinds of rejections (Fallon & Rozin, 1983; Rozin & Fallon, 1980). Foods can be considered as "inappropriate" if the culture does not consider those items to be food (Rozin & Fallon, 1980). These are items that elicit little affect and are not thought to be particularly bad-tasting (Rozin & Fallon, 1980). So, for example, tree bark would be classified as inappropriate in most cultures. On the other hand, ideational factors can cause foods to be rejected because they are considered "disgusting" (Rozin & Fallon, 1980). In this case, knowledge of its source results in the food being rejected (Fallon & Rozin, 1983). Unlike inappropriate foods, disgusting foods result in negative affect and are expected to be bad-tasting Fallon & Rozin, 1983). In fact, the literal meaning of disgust means "bad taste." Disgusting items have the ability to contaminate other items and are usually animal or animal products (Angyal, 1941; Rozin & Fallon, 1987).

Disgust for animal-based foods is influenced by their degree of "animalness" and the degree to which they remind us that their source was a living animal (Angyal, 1941; Martins & Pliner, 2006; Rozin & Fallon, 1987). Disgust responses to meat are greater if the meat is presented in such a manner as to increase the association of a meat with the animal source (e.g., showing cuts of raw chicken such a legs and wings versus pieces of cut-up chicken cooked in a dish containing other foods, Kubberod, Dingstad, Ueland, & Risvik, 2006).

Not only the presentation of animal foods (e.g., small pieces versus whole body parts), but also the type of animal foods affects the elicitation of disgust. For example, Kubberod et al. (2006) found that raw red meat elicits more disgust than does chicken (see also Kubberod et al., 2002). Rozin and Fallon (1980) found that although milk is clearly of animal origin, it fell into the distaste rather than disgust category (except for human milk). Thus, it appears that not all foods of animal origins elicit the same level of disgust. Red meat is more likely than chicken or non-meat animal products such as milk or cheese to elicit disgust. The more meat reminds people of animals the more likely it is to elicit disgust.

Recently, vegan substitutes for animal-based foods have become available (McIlveen, Abraham, & Armstrong, 1999). There are various vegan substitutes for cows' milk, including soy, almond and rice milks. There are also yogurt, cheese, chicken, and red meat vegan substitutes made of soy and/or other vegetable-based ingredients. Many of these products are made to resemble specific animal-based foods. For example, there are vegan "meatballs", "beef tips", and "chicken tenders".

Rozin, Millman, and Nemeroff (1986) have shown that objects made to resemble disgusting objects elicit disgust through the law of similarity, one of the laws of sympathetic magic (Frazer, 1959; Mauss, 1972; Rozin & Nemeroff, 1990). Rozin et al.'s subjects rated their desire to eat some fudge in the shape of a muffin higher than the same fudge in the shape of dog feces. According to the law of similarity, things that look alike have the same properties or essence. Therefore, it is possible that non-animal foods that resemble animal foods cause the same reactions as seen with animal foods, including disgust. This might be particularly true for meat substitutes that are processed such as "balls", "burgers", "sausages", and "coated" items since the animal and non-animal versions of these foods are considered to be from the same food category (Hoek, van Boekel, Voordouw, & Luning, 2011) and therefore similar.

In addition to affecting ratings of disgust, the law of similarity should affect other aspects of a food such as willingness to try it, distaste, danger and liking. Rozin et al. (1986) found that subjects were less willing to taste sugar from a jar they had labeled "poison" than from another jar possibly because they considered it to be dangerous to eat. Tuorila, Meiselman, Bell, Cardello, and Johnson (1994) found that similarity of a novel food to a familiar, already liked food can also increase liking for the novel food once tasted.

The novelty of vegan substitutes relative to their animal counterparts among individuals who are not vegan, might also influence evaluation of these foods. If vegan substitutes are considered to be novel it might be expected that, as with other novel foods, people would expect them to taste unpleasant and be dangerous (Pliner, Pelchat, & Grabski, 1993). People would thus be less willing to try these foods than they would be to try their more familiar animal-based counterparts. Hoek, Luning, Weijzen, Engels, Kok, and de Graaf (2011) did find unfamiliarity to be the most important reason for not eating meat substitutes. In addition, as with other novel foods, once people taste them they might rate them as more unpleasant than the more familiar foods (Birch & Marlin, 1982; Pliner, 1982).

The effect of neophobia on disgust, danger, and distaste reactions and unwillingness to try vegan foods that resemble more familiar animal products might actually be less than if these products did not resemble familiar animal foods. That is, similarity of a vegan substitute to a familiar animal food might reduce neophobia and therefore increase willingness to try and liking for the food. The more a vegan food shares sensory properties with a more familiar animal food the more it might be found acceptable (Hoek et al., 2011). For example, an imitation chicken tender might be more accepted than the same ingredients not shaped like a chicken tender. This similarity might make people more willing to taste it because it looks like a real chicken tender and also make them like it more.

Just thinking that a food is either of plant or animal origin might affect liking for the food. If neophobia increases disgust, danger, and distaste reactions and decreases willingness to try and liking for the food, telling subjects that a food is the more familiar animal product might affect the evaluation of the food in a positive way. On the other hand, telling subjects that a product is a less familiar vegan substitute might have a negative impact. Labeling has been shown to affect liking ratings of foods (Guinard, Uotani, & Schlich, 2001; Pliner & Pelchat, 1991; Torres-Moreno, Tarrega, Torrescasana, & Blanch, 2011) and food odors (De Araujo, Rolls, Velazco, Margot, & Cayeux, 2005; Herz & von Clef, 2001; Zellner, Hoer, & Feldman, 2014). If foods are labeled in such a way as to indicate a superior product they are more positively evaluated.

Visual similarity of a vegan food to a familiar animal product and labeling it as such should only increase liking for the vegan food if the food is good enough to be accepted as the animal product. If the taste, texture, or other sensory quality of the food is not what the subjects expects, a decrease in liking might occur (Zellner, Strickhouser, & Tornow, 2004).

The present study investigated people's willingness to try, and their ratings of disgust, danger, and distaste for animal and non-animal (vegan) versions of foods that they were told were either vegan substitutes for animal products or the actual animal products. Four types of foods were presented to each subject. The foods were either a vegan or animal version of chocolate milk, macaroni and cheese, chicken tender, or meatball. After eating the foods the subjects also rated their liking for the foods.

If the vegan versions of the foods are more unfamiliar than the animal versions, we expect less willingness to try the foods subjects think are vegan, lower ratings of liking for the taste and higher ratings of danger (Pliner et al., 1993) and distaste (Martins & Pliner, 2005) for those foods. We expect to see more disgust for the flesh foods (chicken tender and meatball) than either the milk or cheese (Pliner & Pelchat, 1991). This should be true of both the vegan and animal-based foods and the foods that people are told are animal-based and those they are told are vegan due to the similarity in the look and name of the foods due to sympathetic magic. The disgust ratings might be higher for both the vegan and animal-based meatball than for the other foods since it is a red meat or red meat substitute. Vegan foods also might