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**Am I too cute to eat? The effect of cuteness appeal  
on the promotion of a more plant-based diet**

Dissertation submitted as partial requirement for the conferral of  
*Master in Social and Organizational Psychology*

by

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## Resumo

Reduzir o consumo de carne e adotar uma dieta mais baseada em alimentos de origem vegetal está associada a várias vantagens (e.g., sustentabilidade ambiental, saúde pública, bem-estar animal, etc.). No entanto, parece existir uma lacuna na investigação sobre os processos psicológicos que podem impedir (ou facilitar) esta transição. No presente estudo investigamos se a associação entre a comida e o animal que a originou poderá ser uma estratégia eficaz na promoção de uma dieta mais baseada em alimentos vegetais e se tal pode influenciar a avaliação dos indivíduos face a refeições com carne. Através de um estudo experimental, manipulámos a associação animal-carne (AMA) através da apresentação de imagens de um animal (porco), apresentado com dois níveis de *cuteness* (alto vs. baixo), juntamente com imagens de refeições (com carne porco como ingrediente principal). Adicionalmente, também analisámos se a dessensibilização face ao uso de animais para fins alimentares e a atribuição de capacidades mentais ao animal em análise têm um papel mediador nestas relações. Um total de 201 participantes (omnívoros) foram incluídos na análise (68.8% mulheres,  $M_{idade} = 26.23$ ;  $DP = 7.81$ ) e distribuídos aleatoriamente por uma de três condições: (1) AMA com um animal muito *cute*; (2) AMA com um animal menos *cute*; (3) e uma condição de controlo (i.e., nenhum animal foi apresentado). Os nossos resultados sugerem que a AMA e o nível de *cuteness* do animal podem desempenhar um papel crítico e consistir abordagens eficazes para promover a disposição em adotar uma dieta mais baseada em produtos de origem vegetal, afectando negativamente a avaliação de refeições com carne. O efeito mediador da dessensibilização foi também confirmado: AMA conduziu a uma menor dessensibilização e consequentemente a uma avaliação mais negativa face a refeições com carne, bem como a uma maior disposição em adotar uma dieta mais baseada em vegetais. Os resultados revelaram ainda que a AMA não influenciou a atribuição de capacidades mentais, e que uma maior atribuição de capacidades mentais ao animal em análise levou a uma maior disposição para adotar uma dieta mais baseada em vegetais. Esta atribuição de capacidade mentais não afetou a avaliação das refeições. Estes resultados poderão informar iniciativas que promovam a transição para uma dieta mais baseada em produtos de origem vegetal, bem como trazer algumas orientações para a comunicação utilizada em organizações ambientais e outras entidades que promovem o bem-estar animal.

**Palavras-chave:** Associação animal-carne, *cuteness*, dieta baseada em produtos de origem vegetal, atribuição de capacidades mentais, dessensibilização.

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**3900** Psicologia do Consumidor

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## Abstract

A transition towards reduced meat consumption and a more plant-based diet (PBD) has several advantages (e.g., environmental sustainability, health promotion and animal welfare). However, research on the psychological processes that may hinder (or facilitate) this shift is still scarce. We investigated whether the association between the food and the living animal is effective in the promotion of a more PBD, and if the association influences individuals' based-meat meals appraisal. In this experiment, we manipulated animal-meat association (AMA) through the presentation of pictures of an animal (pig), with two levels of cuteness (high vs. low), along with images of (pork) meals. We also examined whether desensitization and mind attribution mediate these relations. A total of 201 meat-eaters were included in the analysis (68.8% female,  $M_{\text{age}} = 26.23$ ;  $SD = 7.81$ ) and randomly assigned to one of three conditions: (1) AMA with a very cute animal; (2) AMA with a less cute animal; (3) and a control condition (i.e., no animal picture presented). Our findings suggest that AMA and animals' cuteness may be effective in promoting willingness to follow a more PBD. AMA and animal cuteness also affected participants' appraisal of meat meals. The mediator role of desensitization was confirmed: AMA led to lower desensitization and consequently to more negative appraisal towards meat-based meals, and to more willingness to follow a PBD. However, AMA did not predict mind attribution. Mind attribution positively influenced willingness to follow a PBD, but did not affect meals appraisal. These findings may be used to inform communication strategies in order to promote a more PBD and also communication applied by environmental and animal welfare organizations in order to promote animal welfare.

**Key-words:** Animal-meat association, cuteness, plant-based diet, desensitization, mind attribution.

**American Psychological Association (PsycINFO Classification Categories and Codes):**

**3900** Consumer Psychology

**3920** Consumer Attitudes & Behavior

**4000** Environmental Psychology





## Index

INTRODUCTION .....	1
<b>Meat consumption: General trends</b> .....	1
<b>Dissociation and association in meat consumption and substitution</b> .....	2
<b>Cuteness in meat consumption and substitution</b> .....	4
<b>Mind attribution and desensitization in meat consumption and substitution</b> ....	7
<b>Present study: aims and hypotheses</b> .....	9
CHAPTER I	
<b>Pre-test</b> .....	11
Method .....	11
Participants .....	11
Materials .....	11
Measures .....	12
Procedure .....	12
Results .....	12
CHAPTER II	
<b>Experiment</b> .....	15
Method .....	15
Participants and design .....	15
Materials .....	15
Measures .....	16
Procedure .....	17
Results .....	20
CHAPTER III	
<b>Discussion</b> .....	27
CONCLUSION .....	35
REFERENCES .....	37
APPENDICES .....	43



## Index of Tables

Table 1. <i>Experimental design</i> .....	19
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## Index of Figures

<i>Figure 1.1.</i> Average values reported in the evaluation of pork meals (valence, recognizability and desire to eat) per condition (high cuteness, low cuteness and control) .....	20
<i>Figure 1.2.</i> Average values reported in willingness to follow a more PBD (to reduce meat consumption, to avoid eating meat and to follow a plant based-diet) per condition (high cuteness, low cuteness and control) .....	22
<i>Figure 1.3.</i> Mediation model for the effect of condition on willingness to follow a plant-based diet via mind attribution .....	24
<i>Figure 1.4.</i> Mediation model for the effect of condition on valence via mind attribution .....	24
<i>Figure 1.5.</i> Mediation model for the effect of condition on willingness to follow a plant-based diet via desensitization .....	25
<i>Figure 1.6.</i> Mediation model for the effect of condition on valence via desensitization .....	26



## **Index of Abbreviations**

PBD: Plant-based diet

AMA: Animal-meat association





## INTRODUCTION

### **Meat consumption: General trends**

A shift towards reduced meat consumption and a more plant-based diet may present benefits in terms of environmental sustainability (e.g., Aiking, 2014; Bryngelsson, Wirsenius, Hedenus, & Sonesson, 2016; Schösler, de Boer, & Boersema, 2011; Westhoek et al., 2014), public health and food security (e.g., American Dietetic Association, 2003; Friel et al., 2009) and animal welfare promotion (e.g., Foer, 2010; Fox & Ward, 2008; Plous, 2003). In spite of these advantages, many individuals do not appear to be willing to make this shift (Graça, Oliveira & Calheiros, 2015; Latvala et al., 2012; Schösler et al., 2011).

Global meat consumption has increased over the last 50 years, surging from an average of 61 daily grams per person in 1961 to 80 daily grams per person in 2011 (Sans & Combrins, 2015) and is expected to continue to increase (OECD/FAO, 2016). According to Instituto Nacional de Estatística (INE, 2016), meat consumption in Portugal has also been increasing. In 2015, each Portuguese consumer ate, on average, 111.2 kilograms of meat, which equals to about 305 grams per day. Importantly, this represents an increase of 3 kilograms of meat per person in comparison with 2014 and of 6 kilograms in comparison with 2013 (INE, 2016). That ranks Portugal as one of the countries with the largest meat consumption per capita, not only comparing with the remaining European Union, where last year each individual consumed about 68.3 kilograms of meat per year (187 daily grams), but also comparing with the average meat consumption worldwide (i.e., 34.1 kg or 93.4 g per capita, OECD, 2016).

Attending to this growing pattern, health organizations call for individuals to limit their intake of meat, particularly processed meat and red meat, which are the types that have been mainly associated to increased risks of several illnesses, including heart disease, obesity, diabetes and several types of cancer (Boada, Henríquez-Hernández & Luzardo, 2016; Lock et al., 2010; Pan et al., 2011; 2013; Popkin, Adair & Ng, 2012). Moreover, there are studies suggesting that plant-based diets can help attenuating health problems, such as heart disease (Campbell & Campbell, 2007; Ornish et al., 1998).

In addition to health promotion, a transition towards a less meat-based diet, along with a lower incidence on the consumption of animal source foods (e.g., meat, dairy), has also been proposed as a means to achieve a more sustainable diet (Machovina, Feeley, & Ripple, 2015; Schösler, de Boer, Boersema, & Aiking, 2015). For instance, Westhoek et al. (2014) have shown that substituting 25 to 50% of present EU intake of meat, dairy products and eggs

The effect of cuteness appeal on the promotion of a more plant-based diet

would lead to a decrease of 25 to 40% in greenhouse gases and approximately 40% in reactive nitrogen. Meat consumption has indeed been portrayed as a very significant trigger to environmental destruction caused by humans and identified as an “interesting target for interventions” to promote more sustainable lifestyles (Zur & Klöckner, 2014, p. 629).

Despite the benefits of shifting towards a more plant-based diet and reduced meat consumption, there have been few efforts concerning the study and the understanding of the processes that may be holding back this transition or that might potentially facilitate it (for a review see Graça, 2016).

To assist in expanding knowledge in this regard, the current study offers an innovative approach to the role that the association between the meat and the living animal might play in meat consumption and substitution.

### **Dissociation and association in meat consumption and substitution**

Due to the adverse outcomes of current and projected levels of meat consumption, it is relevant to analyze which barriers and processes may be hampering reducing meat consumption.

Previous studies have identified several barriers that may hinder a shift to adopt a more plant-based diet, namely: (a) a pattern of meat attachment, translated into a general enjoyment of eating meat and unwillingness to change eating habits (Graça, et al., 2015; Lea & Worsley, 2003); (b) barriers related with sensory properties, such as taste and texture (Bredahl, Grunert & Fertin, 1998; Kearney, & McElhone, 1999; Verbeke et al., 2010), lower sensory attractiveness and unfamiliarity towards meat substitutes compared to meat (Hoek et al., 2011); (c) lack of information about plant-based diets, their preparation and access (Johnson et al., 2014; Lea, Crawford & Worsley, 2006); (d) perceived (higher) cost of plant foods (Johnson et al., 2014); (e) cultural aspects, such as cultural impregnation of meat consumption in Western countries or the conception that humans are “meant” to eat meat (de Boer, 2006); (f) social concerns, such as difficulties related to the fact that one’s family or friends consume meat (Lea et al., 2003); and (g) quotidian individual concerns, such as lack of time to change habits or irregular working hours (Balch, Loughrey, Weinberg, Lurie & Eisner, 1997; Lappalainen, Saba, Holm, Mykkanen & Gibney, 1997).

One of the barriers that may play a critical (but understudied) role regarding the shift towards reduced meat consumption and willingness to change eating habits is the dissociation between a given type of meat (e.g., pork) and the respective animal (e.g., the pig).

Thinking about the living animal, about the livestock living conditions and the process of killing animals for food purposes, may elicit feelings of psychological tension, guilt and discomfort (Plous, 1993), when individuals experience the *meat paradox* – i.e., pleasure of eating meat but love for animals and concern for their welfare (Loughnan, Haslam & Bastian, 2010). Many omnivores are conflicted by this dilemma (Loughnan, Bastian, & Haslam, 2014), which frequently generates a state of a cognitive dissonance. This undesirable state stimulates looking for strategies to reduce the dissonance (Festinger, 1957). A way to cope with this paradox consists in rationalizing the choice of eating meat, for example, believing that eating meat is *natural, normal, necessary* (Joy, 2010) and *nice* (Piazza et al., 2015). Other strategies include categorization processes, such as categorizing animals as food, which induces to a perception that they are less sensitive to pain and undeserving of moral concern (Bratanova, Loughnan & Bastian, 2011). Another way to alleviate the unpleasant emotional state that this dissonance provokes is to dissociate the food on the plate from the living animal that originated that meal. Grauerholz (2007) explored in which ways meat industry erases the increasingly blurred link between the “food” and the “animals”, through a content analysis of commercialized images of animals. The author found that this dissociation comprises two main processes: (1) a depiction of meat that disguises its origin, in order to present a product that no longer resembles the living animal; (2) followed by a process called *cutification* (i.e., “making objects appear cuter than they usually appear”, p. 334) of animals, to endorse their consumption. In order to disrupt the dissociation potentiated by meat industry, animal welfare associations such as World Wide Fund for Nature (WWF) and Society for the Protection of Animals (ENPA) frequently design campaigns that enhance the association between the animal and the outcome product (e.g., food, fur clothing, cosmetics developed through animal testing).

The first process – dissociation – has been corroborated by several studies suggesting that individuals have a propensity to dissociate meat from its origin, removing the connection between the food on their plate and the animal that the meat derived from (Graça, Calheiros & Oliveira, 2016; Gray, 2015; Hoogland, de Boer, & Boersma, 2005; Kubberød, Dingstad, Ueland, & Risvik, 2006; Plous, 2003; Rothgerber & Mican, 2014; Tian, Hilton, & Becker, 2016). For example, Kubberød et al. (2006) studied the impact of the concept of animality, which refers to the proximity between the food and the living animal (e.g., redness and bloodiness of the meat, meals with distinct animal’ body parts), on consumers’ disgust response. One way this concept was operationalized was through the presentation of pictures of raw meat cuts (vs. pictures of prepared meals) in order to trigger the association between

the meat and the animal and then analyze its effect on consumers' emotional reactions. The more the meat stimuli were animalized and strongly resembled the living animal, more likely were to evoke disgust and to induce avoidance (Kubberød et al., 2006; Shimp & Stuart, 2004). Disgust can be very effective in producing such an avoidance reaction (Nabi, 1998). Indeed, studies have found that presenting cooked meat meals (vs. raw meat), or not showing the meat preparation process, disguise the intrinsic animalness of the product and reduces the association between the meat and the animal, which in turn makes individuals to perceive the meat with less disgust (Gregory, 1997; Rozin & Fallon, 1987).

Altogether, these results suggest that animal-food dissociation may become a strategy for people who include meat on their diets to avoid thinking about the origin of meat (Graça, Calheiros & Oliveira, 2014; Rothgerber et al., 2014; Vialles, 1994) and to better cope with the inconsistency behind the meat paradox, which arguably decreases the dissonance caused by liking meat but disliking animal suffering (Loughnan et al., 2010).

We propose that if the process of dissociation may help bolstering meat consumption, the process of association should promote the opposite effect, reducing consumers' positive appraisal of meat products and possibly facilitating their willingness to shift towards plant-based alternatives. To our knowledge, direct experimental evidences on the impact of association are still scarce. A relevant exception is a recent study that found that when participants were exposed to a meat-based recipe along with a picture of the animal that originated it (i.e., a cow), they revealed lower willingness to consume meat than individuals that were only exposed to the recipe (Tian et al., 2016). Moreover, animal-meat association might be promoted through several ways, attending, for example, to physical characteristics of the animal.

### **Cuteness in meat consumption and substitution**

Animal cuteness emerges as an interesting strategy to promote the association between the food and the living animal. But how to define cuteness? Cuteness may be described as a particular type of appeal that resorts to stimulus with specific babyish or infantile physical characteristics that are perceived as cute, such as large rounded head and big eyes. This set of features could be designated as "baby schema", a concept first introduced by the ethologist Konrad Lorenz (1943), which besides eliciting cuteness perception also motivates caretaking behavior (Glocker et al., 2009; Lobmaier, Sprengelmeyer, Wiffen & Perrett, 2010; Sanefuji, Ohgami & Hashiya, 2006) and behavioral tenderness (Sherman, Haidt & Coan, 2009).

According to Lorenz (1943), people have also a propensity to respond in more caring, affectionate and protective ways to perceived cute stimuli. For example, Glocker et al. (2009) conducted an experimental study where they asked participants to rate the cuteness level of several pictures of infants and their motivation to take care of them. Baby schema was operationalized by manipulating pictures of infants in order to produce versions of the same portray with different levels of baby schema (i.e., high vs. low), according to the facial features and anthropometric measures evolved by this concept (e.g., eyes and mouth size). Results revealed that high baby schema infants were evaluated as cuter and also produced higher motivation for caretaking behavior (Glocker et al., 2009).

Likewise, Bellfield et al. (2011) showed that the exposure to a cute stimulus (i.e., a picture of a cute infant in Experiment 1; holding a puppy in Experiment 2) positively influenced participants' response rate to surveys (about organ donation in Experiment 1 and about nutritional label of menus in Experiment 2) in comparison to control conditions in which the cute stimulus was absent. Note that in both experiments stimuli were not selected based on the baby schema parametric features. Instead, stimuli were selected based on prior cuteness ratings (i.e., participants were simply asked to rate each picture for cuteness). This suggests that there are more characteristics that might elicit cuteness besides the set of specific anthropometric measures from baby schema.

Indeed, while cuteness and infantility are linked, studies found that human faces of several ages might also be perceived as cute (Livingston & Pearce, 2009; Zebrowitz, Fellous, Mignault & Andreolletti, 2003). Also, there is evidence suggesting that baby schema is not the only feature that makes an individual to perceive something as cute (Ihara & Nittono, 2012). The concept “kawaii” (meaning cute in Japanese) is becoming very popular due to the Japanese culture (e.g., anime) and refers to anything that is perceived as cute (Nittono & Tanaka, 2010), extending the concept of cuteness beyond the baby schema. In fact, cuteness is being defined by several authors as a broadest concept beyond a set of anthropometric features, indicating that other characteristics such as color, design, or marketing positioning may as well affect cuteness perception (Ihara et al., 2012; Norman, 2004). For example, fashion might also be perceived as cute, when displayed in pastel tones, fluffy clothes and with ribbons (Granot, Alejandro & Russell, 2014). Cuteness is also described as something that is simply perceived as “adorable” or “endearing” (Hellen & Sääksjärvi, 2011), “visually easily identifiable” and that “clearly generates a sense of desire and emotional affect” (Granot et al., 2014, p. 80).

Ihara et al. (2012) also found that something can be perceived as cute regardless the presence of the baby schema. In this study the authors asked to Japanese university students to rate the degree of *kawaii* of several objects, described by words or short phrases. They found that there was a cluster that was perceived as very cute but not infantile, including items such as “smiles”, “sweets”, “accessories”, “flowers” and “pastel colors”). Also, they investigated if the exposure to different types of cute stimuli was able to elicit psychophysiological responses (assessed via facial EMG). Despite that high cuteness infantile pictures (e.g., babies) elicited a greater increase in the activity of the muscle associated to smiling (i.e., zygomaticus major), high cute stimuli with no infantile features (e.g., accessories) also showed the same pattern.

Some companies have become aware of the positive marketing effect of cuteness appeal and have been applying it on their products and advertisements to make them more attractive. This strategy is used in a wide range of domains: from movie studios that design cute cartoon characters depicted with big rounded heads and big eyes along with other cute features (e.g. Betty Boop), to the companies that design or associate their products to cute figures or characters, such as mascots, babies and even cute animals (e.g., ads for Scottex, a toilet paper brand, uses regularly a Labrador Retriever puppy as the main character). Indeed, studies have also demonstrated that cuteness appears to be elicited not only in human individuals, but also in cartoon characters (Jacob, Rodenhauser & Markert, 1987), animals (Gould, 2008; Lehmann, Huis in't Veld & Vingerhoets, 2013; Lorenz, 1943; Sanefuji et al., 2006) and objects (Miesler, Leder & Herrmann, 2011; Nenkov & Scott, 2014). For example, Miesler et al. (2011) manipulated car fronts in order to increase their cuteness and found that individuals revealed more positive affective responses (assessed by facial EMG) to the babyfaced versions (e.g., enlarged headlights) than to the original versions. The authors discuss the implications for product design and marketing, wherein designers may develop cute designs in order to increase more affective responses and increase their attractiveness (Miesler et al., 2011). It is also possible to detect the use of cute animals on product packaging, logos and advertisings and observe their commercial success (e.g., Mickey Mouse, Hello Kitty). Accordingly, several animal welfare organizations use cuteness appeals as a form of communication, displaying cute animals in their contents in order to sensitize individuals who consume animal-source products to do more compassionate choices regarding their diets (e.g., People for the Ethical Treatment of Animals (PETA), WWF).

Although cuteness appeals are quite frequent, studies examining the potential of the persuasive impact of cuteness regarding environmental causes are still scarce. An important

exception is the work by Huddy and Gunnthorsdottir (2000) that compared the impact of flyers varying the animals' cuteness displayed, along with a message regarding animal welfare. They found that participants that were a priori more supportive of environmental causes were more likely to support the campaign in the "cute" condition (vs. "ugly" condition).

According to these evidences, cuteness appeal may become an apparently successful strategy on environmental issues and animal welfare, once they often lead to an innate cute-response (i.e., affectionate, caring and protective responses towards cute stimuli) (Alley, 1989; Cunningham, Roberts, Barbee, Druen, & Wu, 1995), while promoting animal-meat association – an apparently prevailing barrier for reducing meat consumption.

As reviewed, “cutifying” the final meat product might be a successful marketing communication strategy to endorse the consumption of animal flesh (Grauerholz, 2007). However, using cute animals as a marketing communication strategy to promote meat products might create the opposite effect and offend consumers, induce disgust responses and repel individuals to buy the products, once remembered about the link between the meat and the living animal (Kubberød et al., 2006). Therefore, animal cuteness may be a relevant strategy to promote animal-meat association and possibly encourage consumers to move away from animal-sourced products.

Thus, in order to contribute to an expanded knowledge on this matter, we propose to measure the potential of cuteness regarding the promotion of a more plant-based diet. Also, we propose to examine which mechanisms might explain this relationship.

### **Mind attribution and desensitization in meat consumption and substitution**

Which processes can explain the potential effect of cuteness appeal regarding the shift towards a more plant-based diet? A possibility is the individuals' perception about the level of mental complexity attributed to animals. Ruby and Heine (2012) showed that perceiving animals' mental capacities increases disgust response at the idea of eating them. Likewise, when compared to vegetarians, omnivores qualify animals with less mental and emotional complexity (Bilewicz, Imhoff, & Drogosz, 2011). Accordingly, studies have shown that a way people cope with dissonance related to their enjoyment by eating meat, but also their love for animals and aversion to harm something that has mental capacities, is to deny or diminish animals' psychological attributes (Bastian, Loughnan, Haslam, & Radke, 2012; Bratanova et al., 2011; Loughnan et al, 2010; Tian et al., 2016). Once individuals want to continue eating

meat, they may change their perception towards animals (Bratanova, et al., 2011). One way to do it is decreasing animals' capacity to suffer and other capacities. Thus, when animals are perceived as "appropriate" for human consumption, or are categorized as "food" (vs. "animals/sentient living beings"), people are motivated to deny their minds and their perceived capacity to suffer, in order to reduce the dissonance when exposed to the animal suffering associated to meat consumption (Bastian et al., 2012; Bratanova et al., 2011). Therefore, mind denial might be a way to diminish moral concerns and to enable ethically questionable but cherished behaviors, such as using animals for food purposes (Bastian, et al., 2012). Also, Tian et al. (2016), investigated whether individuals reveal lower willingness to eat meat and diminish mind attribution to animals in order to reduce cognitive dissonance from meat paradox. They found that individuals exposed to a meat-based recipe along with a picture of an animal (i.e., a cow), not only revealed lower willingness to consume meat, but also attributed less mind to the animal portrayed, than individuals that were only exposed to the recipe (Tian et al., 2016).

Looking through these evidence, a fundamental move in order to promote willingness to follow a more plant based diet may pass to remove the dissociation between the living animals and the food they become (Gray, 2015), once consumers are increasingly losing the connection between both elements (Kubberød et al., 2006). Accordingly, we propose to analyze whether animal-meat association (and animals' cuteness) endorses mind attribution and test if it leads to higher willingness to follow a more plant-based diet.

A person's level of susceptibility to animal suffering for food purposes may also play a relevant role on this matter (Graça et al., 2016). Animal-meat association arguably promotes individuals' awareness to the link between the food and the living animal. Likewise, cuteness incites feelings of protection, affect and caring (Lorenz, 1946). Thus, it is possible that promoting association through cuteness appeals may also promote increased sensibility to animal suffering, and lead to lower desensitization towards animals use for food purposes.

Thus, we also propose to examine whether meat-animal association, in addition to cuteness, decreases desensitization to the use of animals for food purposes and explore if it motivates willingness to follow a more plant-based diet.



### **Present study: Aims and hypotheses**

In the present work we aim to investigate the impact of association between the meat (i.e., prepared meals) and the living animal, also attending to the animal's level of cuteness, on two levels: (1) the evaluation of meat meal attributes, namely *valence* and *desire to eat* and (2) willingness to follow a more plant based diet (i.e., *meat consumption reduction*, *meat consumption avoidance* and *following a plant-based diet*).

To promote such association, in experimental conditions, we exposed participants to images of the animal, whereas in control condition no animal was presented. Moreover, we tested the role played by animal cuteness by varying the cuteness levels of the displayed animal (*high cuteness* vs. *low cuteness*). For this study, we decided to use pigs, associated to pork meals, for two reasons. First, pork is the most consumed meat by the Portuguese population (Gabinete de Planeamento, Políticas e Administração Geral, 2013). Second, a previous report (Humane League Labs, 2015) compared photos of several animals (e.g., cows, goats, chickens, turkeys, fishes) and concluded that pigs were the most compelling in order to move people towards a more plant-based diet. Since such findings are not published in a peer-reviewed scientific journal we interpret them with caution and test the effect of using images with methodological rigor. Specifically, we pretested the images of pigs regarding cuteness, assuring the equivalence of graphical aspects (e.g., blank background, full body pictures).

According to the literature review, we expect that participants exposed to the animal pictures (i.e., animal-meat association) will be more likely to report less positive attributes to meat meals and report higher willingness to follow a more plant-based diet than participants in the control condition. Also, we predict that this effect will be stronger when the picture presented is portraying a very cute animal, due to the caring and affectionate responses that cuteness elicits.

Furthermore, we expect to observe the mediational effects of mind attribution and desensitization on this relationship. Therefore, we anticipate that promoting animal-meat association will lead individuals to perceive animals with higher mental attributes and that this higher mind attribution will incite a more negative appraisal towards meals including meat and more willingness to follow a plant-based diet. Finally, we expect that promoting animal-meat association will also lead to lower levels of desensitization, and that this lower desensitization will motivate more negative appraisals towards meals including meat and more willingness to follow a more plant-based diet. Similarly, we expect that these effects will be strongest in the high cuteness condition.

The effect of cuteness appeal on the promotion of a more plant-based diet

## CHAPTER I

### Pre-test

Firstly, we conducted a pre-test in order to select the material (i.e., the animals' pictures) needed for the experimental study, to later select the two pictures of pigs to include in the two experimental conditions, one with a high cuteness level and another one with a low cuteness level.

### Method

#### Participants

The pictures were evaluated by a total of 50 volunteers recruited on-line through email and social media. Participants that identified themselves as vegetarians ( $n=3$ ) and vegans ( $n=6$ ) were excluded from the analysis, remaining a sample of 41 individuals (75% female,  $M_{age} = 25.33$ ,  $SD = 8.06$ ).

From the participants included in the analysis, 82.9% self-identified them as omnivorous, and 6% as piscivorous. The remaining percentage (9.8%) self-identified as “other” category – i.e., diets without gluten or without lactose, for example, but including meat. The majority of participants reported that include pork in their diet (80.5%). Regarding their contact with animals, 73.2% reported to have a pet, with dog as the most reported (14.7%), followed by cats (12.2%) and birds (12.1%). Only 14.6% said have never had contact with farm animals, being that 22% indicated to have present contact with farm animals, being that 9.8% of participants have current contact with pigs and 39% already had contact with pigs in the past. Almost all participants indicated to be living in an urban area (67.5%), and the remaining in a rural area.

#### Material

Three judges assessed an initial number of 112 pictures of pigs which were gathered from online pages and image banks. From this initial set, 27 pictures were included in the pre-test (Appendix A). This selection was grounded in criteria such as full body pictures of the animal, only one animal depicted, and no humans or objects present. The selected pictures were edited in order to have a size of 494 x 374, depict the animal centered in a white background, with a left-right orientation, also adjusting the size of the animal in proportion to the background.

## Measures

Participants were asked to rate each pig's perceived level of cuteness using a 7-point Likert scale (from 1 - *Not cute at all*, to 7 - *Very cute*, based in Bellfield et al., 2011).

Finally, it was also requested information about participants' diet, specifically the frequency of intake of several foods (e.g., dairy, eggs, fish or seafood, chicken, turkey, duck, rabbit, pork and beef) and how they describe their current diet (e.g., omnivorous, piscivorous, ovo-lacto vegetarian or vegan) and their present or past contact with pets and farm animals, followed by demographic data, including age, gender and area of residence (rural or urban).

## Procedure<sup>1</sup>

The survey was conducted using Qualtrics<sup>®</sup> software (from March 12 to March 22, 2016). Participants were invited to collaborate on a web survey about perception of images that required the evaluation of the content of a set of animal pictures. Then, participants were asked to rate each pig's perceived level of cuteness. Instructions also stated that the concept of "cute" also includes related traits such as "pretty", "fluffy", "adorable" or "sweet", once this concept may take several interpretations in Portuguese.

All participants rated the full set of images (i.e., 27), and presentation order was randomized. A single image was displayed per screen and no time limit was imposed. On average, the pre-test took 7.58 minutes.

## Results

Statistical analyses were completed using SPSS (*Statistical Package for the Social Sciences*) version 22.0.

Descriptive statistics (i.e., mean, standard-deviation and confidence intervals) of the cuteness evaluative scale were computed by stimulus (Appendix C). Based on the confidence-interval, first we eliminated the pigs that were perceived as moderately cute (i.e., pictures that included the midpoint of the scale - 4 - on its confidence interval). This led to the elimination of 12 images. Secondly, we analyzed the stimuli whose lower bound of the confidence interval was higher than 4, in order to get the pictures rated as the cutest, and the pictures with the upper bound lower than 4, constituting the pigs rated as the less cute ones. Finally, after this analysis, we found that the overall average level of cuteness was 4.69 ( $SD = 1.74$ ) and that most pigs (i.e., 24) were evaluated with scores above 4, only with three pictures evaluated

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<sup>1</sup> Consult Appendix B for an example of procedure and measures included in the pre-test.

## The effect of cuteness appeal on the promotion of a more plant-based diet

with 4 or less. Also, no picture could be defined as low in cuteness given that none had an upper bound lower than scale midpoint. Thus, we selected the picture that was perceived with the lowest average level of cuteness ( $M = 3.63$ ;  $SD = 1.43$ ) and the one with the highest average perceived level of cuteness ( $M = 5.61$ ;  $SD = 1.14$ ), to constitute the two levels of cuteness (low vs. high) for the study.

The effect of cuteness appeal on the promotion of a more plant-based diet

## CHAPTER II

### Experiment

#### Method

##### Participants and design

A total of 216 volunteers recruited on-line through email and social media participated in the study. Self-reported vegetarians and vegans were eliminated from the analyses ( $n = 15$ ), remaining a sample of 201 participants, 68.8% females, with ages between 18 to 58 ( $M = 26.23$ ;  $SD = 7.81$ ).

The majority of the participants self-identified as omnivorous (92%) and the remaining as piscivorous (2.5%) or included themselves in the “other” category (5.5%). Roughly 80% of the participants lived in an urban area (78.9%). Framing participants’ bound towards meat consumption (1 = *Strongly disagree* to 5 = *Strongly agree*, Graça et al., 2015), a high level of attachment to meat was reported ( $M = 3.38$ ,  $SD = 0.86$ ) (Appendix D).

A study with a between-subjects design with three conditions was conducted. Participants were randomly distributed by the following conditions: (1) *high cuteness animal-meat association* condition, where they were exposed to an image of a pig with a high cuteness level ( $n = 68$ ), (2) *low cuteness animal-meat association* condition, where participants were exposed to an image of a pig with a lower cuteness level ( $n = 71$ ), (3) control condition, where no animals were shown ( $n = 62$ ).

##### Materials

The animal pictures used in the experimental conditions, to firstly present the content of the meals that participants would see, were the two pictures portraying a pig selected through the pre-test.

For the pork meal pictures, we selected one image from the food pics database (Blechert, Meule, Busch & Ohla, 2014) and the other two from the internet, due to the lack of validated pictures portraying what we was looking for the study, i.e, pictures depicting pork meals. We selected three pork meals presented on white plates, with blank background and with no explicitly meat portrayed, so this aspect was not activated. For all the pictures, it was also taking into account their dimensions and the size of the borders, being all edited to be with the same proportions.

For the introductory picture, presenting the pasta meals that would be subsequently presented, a picture of raw spaghetti displayed on white background was selected from the database (Blechert et al., 2014).

For the pasta meals presented, we selected three pasta meals on white plates, with blank background and with no explicitly meat portrayed, so this aspect was not activated. One of them was collected from database aforementioned and the other two were selected online, because the other few pasta meals with any meat depicted from the database abovementioned looked very similar from the selected one. All of these pictures were also edited to be with the same dimensions and size of the borders.

## Measures

### *Meals assessment*

Three items were used to assess meal evaluation using slider scales:

(1) valence/pleasantness (“How negative/positive is the meal represented in the image?”; 0 = *Very negative* to 100 = *Very positive*; Foroni, Pergola, Argiris & Rumiati, 2013);

(2) recognizability (i.e., “How easy/difficult is to understand what is represented in the image?”; 0 = *Very easy* to 100 = *Very difficult*; Foroni, et al., 2013); and

(3) desire to eat (“How much would you like to eat this meal?”; 0 = *Not at all*, 100 = *Extremely*; Blechert, et al., 2014).

### *Mind Attribution Questionnaire*

An adapted<sup>2</sup> version of the Mind Attribution Questionnaire (Bastian, Loughnan, Haslam & Radke, 2012) was presented. Participants were asked to rate the degree to which they consider that pigs possess 10 mental capacities (i.e., hunger, fear, pleasure, pain, rage, self-control, morality, memory, emotion recognition and planning) using a 7-point scale (1 = *Definitely does not possess*, 7 = *Definitely does possess*). In the current sample internal consistency was high ( $\alpha = .84$ ) (Appendix E).

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<sup>2</sup> The original questionnaire asks to rate mental capacities of animals in general whereas we indicated to participants to particularly rate mental capacities of pigs.



### ***Willingness to follow a more plant-based diet***

We used three items to assess participants' willingness to follow a more plant-based diet (1 = *Very unwilling* to 5 = *Very willing*; Graça, Calheiros & Oliveira, 2015). Specifically, participants were asked "Please tell us about your willingness to...":

- (1) reduce meat consumption;
- (2) avoid eating meat;
- (3) follow a plant-based diet.

### ***Desensitization scale***

We measured desensitization regarding consuming animal meat, specifically pork, using an adapted<sup>3</sup> version of the Desensitization Scale from the Moral Disengagement in Meat Questionnaire (Graça, Calheiros & Oliveira, 2016), which comprised four items ("It would be difficult for me to watch a pig being killed for food purposes" (reversed score); "If I saw a pig being killed I would have no problems eating it"; "If I had to kill the animals myself, I would probably stop eating pork (reversed score); "I would be capable of skinning, separating the organs and cutting a pig to pieces"), using a 5-point rating scale (1 = *Strongly disagree* to 5 = *Strongly agree*). In the current sample internal consistency was acceptable ( $\alpha = .75$ ) (Appendix F).

### ***Additional measures***

This study comprised additional measures which included questions about participants' intentions towards meat consumption and substitution and participants' level of meat attachment (MAQ, Graça et al., 2015). These measures served exploratory purposes and were of less relevance to the main aims of the dissertation. Thus, for brevity's sake we do not report them in this section, but include them in the appendix (Appendix G).

### **Procedure<sup>4</sup>**

As in the pre-test, data was collected online using Qualtrics© (from April 12 to May 9, 2016). The survey was announced through social media and the participation in the study gave the opportunity to win a 50€ raffle.

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<sup>3</sup> The original items refer to desensitization to animals in general, whereas we specify the items for pigs/pork, replacing the word "animal(s)" for "pig(s)" and "meat" for "pork".

<sup>4</sup> Consult Appendix H for an example of procedure and measures in study.

## The effect of cuteness appeal on the promotion of a more plant-based diet



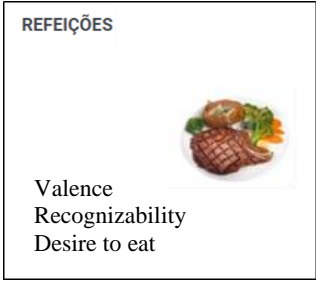
Participants were told the study was about attitudes towards food and aimed to explore perceptions and opinions regarding topics related to diet. Participants were informed about anonymity, data confidentiality and that they could leave the study at any moment. Only those who agreed with this informed consent could continue their participation in the study. Participants were randomly assigned to one of the conditions.

After the page of the informed consent, all participants were indicated that they will perform an evaluation task of different meals. To mask the real purpose of this study, a pasta meals assessment was firstly requested. Participants saw an initial page that introduced the kind of meals they would see. The content of this page was different for each condition. On both AMA conditions they were exposed to a picture of raw spaghetti followed by “pasta meals”, to announce the meals content they will be exposed to. Participants in the control group only say the word “meals” with no picture presented. Then, in a different page, participants were exposed to the picture of the raw spaghetti or a white square instead, accordingly to their condition, followed by three pasta meals with no meat depicted (in order to do not activate this concept) and they were asked to evaluate each presented meals, particularly their valence, recognizability and desire to eat them.

The second task was the pork meals assessment. Similarly, participants saw an initial page introducing the meals they would evaluate, which content was different for each condition. On both AMA conditions they were exposed to a picture of one of the selected pigs, followed by “pork meals”, being that those in the high cuteness condition were exposed to the picture where the pig portrayed had a high cuteness level, and those in the low cuteness condition were exposed to the pig with a lower cuteness level. In the control group this first introductory page did not portrayed any image, but a white square instead, with the same size of the pictures presented on both experimental conditions, to equalize the conditions. Only the word “meals” were presented, with no reference to the type of meals they would see, as occurred in both experimental conditions where participants saw the word “pork” next to “meals” to activate the animal-meat association (Table 1).

Table 1

*Experimental design*

	<b>Animal-Meat Association (AMA)</b>		<b>No Association</b>
<b>Condition</b>	High Cuteness	Low Cuteness	Control
<b>Stimuli presented</b>	<div style="border: 1px solid black; padding: 5px;"> <p>CARNE DE PORCO</p>  <p>Valence Recognizability Desire to eat</p> </div>	<div style="border: 1px solid black; padding: 5px;"> <p>CARNE DE PORCO</p>  <p>Valence Recognizability Desire to eat</p> </div>	<div style="border: 1px solid black; padding: 5px;"> <p>REFEIÇÕES</p>  <p>Valence Recognizability Desire to eat</p> </div>

Then, in a different page, participants were exposed to the animal picture, accordingly to their condition, followed by three meals with pork as main ingredient and they were asked to evaluate each presented pork meals regarding the same attributes presented in the pasta meals assessment (valence, recognizability and desire to eat).

After meals assessment, we presented, in a different page, the Mind Attribution Questionnaire. The picture of the pig associated to each condition was displayed above the items. Then, in a different page, we asked about participants' willingness (and intention) to follow a more plant-based diet. After that, in different pages, we access participants' level of desensitization, meat attachment and presented the Meat Attachment Questionnaire.

Then, we required participants to respond to some sociodemographic questions, such as diet, previous or actual contact with animals in general (both pets and farm animals), age, gender and area of residence.

In order to check the cuteness manipulation, in both AMA conditions participants saw again the pig associated to their condition and they were asked to rate how cute they thought the pig was, using the same 7-point rating scale used in the pretest (i.e., 1 = *Not cute at all* to 7 = *Very cute*).

To conclude, we thanked to individuals their participation and we provided a debriefing revealing the real purpose of our study. We also provided an email address if they would like to know more about the study, or in case they had any question. On average, the participation in this survey took about 12:52 minutes.

## Results

Statistical analyses were completed using SPSS, version 22.0.

### Manipulation check

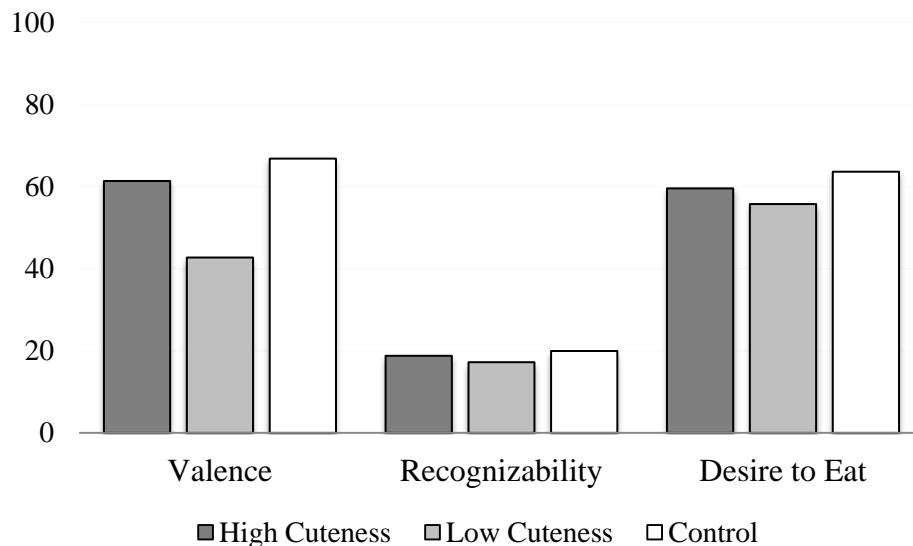
Data from the manipulation check of cuteness level showed, as expected, that participants in the high cuteness condition rated the exemplar as more cute ( $M = 5.91$ ,  $SD = 1.39$ ) than those in the low cuteness condition ( $M = 5.10$ ,  $SD = 1.50$ ),  $t(135) = 3.28$ ,  $p = .001$ ,  $d = .56$  (Appendix I).

### Direct effects

Firstly, we analyzed the direct effects of our three conditions defined by association and cuteness (high cuteness, low cuteness, control) in our outcome variables.

### Meals assessment

This section contains the three items used to evaluate pork meals (valence, recognizability and desire to eat). The averages of the three presented meals were computed per dimension. An ANOVA was performed considering ratings on each evaluative dimension as the dependent variables and condition as the between-participants factor (see Figure 1.1).



*Figure 1.1.* Average values reported in the evaluation of pork meals (valence, recognizability and desire to eat) per condition (high cuteness animal-meat association, low cuteness animal-meat association and control) (Appendix J).

The analysis yielded on the valence ratings, data revealed significant differences between conditions,  $F(2,198) = 27.72, p < .001, \eta_p^2 = .22$  (Appendix K). Planned contrasts showed that participants in the low cuteness condition evaluated the pork meals more negatively ( $M = 42.74; SD = 18.65$ ) than those in the control group ( $M = 66.89; SD = 19.16$ ),  $t(198) = 7.01, p < .001, d = 1$ , and those in the high cuteness condition ( $M = 61.42; SD = 21.53$ ),  $t(198) = 5.55, p < .001, d = .79$ . However, the valence ratings of participants in the high cuteness condition did not differ from those in the control condition,  $t(198) = 1.57, p = .118, d = .22$ . Overall, the meals were perceived as very positive ( $M = 56.51; SD = 22.31$ ),  $t(200) = 4.13, p < .001, d = .58$  ( $t$  test against scale midpoint: 50) (Appendix L).

The analysis on recognizability ratings revealed nonsignificant differences between the conditions,  $F < 1$  (Appendix K). Indeed, recognizability was very similar in all conditions: participants in the low cuteness condition evaluated the recognizability of the meals ( $M = 17.20; SD = 19.07$ ) as similar to those in the control group ( $M = 19.96; SD = 20.87$ ),  $t < 1$ , and as similar to those in the high cuteness condition ( $M = 18.76; SD = 20.65$ ),  $t < 1$ . Recognizability ratings were also equivalent between high cuteness and control condition,  $t < 1$ . Overall, participants indicated to be quite easy to identify the presented meals ( $M = 18.58; SD = 20.11$ ),  $t(200) = -22.16, p < .001, d = -3.13$  ( $t$  test against scale midpoint: 50) (Appendix L).

Finally, regarding the desire to eat ratings also showed the absence of differences between the conditions,  $F(2,198) = 1.69, p = .187, \eta_p^2 = .02$  (Appendix K). Indeed, participants in the low cuteness condition evaluated the desire to eat the meals ( $M = 55.74; SD = 28.92$ ) as those in the control group ( $M = 63.68; SD = 18.43$ ),  $t(198) = 1.84, p = .068$ , and as those in the high cuteness condition ( $M = 59.60; SD = 25.36$ ),  $t < 1$ . Desire to eat ratings were also equivalent between high cuteness and control conditions,  $t < 1$ . Overall, participants revealed a high desire to eat the meals ( $M = 59.50; SD = 24.94$ ),  $t(200) = 5.40, p < .001, d = .74$  ( $t$  test against scale midpoint: 50) (Appendix L).

### ***Willingness to follow a more plant-based diet***

The following section contains the three items used to measure the willingness to shift towards a more plant-based diet (i.e., willingness to reduce meat consumption, willingness to avoid eating meat and willingness to follow a plant-based diet). An ANOVA was performed considering ratings on each item as the dependent variables and condition as the between-participants factor (see Figure 1.2).

## The effect of cuteness appeal on the promotion of a more plant-based diet

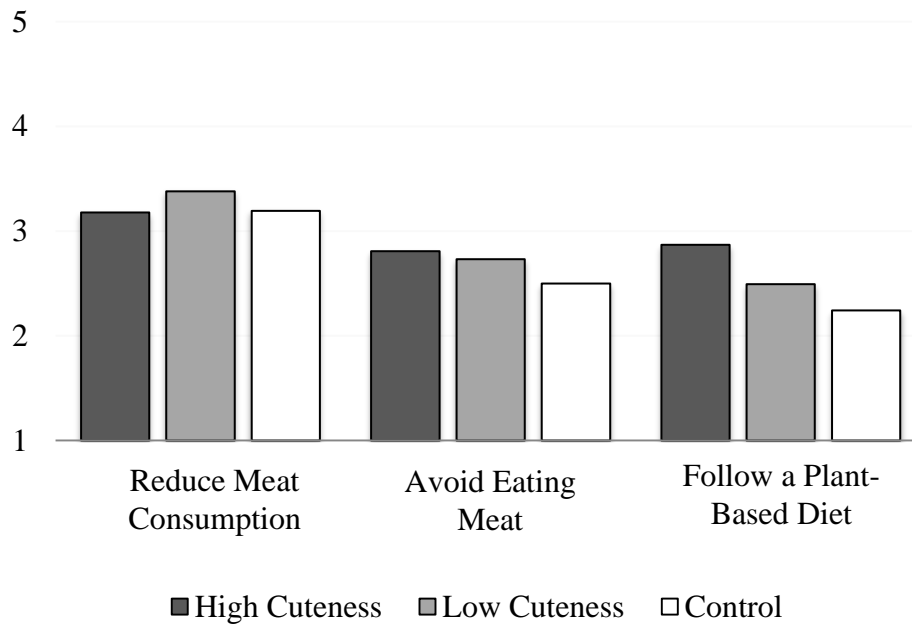


Figure 1.2. Average values reported on the willingness to follow a more PBD (to reduce meat consumption, to avoid eating meat and to follow a plant based-diet per condition (high cuteness, low cuteness and control) (Appendix M).

Experimental condition did not have an impact on willingness to reduce meat consumption,  $F < 1$  (Appendix N). Indeed, participants in the low cuteness condition reported similar willingness to reduce meat consumption ( $M = 3.38$ ;  $SD = 1.41$ ) as those in the control group ( $M = 3.19$ ;  $SD = 1.37$ ),  $t < 1$ , and as those in the high cuteness condition ( $M = 3.18$ ;  $SD = 1.37$ ),  $t < 1$ . These ratings were also equivalent between high cuteness and control conditions,  $t < 1$ . Overall, participants revealed a high willingness to reduce meat consumption. ( $M = 3.25$ ,  $SD = 1.35$ ),  $t(200) = 2.67$ ,  $p < .001$ ,  $d = .38$  ( $t$  test against scale midpoint: 3) (Appendix O).

Regarding willingness to avoid eating meat, results also revealed the absence of differences between conditions,  $F < 1$  (Appendix N). Participants in the low cuteness condition reported similar willingness to reduce meat consumption ( $M = 2.73$ ;  $SD = 1.37$ ) as those in the control group ( $M = 2.50$ ;  $SD = 1.32$ ),  $t(198) = 1.06$ ,  $p = .316$ ,  $d = .15$ , and as those in the high cuteness condition ( $M = 2.81$ ;  $SD = 1.30$ ),  $t < 1$ . These ratings were also equivalent between high cuteness and control conditions,  $t(198) = 1.32$ ,  $p = .187$ ,  $d = .19$ . Overall, participants reported low willingness to avoid eating meat ( $M = 2.69$ ;  $SD = 1.33$ ),  $t(200) = -3.34$ ,  $p = .001$ ,  $d = -.47$  ( $t$  test against scale midpoint: 3) (Appendix O).

Finally, the item regarding willingness to follow a plant-based diet revealed differences according experimental condition,  $F(2, 198) = 3.22, p = .042, \eta_p^2 = .03$  (Appendix N). Participants in high cuteness condition reported higher willingness to follow this type of diet ( $M = 2.87; SD = 1.42$ ), comparing with control group ( $M = 2.24; SD = 1.40$ ),  $t(198) = 2.51, p = .013, d = .36$ . However, no differences were found in these ratings between high and low cuteness ( $M = 2.49, DP = 1.43$ ) conditions,  $t(198) = 1.56, p = .121, d = .22$ , and between low cuteness and control condition,  $t(198) = 1.02, p = .310, d = .14$ . Overall, individuals indicated a low willingness to follow a plant-based diet ( $M = 2.54; SD = 1.44$ ),  $t(200) = -4.52, p < .001, d = .64$  ( $t$  test against scale midpoint: 3) (Appendix O).

### **Mediation Analyses**

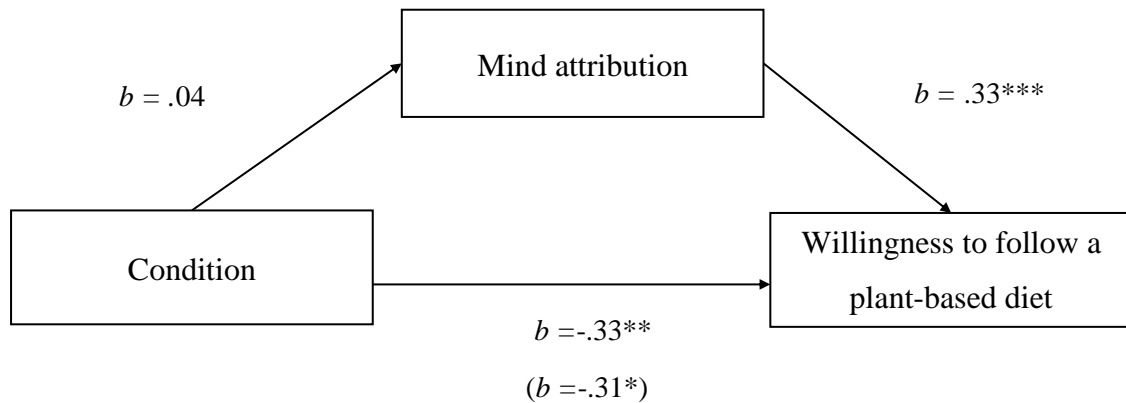
Concerning our predicted models of mediation, we focused our analysis in the variables that reported statistically significant effects in the previous direct effect analysis (willingness to follow a plant-based diet and valence). For this purpose, we performed four regression analyzes, using the Process macro (Hayes, 2012): the role of mind attribution on (1) the relationship between condition and willingness to follow a plant-based diet, and on (2) the relationship between condition and valence; and also the role of desensitization on (3) the relationship between condition and willingness to follow a plant-based diet, and on (4) the relationship between the condition and valence.

#### ***Mind attribution***

We investigated the hypothesis that mind attribution mediates the effect of condition on willingness to follow a plant-based diet (Appendix P). Results indicated that the condition was not a significant predictor of mind attribution,  $b = .04, SE = .09, t < 1$ . Nonetheless, in this model, mind attribution revealed to be a significant predictor of willingness to follow a plant-based diet,  $b = .33, SE = .10, t(198) = 3.48, p < .001, d = .50$ , wherein higher mind attribution reported, higher was the participants' willingness to follow a plant-based diet. Total effect of condition on willingness to follow a plant based diet was significant,  $b = -.31, SE = .13, t(199) = -2.52, p = .013, d = -.36$ , as had already been confirmed above, indicating higher willingness in the high cuteness condition, comparing with control group. Results regarding the direct effect of condition on willingness also showed significant effects,  $b = -.33, SE = .12, t(199) = -2.68, p = .008, d = -.38$ . The indirect effect was tested using a bootstrap estimation approach with 5000 samples. These results indicated the indirect coefficient was not significant,  $b = .01, SE = .03, 95\% CI = -.0470, .0806$ . Thus, the degree in

The effect of cuteness appeal on the promotion of a more plant-based diet

which participants qualify pigs' mind capacities does not mediate the effect of condition on willingness to follow a plant-based diet (see Figure 1.3).



\* < .05, \*\* < .01, \*\*\* < .001

Figure 1.3. Mediation model for the effect of condition on willingness to follow a plant-based diet via mind attribution.

Then, we examined the effect of mind attribution on the relationship between condition and valence (Appendix Q). As already reported, condition was not a significant predictor of mind attribution. Analysis also revealed a nonsignificant effect of mind attribution on valence,  $b = -2.81$ ,  $SE = 1.72$ ,  $t(198) = -1.64$ ,  $p = .103$ ,  $d = -.23$ . Total effect of condition on valence were nonsignificant,  $b = 2.39$ ,  $SE = 1.92$ ,  $t(199) = 1.24$ ,  $p = .215$ ,  $d = .16$ . Results also reported nonsignificant direct effects on valence,  $b = 2.50$ ,  $SE = 1.92$ ,  $t(198) = 1.30$ ,  $p = .195$ ,  $d = .18$ . The indirect effect was tested using the same bootstrap estimation approach with 5000 samples. These results indicated the indirect coefficient was not significant,  $b = -.11$ ,  $SE = .30$ , 95% CI =  $-.9746, .2949$ . Therefore, results showed that mind attribution also does not mediate the effect of condition in individuals' perceived valence of meals (see figure 1.4).

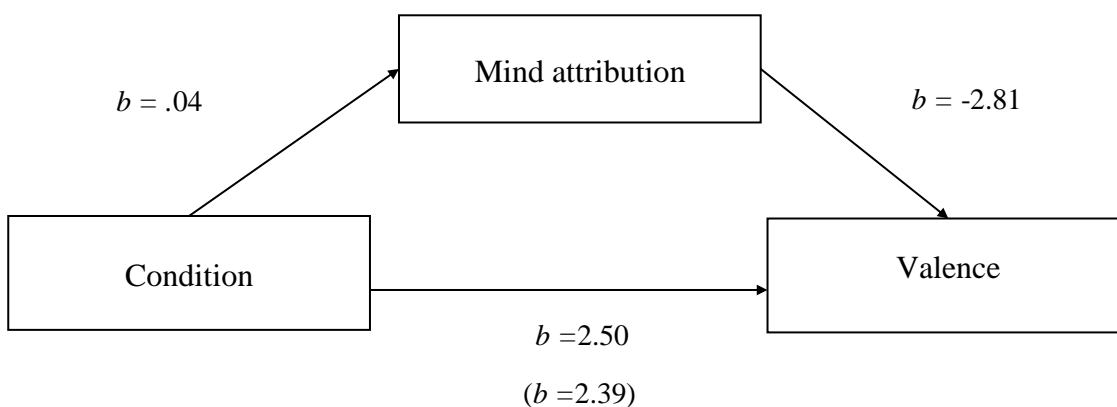


Figure 1.4. Mediation model for the effect of condition on valence via mind attribution.



**Desensitization**

Considering desensitization as mediator in the effect of condition on willingness to follow a plant-based diet (Appendix R), results indicated that condition was a significant predictor of desensitization,  $b = .25$ ,  $SE = .09$ ,  $t(199) = 2.71$ ,  $p = .007$ ,  $d = .38$ . As expected, individuals in the control group presented the highest desensitization towards the use of animal for food purposes ( $M = 2.66$ ,  $SD = 1.20$ ), differing from both conditions where animal-meat association was promoted. Thus, participants reported lower levels of desensitization in the high cuteness ( $M = 2.15$ ,  $SD = .88$ ,  $t(111,003) = -2.77$ ,  $p = .007$ ,  $d = -.53$ ) and in the low cuteness condition ( $M = 2.14$ ,  $SD = 1.16$ ,  $t(131) = -2.52$ ,  $p = .013$ ,  $d = -.44$ ) when compared with control group (Appendix S). Also, desensitization was a significant predictor of willingness to follow a plant-based diet,  $b = -.42$ ,  $SE = .08$ ,  $t(198) = -5.14$ ,  $p < .001$ ,  $d = .73$ , wherein higher is the desensitization reported, lower will be the willingness to follow a plant-based diet. The condition, previously a significant predictor of willingness to follow a plant-based diet,  $b = -.31$ ,  $SE = .12$ ,  $t(199) = -2.52$ ,  $p = .013$ ,  $d = -.36$ , was no longer a significant predictor of willingness to follow a plant-based diet after including the mediator desensitization,  $b = -.21$ ,  $SE = .12$ ,  $t(198) = -1.71$ ,  $p = .088$ ,  $d = -.24$ , consistent with full mediation. These results support the mediation hypothesis that desensitization mediates the relationship between the condition and willingness to follow a plant-based diet, with approximately 13% of the variance accounted for by the predictors,  $F(2,198) = 17.35$ ,  $p < .001$ ,  $R^2 = .13$ . Results confirmed the indirect effect of condition on willingness to follow a plant-based diet was significant,  $b = -.11$ ,  $SE = .04$ , 95% CI =  $-.2032$ ,  $-.0359$ . Thus, desensitization mediates the relation between condition and willingness to follow a plant-based diet. When there was association, individuals reported less desensitization, which in turn led to higher willingness to follow a plant-based diet (see figure 1.5).

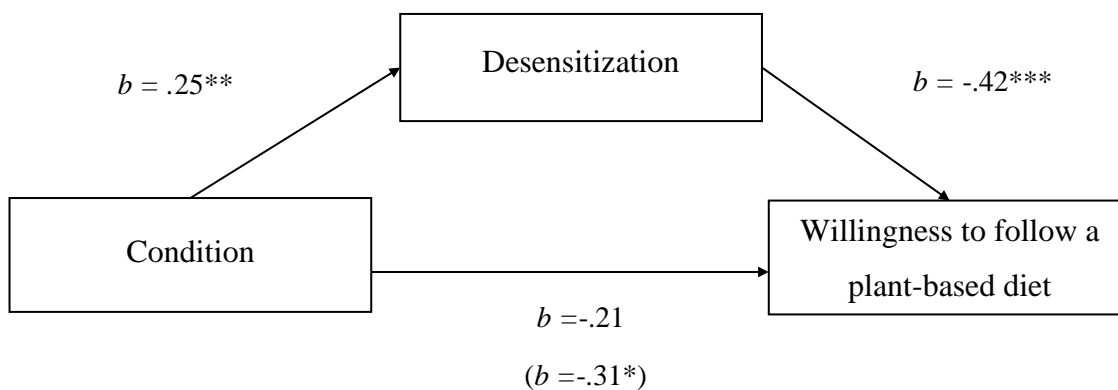


Figure 1.5. Mediation model for the effect of condition on willingness to follow a plant-based diet via desensitization.

## The effect of cuteness appeal on the promotion of a more plant-based diet

As regards the effect of the condition in valence being mediated by desensitization (Appendix T), analysis already indicated that condition was a significant predictor of desensitization. Also, results showed that desensitization significantly affects valence of meals,  $b = 5.91$ ,  $SE = 1.44$ ,  $t(198) = 4.10$ ,  $p < .001$ ,  $d = .58$ , which indicates that higher levels of desensitization towards the use of animals for food purposes leads to higher positivity reported in meat meals assessment. Total effect of condition on valence showed nonsignificant values,  $b = 2.39$ ,  $SE = 1.92$ ,  $t(199) = 1.24$ ,  $p = .215$ ,  $d = .18$ . Direct effect of condition on valence also revealed to be nonsignificant,  $b = .89$ ,  $SE = 1.93$ ,  $t(198) = .46$ ,  $p = .644$ ,  $d = .07$ . Despite that, analyses divulged that the indirect effect was significant,  $b = 1.50$ ,  $SE = .70$ , 95% CI = .4193, 3.1950. Thus, results indicate that the mediator effect of desensitization in this relationship occurred, with approximately 9% of the valence variance accounted for by the predictors,  $F(2,198) = 9.47$ ,  $p < .001$ ,  $R^2 = .09$ . When there was association, individuals reported less desensitization, which in turn led to a more negative appraisal of the meals (see figure 1.6).

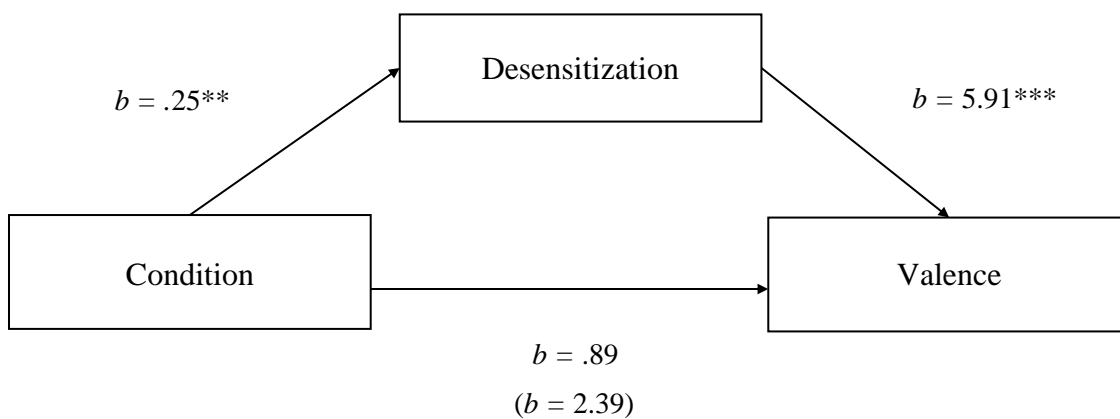


Figure 1.6. Mediation model for the effect of condition on valence via desensitization.

## CHAPTER III

### Discussion

This study aimed to examine the effect of promoting the association between meat and the living animal, also analyzing its impact attending to different levels of cuteness (high vs. low), on individuals' assessment towards meat based meals and willingness to follow a more plant-based diet.

Meat-eaters have a general propensity to dissociate meat from the animal that it derived from (Graça, et al., 2016; Gray, 2015; Hoogland, et al., 2005; Kubberød, et al., 2006; Plous, 2003; Rothgerber et al., 2014), in order to better cope with the dissonance generated by the meat paradox (i.e., pleasure of eating meat but also love for animals and concern for their welfare) (Loughnan, et al., 2010; 2014). According to these evidence, we expected that enhancing the association between the food and the animal - i.e., by presenting meals next to the animal that originated it -, would lead participants to report a more negative appraisal of these meals. Moreover, as people have a propensity to respond in caring and protective ways to anything that is perceived as cute (e.g., Bellfield et al., 2011), we expected the strongest effects in the high cuteness condition.

Concerning the perceived valence of meals, our results showed that individuals rated the pork meals as more negative when the animal-meat association with the less cute animal was promoted (when compared both with the association using a very cute animal and control group). Thus, an animal displayed with a lower level of cuteness appeared to be the most effective to reduce meals' pleasantness than a very cute animal (or than not displaying any animal). Such effect might be related with a possible higher perception of threat, probably more encouraged in the high cuteness condition, that might have led to the need to reduce the eventual dissonance elicited. Promoting the link between the meat and the living animal may already increase dissonance (Bastian et al., 2012). Also, cute stimuli may induce to increased feelings of caring and protection towards them (Bellfield et al., 2011). Thus, the combination of confronting people with the animal-meat association and promoting it through a very cute animal might have induced to more threat regarding their meat consumption and even higher levels of dissonance. As dissonance is also intensified when individuals expect to involve in behaviors that are inconsistent with their attitudes (Festinger, 1957; Harmon-Jones et al., 2008), perhaps they sought to report an attitude (i.e., rate meat meals more positively) aligned to their meat eating behaviors. According to Dijkstra, Rothman and Pietersma (2011) this threatening perception tends to lead to more defensive reactions, particularly usual in

persuasive communication (e.g., health messages). Thus, possibly confronted with this higher threat and dissonance, promoted by the association through a very cute animal, in order to reduce it participants rated the meals less negatively, when compared with individuals in the low-cuteness condition. Therefore, associating meat to a very cute animal might have incited a more defensive reaction elicited by this framing (Dijkstra et al., 2011), leading to a more self-protective response (i.e., rate meat meals positively), aligned with their behaviors (i.e., meat eating).

These results suggest that although animal-meat association is likely an effective strategy, not only it is important to promote the link between the meat and the living animal that it derived from, but it may also be important to take into account the inherent characteristics of the animal presented, such as his cuteness level. Thus, the promotion of an animal-meat association that presents an animal with a lower level of cuteness, instead of a very cute one, appeared to be more effective regarding the construction of a more negative evaluation towards meat products, as high levels of cuteness possibly induce more threat and therefore higher levels of dissonance regarding meat consumption.

Unexpectedly, results revealed that there were no significant differences in participants' desire to eat and recognizability of meals. A possible explanation concerning the desire to eat is that the presented pork meals were perceived as very appealing and appetizing, leading to a high desire to eating them regardless the animal-meat association was being promoted or not, or the cuteness level that was inherent in the animal portrayed. In fact, individuals revealed an overall high desire to eat the presented meals. Also, the validated pork meal picture that we used in our study reported a high palatability (Blechert et al., 2014). However, we do not know how appetizing the other two meals were perceived, since these pictures were not validated images. As a result, a limitation that might have conditioned our understanding of the results was the fact we did not use validated images on this regard. Alternatively, we should have checked some other variables (e.g., palatability, arousal) that could give us some useful insight to understand these outcomes. Also, we could have checked participants' level of hunger during the study, because this uncontrolled variable might also have affected their perception concerning their desire to eat the meals. Hereafter, it would be interesting to study these effects with meals portraying several levels of attractiveness and palatability, and also control some of the variables abovementioned. Regarding recognizability, it is possible that the animal picture worked as a clue to the meals recognition. Apparently, the presented meals were so easily identified that their recognizability was not affected by other variables.

Furthermore, we expected that promoting animal-meat association would also increase willingness to follow a more plant-based diet, once again, expecting higher willingness when a very cute animal was presented.

Regarding willingness to follow a plant-based diet, participants indicated to be, in general, moderately willing to follow a plant-based diet. Yet, as expected, our results revealed that when the connection between the food and the animal that originated it is promoted by presenting a very cute animal, individuals were more willing to follow this type of diet, when compared with the individuals who only saw the meal. These results seem to be in line with the conclusions made by Kubberød et al. (2006), who point out the relevance of their findings regarding the effects of animal-meat association for the meat industry, not only referring that they should develop meat products that disguise as much as possible their origin and animality aspects (e.g., reddish colour), but that they must also take into account the content of their communication strategies. The authors also discussed the potential negative outcomes for the meat industry. Marketing communication usually presents their products with “happy animals with a high “cuteness” factor, personified through naming and with a life story of the animal provided” (p. 206), but this may possibly induce the consumer to connect the living animal to the meat and lead him to not buy the product (Kubberød et al., 2006). Hence, our findings suggest that promoting the association between the meat and the animal, by presenting a very cute animal followed by a meat meal that derived from that animal (e.g., a very cute pig and a pork meal), might be a good strategy to encourage individuals’ willingness to follow a plant-based diet.

In the current experiment, participants revealed an overall high willingness to reduce meat consumption and low willingness to avoid it. Furthermore, results appear to follow an identical pattern to the willingness to follow a plant-based diet, but the differences between conditions were non-significant. One possible explanation might be related to the framing of the messages. A meta-analytic review found that gain-framed appeals, which highlight the benefits of compliance with the message, are more persuasive than loss-framed appeals, which accentuate the negative outcomes of noncompliance (O’Keefe & Jensen, 2007). Likewise, several authors find the same pattern (Baxter & Gram-Hanssen, 2016; Chaurand, Bossart, & Delhomme, 2015; Dijkstra et al., 2011; Spence & Pidgeon, 2010; Mir, Behrang, Isaai, & Nejat, 2016). Thus, whereas the inherent message in willingness to follow a plant-based diet may lead to a more gain frame, where it is being encouraged the consumption of more plants, fruits, vegetables and its associated positive outcomes (e.g., healthier diet), the perception of messages containing “reduce” meat consumption and “avoid” eating meat may

lead the individual to a perception of loss and to the undesirable outcome of not consuming meat. It is also important to remind that our participants revealed a high level of attachment to meat which indicates a positive bond towards meat consumption (e.g., “Meat is irreplaceable in my diet”, “I don’t picture myself without eating meat regularly”). This is important because when individuals are exposed to a message that relies on something that promotes a general perception of gain, their willingness to adopt a particular behavior seems to increase (Mir et al., 2016). Conversely, when the message construes to a loss frame their willingness to “lose” something, in this case reduce and avoid meat consumption, may be jeopardized by the framing of the message. Thus, it is also important to take into account the message framing, focusing on the positive outcomes of the desirable behavior and using positive vocabulary that does not lead to a loss-frame message perception.

Concerning our predicted mediation models, results indicated that the degree in which participants qualified pigs’ mind capacities did not mediate the effect of animal-meat association and the cuteness level of the animals on individuals’ willingness to follow a plant-based diet. Our results suggested that promoting the animal-meat association and manipulating the cuteness level of the animal presented did not impact on mind attribution. Possibly, to modify individuals’ perception towards mental capacities of a particular animal requires a more sophisticated stimulus, such as an informative content about his capacities. Thus, it would be interesting to explore which strategies might be able to increase mind attribution in this context, examining which strategies may interfere with individuals’ perception towards animals, particularly their perception about their minds. Our findings also indicated that mind attribution did not affect individuals’ perceived valence of meals. Thus, we did not find empirical support for our mediation hypothesis wherein mind attribution affects the relationship between the condition and meals valence. It would be relevant to further analyze whether using different animals or manipulations would make mind attribution influence the valence of meals.

Nevertheless, mind attribution revealed to be a significant predictor of willingness to follow a plant-based diet, indicating that more attribution of animal’ mind capacities may lead to more willingness to follow a plant-based diet, in line with previous studies (Bratanova, et al., 2011; Bastian, et al., 2012).

Considering desensitization as mediator in the effect of condition on willingness to follow a plant-based diet, our results support the mediation hypothesis. As expected, when the association between the food and the animal is not promoted (i.e., only the meal is portrayed but not the animal), individuals revealed higher desensitization towards the use of animal for

food purposes, when compared with individuals that were confronted by this association. These findings suggest the important role that animal-meat association might play on promoting higher sensitization towards animal death and suffering for food purposes. However, the level of desensitization reported from individuals who were exposed to a very cute animal when compared to subjects that were exposed to an animal with a lower level of cuteness did not differ. This might be related with the fact that despite data from the manipulation check of cuteness level showed that participants evaluated the animal in the high cuteness condition as more cute than the animal presented in the low cuteness condition, both animal pictures were evaluated with a high level of cuteness. It will be interesting in further studies to test these effects with pictures with more extreme ratings, particularly a picture portraying an animal with a lower cuteness level, in order to see whether a wider range between cuteness levels would lead to different results regarding desensitization. Cuteness may indeed play an interesting role if well operated, attending to previous studies designating cuteness as an elicitor of protective, affectionate and caring responses. So it might be possible that extremely cute stimuli would potentially lead to higher sensitization towards animal suffering than extremely lower cute ones.

Also, as hypothesized, desensitization seemed to be a significant predictor of the individuals' willingness to follow a plant-based diet, wherein lower desensitization reported led to higher willingness to follow a plant-based diet. Similarly, participants' level of desensitization also affected the perceived valence of meals, indicating that individuals who were less desensitized about the use of animals for food purposes were more likely to perceive meat meals more negatively.

Thus, our data suggests that animal-meat association might be an effective strategy to sensitize individuals regarding the use of animals for food purposes and to promote willingness to follow a plant-based diet. Additionally, our findings suggest that this strategy, conducting to higher sensitization, also led to a more negatively appraisal towards meat-based meals.

Besides animal-meat association, animal cuteness also appeared to play a relevant role. When compared with control group, participants reported to be more willing to follow a plant-based diet only after being exposed to the association presented through a very cute animal (association with a less cute animal did not differ). This seems reasonable once cuteness might incite a more protective and caring feeling towards (cute) animals (Bellfield et al., 2011) and lead individuals to move away from meat products depicted with cuteness (Kubberød et al., 2006). However, when it comes to meat-based meals appraisal, results

suggest being more effective to present an animal with a lower cuteness level in order to lead individuals to perceive a meal that contains animal-source products more negatively. These results appear to be somehow inconsistent, suggesting that different levels of cuteness might work better depending on the specific outcome. A possible explanation might be related with the perception and framing of the message. Perhaps, when individuals were asked to evaluate a meat-based meal they tended to feel more threatened when confronted with the possibility of taking a position that might not be aligned with their behaviors (i.e., consuming meat), particularly when confronted with a very cute animal, as abovementioned. But maybe when simply asked about their willingness to follow a plant-based diet, which supports a gain-framed message and does not promote any loss or threat regarding their meat consumption, the eventual threatening effect of a very cute animal did not occur and participants were merely affected by cuteness and their elicitors (i.e., protective and caring feelings), which led to more willingness to follow a plant-based diet. Therefore, further research may continue to study these effects and examine whether these results are consistent with different designs and manipulations.

In the future, it would be also interesting to verify whether the reported willingness to follow a plant-based diet in our study was induced by the caretaking behavior and propensity to respond in “affectionate, caring and protective ways” (Bellfield et al., 2011, p.1) elicited by cuteness, leading individuals more willingness to follow a plant-based diet in order to protect animals to become food, which is yet to be determined.

Addressing other limitations in the present study, we did not control participants’ pork consumption as we did in the pretest, and neither did we include a scale to measure participants’ intention to reduce or eliminate specifically pork from their diets. Further studies can take these variables in consideration to allow achieving a clearer insight regarding the reported effects.

Considering the two selected pictures used in the experimental conditions, it might be possible to discuss an eventual additional restraint. Even though we took into account the size of the pictures, the right orientation of the animals and pre-tested this material, the physical position of the animals was not a constant. Particularly, the picture in the high cuteness condition displays the animal lying down, while the low cuteness condition portrays the animal standing. Positioning might also be a variable that affects individuals’ cuteness perception towards animals.

It is also important to point out that our study only used an animal (pig) and one experimental design. Thus, further research is needed to expand the knowledge regarding the



power of animal-meat association and cuteness appeals, to observe further evidence and analyze the generalizability of the effects examined in our study, with regard to other animals and other designs and manipulations.

An additional restraint may be related with the ecological validity of our study, since our experimental conditions did not represent naturally the moment and phenomenon we were studying (i.e., mealtime or even the moment of purchase).

Additionally, experiments were prosecuted at participants' desired place (e.g., home, work), and not in a laboratory, which could also have conditioned in some extent our results.

Despite the limitations, our findings helped developing the knowledge of animal-meat association and animals' cuteness regarding the promotion of a more plant-based diet. Huddy et al. (2000) also found a positive impact of cuteness in messages concerning animal welfare. It would be interesting to continue studying the impact of animals' cuteness and animal-meat association in further studies, particularly regarding environmental issues, where investigation is still scarce.

Our findings can bring some interesting insights and potentially highlights regarding environmental communication applied by environmental and welfare entities. Also, Grauerholz (2007) argues that the processes of objectifying animals are comparable to "other forms of objectification in society, including women and minorities" (p. 334). Thus, this topic should be an important subject of study and development in order to find successful strategies to be used in animal welfare and environmental communication, also consequently helping promoting public health and, perhaps, helping to give a step closer towards social justice.

The effect of cuteness appeal on the promotion of a more plant-based diet

## CONCLUSION

This study addresses the impact that animal-meat association may play in meat consumption and substitution, also examining the persuasive potential of cuteness appeals concerning environmental causes, particularly a shift away from meat-based towards a more plant-based diet.

Overall, our study suggests that association and animals' cuteness may be useful in promoting a more plant-based diet. In particular, animal-meat association appeared to negatively affect the appraisal of meat-based meals and increase willingness to follow a plant-based diet. Furthermore, our findings suggest that the cuteness level portrayed by the animal and message framing might be relevant variables on this matter. Our findings also point out that these approaches might trigger higher sensitization towards animals' exploitation for food purposes, which may lead both to a negative appraisal towards meals that include meat, and to higher willingness to follow a plant-based diet. Also, in line with previous studies, mind attribution seems to be a strong predictor of willingness to follow a plant-based diet.

The effect of cuteness appeal on the promotion of a more plant-based diet

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The effect of cuteness appeal on the promotion of a more plant-based diet

Appendix A – Animals' pictures presented in pre-test, displayed attending their cuteness rating (from the less cute to the cutest)



1



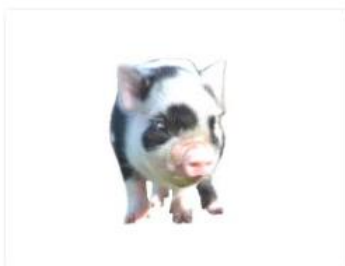
2



3



4



5



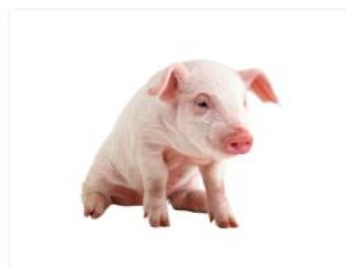
6



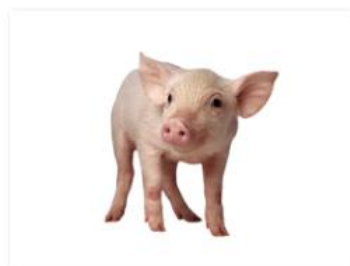
7



8



9



10



11



12

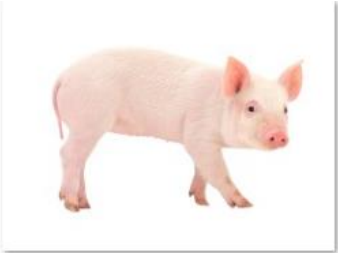
The effect of cuteness appeal on the promotion of a more plant-based diet



13



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Appendix B – Pre-test survey

Este estudo tem como objetivo compreender a percepção dos indivíduos face ao conteúdo de várias imagens.

Desta forma, iremos apresentar-lhe algumas imagens e, de seguida, pedir-lhe-emos que as avalie tendo em conta o seu conteúdo.

Não existem respostas certas ou erradas, uma vez que apenas pretendemos compreender qual a sua percepção face às imagens apresentadas.

Garantimos a confidencialidade e o anonimato dos seus dados, uma vez que estes serão analisados em conjunto com as respostas dos restantes participantes.

A participação neste estudo tem um carácter voluntário, pelo que pode negar a sua participação ou, a qualquer momento, desistir do estudo.

- Aceito participar neste estudo.
- Não pretendo participar neste estudo.

>>

De seguida irá visualizar algumas imagens de animais, especificamente porcos.

Tendo em conta a sua opinião, pedimos-lhe que avalie as seguintes imagens, indicado em que medida considera os animais presentes nas fotografias giro.

**Por "giro", entenda também fofinho, adorável, bonito, querido.**

>>

## The effect of cuteness appeal on the promotion of a more plant-based diet



---

Na sua opinião, em que medida o animal presente nesta imagem é giro?

1 - Nada giro	2	3	4	5	6	7 - Muito giro
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

>>

The effect of cuteness appeal on the promotion of a more plant-based diet

Appendix C – Animals’ pictures presented with ascending means, standard deviation and confidence interval for mean

	N	Mean	Std. Deviation	95% Confidence Interval for Mean	
				Lower Bound	Upper Bound
1.	41	3,63	1,428	3.18	4.08
2.	41	3,93	1,506	3.45	4.40
3.	41	4,00	1,533	3.52	4.48
4.	41	4,10	1,463	3.64	4.56
5.	41	4,29	1,692	3.76	4.83
6.	41	4,34	1,493	3.87	4.81
7.	41	4,34	1,606	3.83	4.85
8.	41	4,39	1,595	3.89	4.89
9.	41	4,41	1,431	3.96	4.87
10.	41	4,44	1,484	3.97	4.91
11.	41	4,46	1,416	4.02	4.91
12.	41	4,46	1,733	3.92	5.01
13.	41	4,46	1,518	3.98	4.94
14.	41	4,54	1,451	4.08	4.99
15.	41	4,73	1,304	4.32	5.14
16.	41	4,78	1,681	4.25	5.31
17.	41	4,90	1,241	4.51	5.29
18.	41	4,93	1,403	4.48	5.37
19.	41	5,07	1,679	4.54	5.60
20.	41	5,12	1,520	4.64	5.60
21.	41	5,15	1,333	4.73	5.57
22.	41	5,24	1,179	4.87	5.62
23.	41	5,27	1,803	4.70	5.84
24.	41	5,32	1,386	4.88	5.75
25.	41	5,39	1,498	4.92	5.86
26.	41	5,44	1,501	4.97	5.91
27.	41	5,61	1,137	5.25	5.97
Valid N (listwise)	41				

Appendix D – Participants’ level of meat attachment

<b>One-Sample Statistics</b>				
	N	Mean	Std. Deviation	Std. Error Mean
Meat Attachment	201	3,384	,8586	,0606

<b>One-Sample Test</b>						
Test Value = 3						
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Meat Attachment	6,344	200	,000	,3842	,265	,504



Appendix E – Mind attribution scale reliability

<b>Case Processing Summary</b>			
		N	%
Cases	Valid	201	100,0
	Excluded <sup>a</sup>	0	,0
	Total	201	100,0

a. Listwise deletion based on all variables in the procedure.

<b>Reliability Statistics</b>		
Cronbach's		
Alpha	N of Items	
,835	10	

Appendix F – Desensitization scale reliability

<b>Case Processing Summary</b>			
		N	%
Cases	Valid	201	100,0
	Excluded <sup>a</sup>	0	,0
	Total	201	100,0

a. Listwise deletion based on all variables in the procedure.

<b>Reliability Statistics</b>		
Cronbach's		
Alpha	N of Items	
,753	4	

Appendix G – Additional measures

Intention to follow a more plant-based diet (1 = *Very unwilling* to 5 = *Very willing*; Graça, Calheiros & Oliveira, 2015)

Specifically, in the next 6 months, do you intent to...:

- (1) reduce meat consumption;
- (2) avoid eating meat;
- (3) follow a plant-based diet.

Intention to reduce meat consumption

Por favor, seleccione as opções que melhor se adequam e caracterizam o que pretende fazer relativamente à sua dieta actual, pensando nos próximos 6 meses.

Tenho intenção de reduzir o consumo de carne de... (seleccione as opções que quiser)

Vaca	Porco	Aves	Peixe	Não tenho intenção de reduzir
------	-------	------	-------	-------------------------------

>>

Meat attachment items (1 = *Strongly disagree* to 5 = *Strongly agree*; Graça, Calheiros & Oliveira, 2015)

1. Comer carne é um dos bons prazeres da vida.
2. A carne é insubstituível na minha alimentação.
3. Dada a nossa posição na cadeia alimentar, temos todo o direito de consumir carne.
4. Ao pensar em comer carne sinto-me mal.
5. Adoro refeições com carne.
6. O consumo de carne é um desrespeito pela vida e pelo ambiente.
7. Comer carne é um direito inquestionável de qualquer pessoa.
8. Um bom bife é incomparável.
9. Sentir-me- ia bem com uma alimentação sem carne.
10. Sou um grande apreciador de carne.
11. Se eu não pudesse comer carne iria sentir-me fraco.
12. Se fosse obrigado a deixar de comer carne sentir-me- ia triste.
13. A carne lembra-me doenças.
14. Ao comer carne lembro-me da morte e do sofrimento dos animais.
15. Comer carne é uma prática natural e indiscutível.
16. Não me imagino sem comer carne regularmente.

Appendix H – Study survey


Este estudo tem como principal objectivo conhecer vários hábitos e opiniões pessoais face a temas relacionados com a alimentação. Desta forma, este questionário inclui perguntas sobre os seus hábitos alimentares, sendo que terá como tarefa avaliar várias refeições e indicar-nos a sua opinião sobre vários alimentos.

Não existem respostas certas ou erradas, uma vez que apenas pretendemos compreender os vários hábitos alimentares e a sua opinião sincera face a esta temática.

É garantida a sua confidencialidade e o seu anonimato, uma vez que os dados serão analisados em conjunto com as respostas dos restantes participantes.

A participação neste estudo tem um carácter voluntário, pelo que pode negar a sua participação ou, a qualquer momento, desistir do estudo.

Se aceitar participar, para além de ter a oportunidade de colaborar num projecto de investigação, fica ainda habilitado a ganhar 50€ em Cartões Dá, que poderá utilizar nas lojas Continente, Worten, Zippy, Modalfa, Sport Zone, Well's e Book.it.



Aceito participar neste estudo.

Não pretendo realizar este estudo.

>>

De seguida, iremos apresentar algumas refeições.


Terá como tarefa avaliar essas refeições tendo em conta determinadas características.

>>


# The effect of cuteness appeal on the promotion of a more plant-based diet



**MASSA**



Observe o seguinte prato de massa.



Quão fácil/difícil é de perceber o que está representado na imagem?

Muito fácil 0 10 20 30 40 50 60 70 80 90 100 Muito difícil

Quão negativa/positiva é a refeição representada na imagem?

Muito negativa 0 10 20 30 40 50 60 70 80 90 100 Muito positiva


Quanto gostaria de comer esta refeição?

Nada 0 10 20 30 40 50 60 70 80 90 100 Extremamente


>>

# The effect of cuteness appeal on the promotion of a more plant-based diet

**MASSA**



Observe o seguinte prato de massa.



**Quão fácil/difícil é de perceber o que está representado na imagem?**

Muito fácil 0 10 20 30 40 50 60 70 80 90 100 Muito difícil

●

**Quão negativa/positiva é a refeição representada na imagem?**

Muito negativa 0 10 20 30 40 50 60 70 80 90 100 Muito positiva

●


**Quanto gostaria de comer esta refeição?**

Nada 0 10 20 30 40 50 60 70 80 90 100 Extremamente


●

>>>

**MASSA**



Observe o seguinte prato de massa.



**Quão fácil/difícil é de perceber o que está representado na imagem?**

Muito fácil 0 10 20 30 40 50 60 70 80 90 100 Muito difícil

●

**Quão negativa/positiva é a refeição representada na imagem?**

Muito negativa 0 10 20 30 40 50 60 70 80 90 100 Muito positiva

●

**Quanto gostaria de comer esta refeição?**

Nada 0 10 20 30 40 50 60 70 80 90 100 Extremamente

●

>>>

## REFEIÇÕES COM CARNE DE PORCO



## CARNE DE PORCO



Observe o seguinte prato de porco.



Quão fácil/difícil é de perceber o que está representado na imagem?

Muito fácil 0 10 20 30 40 50 60 70 80 90 100 Muito difícil



Quão negativa/positiva é a refeição representada na imagem?

Muito negativa 0 10 20 30 40 50 60 70 80 90 100 Muito positiva



Quanto gostaria de comer esta refeição?


Nada 0 10 20 30 40 50 60 70 80 90 100 Extremamente






# The effect of cuteness appeal on the promotion of a more plant-based diet

**CARNE DE PORCO**



Observe o seguinte prato de porco.



**Quão fácil/difícil é de perceber o que está representado na imagem?**

Muito fácil 0 10 20 30 40 50 60 70 80 90 100 Muito difícil

**Quão negativa/positiva é a refeição representada na imagem?**


Muito negativa 0 10 20 30 40 50 60 70 80 90 100 Muito positiva

**Quanto gostaria de comer esta refeição?**


Nada 0 10 20 30 40 50 60 70 80 90 100 Extremamente

>>>

**CARNE DE PORCO**



Observe o seguinte prato de porco.



**Quão fácil/difícil é de perceber o que está representado na imagem?**

Muito fácil 0 10 20 30 40 50 60 70 80 90 100 Muito difícil

**Quão negativa/positiva é a refeição representada na imagem?**

Muito negativa 0 10 20 30 40 50 60 70 80 90 100 Muito positiva

**Quanto gostaria de comer esta refeição?**

Nada 0 10 20 30 40 50 60 70 80 90 100 Extremamente

>>>

The effect of cuteness appeal on the promotion of a more plant-based diet

Appendix I – Manipulation check for condition

**Group Statistics**

	Condition	N	Mean	Std. Deviation	Std. Error Mean
Manipulation Check	1 High Cute	66	5,9091	1,38927	,17101
	2 Low Cute	71	5,0986	1,49432	,17734

**Independent Samples Test**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tail)	Mean Difference	Std. Error Difference	95% CI of the Difference	
									Lower	Upper
Manipulation Check	Equal variances assumed	,001	,975	3,281	135	,001	,81050	,24702	,32197	1,29903
	Equal variances not assumed			3,290	135,000	,001	,81050	,24636	,32327	1,29773

Appendix J – Descriptives of meals assessment

		<b>Descriptives</b>							
		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Desire to eat	High Cute	68	59,6032	25,35692	3,07498	53,4656	65,7409	,00	100,00
	Low Cute	71	55,7418	28,91925	3,43208	48,8968	62,5869	,00	100,00
	Control	62	63,6832	18,43027	2,34065	59,0028	68,3636	21,00	100,00
	Total	201	59,4978	24,94298	1,75934	56,0285	62,9670	,00	100,00
Recognizability	High Cute	68	18,7647	20,64692	2,50381	13,7671	23,7623	,00	82,33
	Low Cute	71	17,2019	19,07333	2,26359	12,6873	21,7165	,00	93,33
	Control	62	19,9570	20,86774	2,65021	14,6576	25,2564	,00	97,00
	Total	201	18,5804	20,10537	1,41812	15,7840	21,3768	,00	97,00
Valence	High Cute	68	61,4167	21,52606	2,61042	56,2063	66,6271	,00	100,00
	Low Cute	71	42,7371	18,65143	2,21352	38,3224	47,1518	,67	86,67
	Control	62	66,8871	19,16232	2,43362	62,0208	71,7534	17,33	100,00
	Total	201	56,5058	22,31343	1,57387	53,4023	59,6093	,00	100,00

The effect of cuteness appeal on the promotion of a more plant-based diet

Appendix K – Effect of condition on meals assessment

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Valence	Between Groups	21781,747	2	10890,873	27,719	,000
	Within Groups	77796,052	198	392,909		
	Total	99577,799	200			
Recognizability	Between Groups	254,723	2	127,361	,313	,732
	Within Groups	80590,449	198	407,022		
	Total	80845,172	200			
Desire to eat	Between Groups	2088,477	2	1044,239	1,690	,187
	Within Groups	122341,996	198	617,889		
	Total	124430,474	200			

Multiple Comparisons								
Dependent Variable		(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Valence	Tukey HSD	High Cute	Low Cute	18,67958*	3,36333	,000	10,7372	26,6220
			Control	-5,47043	3,48071	,260	-13,6900	2,7492
		Low Cute	High Cute	-18,67958*	3,36333	,000	-26,6220	-10,7372
			Control	-24,15001*	3,44546	,000	-32,2864	-16,0136
		Control	High Cute	5,47043	3,48071	,260	-2,7492	13,6900
			Low Cute	24,15001*	3,44546	,000	16,0136	32,2864
	Scheffe	High Cute	Low Cute	18,67958*	3,36333	,000	10,3843	26,9748
			Control	-5,47043	3,48071	,293	-14,0552	3,1143
		Low Cute	High Cute	-18,67958*	3,36333	,000	-26,9748	-10,3843
			Control	-24,15001*	3,44546	,000	-32,6478	-15,6522
		Control	High Cute	5,47043	3,48071	,293	-3,1143	14,0552
			Low Cute	24,15001*	3,44546	,000	15,6522	32,6478

\*. The mean difference is significant at the 0.05 level.

The effect of cuteness appeal on the promotion of a more plant-based diet

Appendix L – Overall participants’ meals assessment score

<b>One-Sample Statistics</b>				
	N	Mean	Std. Deviation	Std. Error Mean
Valence	201	56,5058	22,31343	1,57387
Recognizability	201	18,5804	20,10537	1,41812
Desire to eat	201	59,4978	24,94298	1,75934

<b>One-Sample Test</b>						
Test Value = 50						
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Valence	4,134	200	,000	6,50580	3,4023	9,6093
Recognizability	-22,156	200	,000	-31,41957	-34,2160	-28,6232
Desire to eat	5,398	200	,000	9,49776	6,0285	12,9670

The effect of cuteness appeal on the promotion of a more plant-based diet

Appendix M – Descriptives of willingness to follow a more plant-based diet

		<b>Descriptives</b>							
		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Willingness to reduce meat consumption	High Cute	68	3,18	1,360	,165	2,85	3,51	1	5
	Low Cute	71	3,38	1,408	,167	3,05	3,71	1	5
	Control	62	3,19	1,265	,161	2,87	3,51	1	5
	Total	201	3,25	1,345	,095	3,07	3,44	1	5
Willingness to avoid eating meat	High Cute	68	2,81	1,296	,157	2,50	3,12	1	5
	Low Cute	71	2,73	1,373	,163	2,41	3,06	1	5
	Control	62	2,50	1,315	,167	2,17	2,83	1	5
	Total	201	2,69	1,329	,094	2,50	2,87	1	5
Willingness to follow a plant-based diet	High Cute	68	2,87	1,424	,173	2,52	3,21	1	5
	Low Cute	71	2,49	1,433	,170	2,15	2,83	1	5
	Control	62	2,24	1,399	,178	1,89	2,60	1	5
	Total	201	2,54	1,435	,101	2,34	2,74	1	5

The effect of cuteness appeal on the promotion of a more plant-based diet

Appendix N – Effect of condition on willingness to follow a more plant-based diet

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Willingness to reduce meat consumption	Between Groups	1,768	2	,884	,486	,616
	Within Groups	360,292	198	1,820		
	Total	362,060	200			
Willingness to avoid eating meat	Between Groups	3,324	2	1,662	,940	,392
	Within Groups	349,930	198	1,767		
	Total	353,254	200			
Willingness to follow a plant-based diet	Between Groups	12,964	2	6,482	3,217	,042
	Within Groups	398,926	198	2,015		
	Total	411,891	200			

Multiple Comparisons								
Dependent Variable		(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	95% Confidence Interval		
						Sig.	Lower Bound	Upper Bound
Willingness to follow a plant-based diet	Tukey HSD	High Cute	Low Cute	,375	,241	,267	-,19	,94
			Control	,626*	,249	,034	,04	1,21
		Low Cute	High Cute	-,375	,241	,267	-,94	,19
			Control	,251	,247	,567	-,33	,83
		Control	High Cute	-,626*	,249	,034	-1,21	-,04
			Low Cute	-,251	,247	,567	-,83	,33
	Scheffe	High Cute	Low Cute	,375	,241	,300	-,22	,97
			Control	,626*	,249	,045	,01	1,24
		Low Cute	High Cute	-,375	,241	,300	-,97	,22
			Control	,251	,247	,597	-,36	,86
		Control	High Cute	-,626*	,249	,045	-1,24	-,01
			Low Cute	-,251	,247	,597	-,86	,36

\*. The mean difference is significant at the 0.05 level.

The effect of cuteness appeal on the promotion of a more plant-based diet

Appendix O – Overall participants’ willingness to follow a more plant-based diet

**One-Sample Statistics**

	N	Mean	Std. Deviation	Std. Error Mean
Willingness to reduce meat consumption	201	3,25	1,345	,095
Willingness to avoid eating meat	201	2,69	1,329	,094
Willingness to follow a plant-based diet	201	2,54	1,435	,101

**One-Sample Test**

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Willingness to reduce meat consumption	2,674	200	,008	,254	,07	,44
Willingness to avoid eating meat	-3,344	200	,001	-,313	-,50	-,13
Willingness to follow a plant-based diet	-4,522	200	,000	-,458	-,66	-,26



The effect of cuteness appeal on the promotion of a more plant-based diet

Appendix P – Effect of condition on willingness to follow a plant-based diet via mind attribution

Model = 4  
 Y = willingness to follow a PBD  
 X = condition  
 M = mind attribution

Sample size  
 201

\*\*\*\*\*  
 Outcome: mind attribution

Model Summary						
R	R-sq	MSE	F	df1	df2	p
,0312	,0010	1,1086	,1947	1,0000	199,0000	,6595

Model						
	coeff	se	t	p	LLCI	ULCI
constant	4,4666	,1995	22,3864	,0000	4,0732	4,8601
condition	,0407	,0922	,4413	,6595	-,1411	,2224

\*\*\*\*\*  
 Outcome: willingness to follow a pbd

Model Summary						
R	R-sq	MSE	F	df1	df2	p
,2994	,0896	1,8938	10,4558	2,0000	198,0000	,0000

Model						
	coeff	se	t	p	LLCI	ULCI
constant	1,6834	,5071	3,3199	,0011	,6835	2,6834
mind_at	,3307	,0950	3,4814	,0006	,1434	,5181
condition	-,3273	,1223	-2,6754	,0081	-,5686	-,0861

\*\*\*\*\* TOTAL EFFECT MODEL \*\*\*\*\*  
 Outcome: willingness to follow a pbd

Model Summary						
R	R-sq	MSE	F	df1	df2	p
,1762	,0310	2,0055	6,3563	1,0000	199,0000	,0125

Model						
	coeff	se	t	p	LLCI	ULCI
constant	3,1606	,2663	11,8695	,0000	2,6355	3,6858
condition	-,3139	,1245	-2,5212	,0125	-,5594	-,0684

\*\*\*\*\* TOTAL, DIRECT, AND INDIRECT EFFECTS \*\*\*\*\*

Total effect of X on Y						
Effect	SE	t	p	LLCI	ULCI	
-,3139	,1245	-2,5212	,0125	-,5594	-,0684	

Direct effect of X on Y						
Effect	SE	t	p	LLCI	ULCI	
-,3273	,1223	-2,6754	,0081	-,5686	-,0861	

## The effect of cuteness appeal on the promotion of a more plant-based diet

Indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
mind_At	,0135	,0315	-,0470	,0806

Partially standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
mind_At	,0094	,0220	-,0328	,0562

Completely standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
mind_At	,0076	,0176	-,0263	,0445

Ratio of indirect to total effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
mind_At	-,0429	1,3931	-,5579	,1692

Ratio of indirect to direct effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
mind_At	-,0411	,5059	-,3710	,1965

R-squared mediation effect size (R-sq\_med)

	Effect	Boot SE	BootLLCI	BootULCI
mind_At	-,0027	,0065	-,0184	,0084

Preacher and Kelley (2011) Kappa-squared

	Effect	Boot SE	BootLLCI	BootULCI
mind_At	,0084	,0130	,0001	,0320

Normal theory tests for indirect effect

	Effect	se	z	p
	,0135	,0320	,4210	,6737

\*\*\*\*\* ANALYSIS NOTES AND WARNINGS \*\*\*\*\*

Number of bootstrap samples for bias corrected bootstrap confidence intervals:  
5000

Level of confidence for all confidence intervals in output:  
95,00

NOTE: All standard errors for continuous outcome models are based on the HC3 estimator

----- END MATRIX -----

The effect of cuteness appeal on the promotion of a more plant-based diet

Appendix Q – Effect of condition on valence via mind attribution

Model = 4  
 Y = valence  
 X = condition  
 M = mind attribution

Sample size  
 201

\*\*\*\*\*  
 Outcome: mind attribution

Model Summary							
R	R-sq	MSE	F	df1	df2	p	
,0312	,0010	1,1086	,1947	1,0000	199,0000	,6595	

Model							
	coeff	se	t	p	LLCI	ULCI	
constant	4,4666	,1995	22,3864	,0000	4,0732	4,8601	
condition	,0407	,0922	,4413	,6595	-,1411	,2224	

\*\*\*\*\*  
 Outcome: valence

Model Summary							
R	R-sq	MSE	F	df1	df2	p	
,1578	,0249	490,3924	1,9834	2,0000	198,0000	,1403	

Model							
	coeff	se	t	p	LLCI	ULCI	
constant	64,3547	8,3397	7,7166	,0000	47,9086	80,8008	
mind_at	-2,8095	1,7160	-1,6372	,1032	-6,1935	,5746	
contition	2,4999	1,9231	1,2999	,1951	-1,2925	6,2923	

\*\*\*\*\* TOTAL EFFECT MODEL \*\*\*\*\*  
 Outcome: valence

Model Summary							
R	R-sq	MSE	F	df1	df2	p	
,0861	,0074	496,6783	1,5460	1,0000	199,0000	,2152	

Model							
	coeff	se	t	p	LLCI	ULCI	
constant	51,8058	4,1960	12,3466	,0000	43,5316	60,0801	
condition	2,3856	1,9186	1,2434	,2152	-1,3978	6,1690	

\*\*\*\*\* TOTAL, DIRECT, AND INDIRECT EFFECTS \*\*\*\*\*

Total effect of X on Y							
Effect	SE	t	p	LLCI	ULCI		
2,3856	1,9186	1,2434	,2152	-1,3978	6,1690		

Direct effect of X on Y							
Effect	SE	t	p	LLCI	ULCI		
2,4999	1,9231	1,2999	,1951	-1,2925	6,2923		

Indirect effect of X on Y

## The effect of cuteness appeal on the promotion of a more plant-based diet

	Effect	Boot SE	BootLLCI	BootULCI
mind_at	-,1143	,2956	-,9746	,2949

Partially standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
mind_at	-,0051	,0133	-,0441	,0134

Completely standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
mind_at	-,0041	,0106	-,0348	,0106

Ratio of indirect to total effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
mind_at	-,0479	4,8713	-3,7696	,1753

Ratio of indirect to direct effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
mind_at	-,0457	5,5535	-2,2387	,1986

R-squared mediation effect size (R-sq\_med)

	Effect	Boot SE	BootLLCI	BootULCI
mind_at	-,0007	,0024	-,0121	,0011

Preacher and Kelley (2011) Kappa-squared

	Effect	Boot SE	BootLLCI	BootULCI
mind_at	,0042	,0083	,0000	,0235

Normal theory tests for indirect effect

Effect	se	Z	p
-,1143	,3114	-,3670	,7136

\*\*\*\*\* ANALYSIS NOTES AND WARNINGS \*\*\*\*\*

Number of bootstrap samples for bias corrected bootstrap confidence intervals:

5000

Level of confidence for all confidence intervals in output:

95,00

NOTE: All standard errors for continuous outcome models are based on the HC3 estimator

----- END MATRIX -----

The effect of cuteness appeal on the promotion of a more plant-based diet

Appendix R – Effect of condition on willingness to follow a plant-based diet via desensitization

Model = 4  
 Y = willingness to follow a PBD  
 X = condition  
 M = desensitization

Sample size  
 201

\*\*\*\*\*  
 Outcome: desensitization

Model Summary

R	R-sq	MSE	F	df1	df2	p
,1841	,0339	1,1889	7,3633	1,0000	199,0000	,0072

Model

	coeff	se	t	p	LLCI	ULCI
constant	1,8065	,1816	9,9491	,0000	1,4485	2,1646
condition	,2529	,0932	2,7135	,0072	,0691	,4366

\*\*\*\*\*  
 Outcome: willingness to follow a pbd

Model Summary

R	R-sq	MSE	F	df1	df2	p
,3640	,1325	1,8047	17,3509	2,0000	198,0000	,0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	3,9197	,3051	12,8461	,0000	3,3180	4,5214
desensit	-,4202	,0818	-5,1379	,0000	-,5814	-,2589
condition	-,2076	,1212	-1,7123	,0884	-,4467	,0315

\*\*\*\*\* TOTAL EFFECT MODEL \*\*\*\*\*  
 Outcome: willingness to follow a pbd

Model Summary

R	R-sq	MSE	F	df1	df2	p
,1762	,0310	2,0055	6,3563	1,0000	199,0000	,0125

Model

	coeff	se	t	p	LLCI	ULCI
constant	3,1606	,2663	11,8695	,0000	2,6355	3,6858
condition	-,3139	,1245	-2,5212	,0125	-,5594	-,0684

\*\*\*\*\* TOTAL, DIRECT, AND INDIRECT EFFECTS \*\*\*\*\*

Total effect of X on Y

Effect	SE	t	p	LLCI	ULCI
-,3139	,1245	-2,5212	,0125	-,5594	-,0684

Direct effect of X on Y

Effect	SE	t	p	LLCI	ULCI
-,2076	,1212	-1,7123	,0884	-,4467	,0315

## The effect of cuteness appeal on the promotion of a more plant-based diet

Indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
desensit	-,1063	,0422	-,2032	-,0359

Partially standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
desensit	-,0740	,0290	-,1385	-,0247

Completely standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
desensit	-,0597	,0233	-,1119	-,0205

Ratio of indirect to total effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
desensit	,3385	1,3174	,1069	1,1911

Ratio of indirect to direct effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
desensit	,5118	94,0661	,0471	5,7240

R-squared mediation effect size (R-sq\_med)

	Effect	Boot SE	BootLLCI	BootULCI
desensit	,0179	,0116	,0022	,0510

Preacher and Kelley (2011) Kappa-squared

	Effect	Boot SE	BootLLCI	BootULCI
desensit	,0605	,0234	,0205	,1127

Normal theory tests for indirect effect

	Effect	se	z	p
	-,1063	,0449	-2,3647	,0180

\*\*\*\*\* ANALYSIS NOTES AND WARNINGS \*\*\*\*\*

Number of bootstrap samples for bias corrected bootstrap confidence intervals:  
5000

Level of confidence for all confidence intervals in output:  
95,00

NOTE: All standard errors for continuous outcome models are based on the HC3 estimator

----- END MATRIX -----

The effect of cuteness appeal on the promotion of a more plant-based diet

Appendix S – Effect of condition on desensitization

**Multiple Comparisons**

Dependent Variable: Desensitization

		(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Tukey HSD	1 High Cute	2 Low Cute		,00269	,18426	1,000	-,4324	,4378
		3 Control		-,51423*	,19069	,021	-,9645	-,0639
	2 Low Cute	1 High Cute		-,00269	,18426	1,000	-,4378	,4324
		3 Control		-,51692*	,18876	,018	-,9627	-,0712
	3 Control	1 High Cute		,51423*	,19069	,021	,0639	,9645
		2 Low Cute		,51692*	,18876	,018	,0712	,9627
Scheffe	1 High Cute	2 Low Cute		,00269	,18426	1,000	-,4518	,4572
		3 Control		-,51423*	,19069	,028	-,9845	-,0439
	2 Low Cute	1 High Cute		-,00269	,18426	1,000	-,4572	,4518
		3 Control		-,51692*	,18876	,025	-,9825	-,0514
	3 Control	1 High Cute		,51423*	,19069	,028	,0439	,9845
		2 Low Cute		,51692*	,18876	,025	,0514	,9825

\*. The mean difference is significant at the 0.05 level.

The effect of cuteness appeal on the promotion of a more plant-based diet

**Group Statistics**

	Condition	N	Mean	Std. Deviation	Std. Error Mean
Desensitization	1 High Cute	68	2,1471	,87698	,10635
	3 Control	62	2,6613	1,19861	,15222

**Independent Samples Test**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2- tailed )	Mean Differenc e	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Desensitization	Equal variances assumed	8,630	,004	-2,809	128	,006	-,51423	,18310	-,87652	-,15194
	Equal variances not assumed			-2,769	111,003	,007	-,51423	,18569	-,88220	-,14627



The effect of cuteness appeal on the promotion of a more plant-based diet

**Group Statistics**

	Condition	N	Mean	Std. Deviation	Std. Error
					Mean
Desensitization	2 Low Cute	71	2,1444	1,16087	,13777
	3 Control	62	2,6613	1,19861	,15222

**Independent Samples Test**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Desensitization	Equal variances assumed	,169	,682	-2,523	131	,013	-,51692	,20486	-,92219	-,11165
	Equal variances not assumed			-2,518	127,382	,013	-,51692	,20531	-,92319	-,11066

The effect of cuteness appeal on the promotion of a more plant-based diet

Appendix T – Effect of condition on valence via desensitization

Model = 4  
 Y = valence  
 X = condition  
 M = desensitization

Sample size  
 201

\*\*\*\*\*  
 Outcome: desensitization

Model Summary

	R	R-sq	MSE	F	df1	df2
p	,1841	,0339	1,1889	7,3633	1,0000	199,0000
	,0072					

Model

	coeff	se	t	p	LLCI	ULCI
constant	1,8065	,1816	9,9491	,0000	1,4485	2,1646
condition	,2529	,0932	2,7135	,0072	,0691	,4366

\*\*\*\*\*  
 Outcome: valence

Model Summary

	R	R-sq	MSE	F	df1	df2	p
	,3006	,0904	457,4599	9,4700	2,0000	198,0000	,0001

Model

	coeff	se	t	p	LLCI	ULCI
constant	41,1305	4,8550	8,4717	,0000	31,5563	50,7047
desensit	5,9093	1,4413	4,1001	,0001	3,0671	8,7515
condition	,8913	1,9281	,4623	,6444	-2,9110	4,6936

\*\*\*\*\* TOTAL EFFECT MODEL \*\*\*\*\*  
 Outcome: valence

Model Summary

	R	R-sq	MSE	F	df1	df2	p
	,0861	,0074	496,6783	1,5460	1,0000	199,0000	,2152

Model

	coeff	se	t	p	LLCI	ULCI
constant	51,8058	4,1960	12,3466	,0000	43,5316	60,0801
condition	2,3856	1,9186	1,2434	,2152	-1,3978	6,1690

\*\*\*\*\* TOTAL, DIRECT, AND INDIRECT EFFECTS \*\*\*\*\*

Total effect of X on Y

Effect	SE	t	p	LLCI	ULCI
2,3856	1,9186	1,2434	,2152	-1,3978	6,1690

Direct effect of X on Y

Effect	SE	t	p	LLCI	ULCI
,8913	1,9281	,4623	,6444	-2,9110	4,6936

## The effect of cuteness appeal on the promotion of a more plant-based diet

Indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
desensit	1,4943	,6904	,4193	3,1950

Partially standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
desensit	,0670	,0303	,0186	,1413

Completely standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
desensit	,0540	,0244	,0151	,1148

Ratio of indirect to total effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
desensit	,6264	10,7060	-,9333	20,1952

Ratio of indirect to direct effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
desensit	1,6766	72,3722	,3708	4058,0007

R-squared mediation effect size (R-sq\_med)

	Effect	Boot SE	BootLLCI	BootULCI
desensit	,0064	,0085	-,0050	,0319

Preacher and Kelley (2011) Kappa-squared

	Effect	Boot SE	BootLLCI	BootULCI
desensit	,0545	,0244	,0150	,1128

Normal theory tests for indirect effect

	Effect	se	Z	p
	1,4943	,6739	2,2174	,0266

\*\*\*\*\* ANALYSIS NOTES AND WARNINGS \*\*\*\*\*

Number of bootstrap samples for bias corrected bootstrap confidence intervals:  
5000

Level of confidence for all confidence intervals in output:  
95,00

NOTE: All standard errors for continuous outcome models are based on the HC3 estimator

----- END MATRIX -----