1 **Title**

2 What do you mean by hot? Assessing the associations raised by the visual depiction of an image of
3 fire on food packaging.

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18 **Abstract**

19 The images shown on food packaging play an important role in the processes of identification,
20 categorisation and the generation of expectations, since the consumer uses the images to infer
21 information about the product. However, a given image may convey different meanings (e.g. in a
22 food package, "fire" may mean *barbecued* or *spicy*), so it is very important for producers and
23 designers to understand the factors responsible for consumers inferring a specific meaning. This
24 paper addresses this problem and shows experimentally that the consumer tends to infer the
25 meaning from the image which is most congruent with the product it is displayed with. 65 participants
26 carried out two speeded classification tasks which results show an interaction between the product
27 (congruent vs. incongruent) and the image (with fire vs. without fire): products congruent with a
28 meaning of fire were categorised more quickly when shown with fire than without it, while products
29 incongruent with a meaning of fire were categorised more slowly when shown with fire than without it.
30 In addition, the results show that stimuli were categorised more quickly when the interpretation of fire
31 was literal (e.g. barbecue) than in those that were metaphorical (e.g. spiciness), indicating that the
32 rhetorical style of the image (literal or metaphorical) influences the cognitive effort required to
33 process it. These contributions improve our understanding of the effect of the images shown on
34 packaging in the communication between packaging and consumers.

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1 **Keywords**

2 Congruency; Categorisation; Semiotics; Expectations; Metaphors

3 **Highlights**

4 • The process by which consumers interpret ambiguous packaging imagery is studied.

5 • Congruency between image meanings and product attributes is used to infer meaning.

6 • High (low) congruency ease (slows) categorisation on a speeded classification task.

7 • The rhetorical style of an image influences the cognitive effort needed to process it.

8 • Processing a literal image requires less cognitive effort than a metaphorical image.

1. Introduction

When consumers first observe a product, they use its visual appearance to identify and categorise it (Loken, 2006; Loken, Barsalou, & Joiner, 2008). Categorisation is the process by which consumers organise and group information into categories, i.e. sets of entities, objects or events related to each other in some way. In the context of shopping in a supermarket, this process allows the consumer to group and classify the different products according to their attributes and common features (Loken et al., 2008). Indeed, packaging is considered a relevant communication tool used by brands to inform consumers (Azzi, Battini, Persona, & Sgarbossa, 2012; Mumani & Stone, 2018), and its different elements and features act as signs from which consumers infer meaning –enabling them to identify and categorise each product (Celhay & Remaud, 2018; Festila & Chrysochou, 2018; Spence, 2018). As indicated by Ares et al. (2011), based on the semiotics of Peirce (1991), two main types of signs can be distinguished in the context of food packaging: linguistic signs, which produce meaning only by social convention (e.g. texts and verbal expressions), and visual signs, which produce meaning by resemblance (e.g. colours, shapes, images and illustrations). Both types of signs are frequently used in food packaging and the consumer relies on both textual claims as well as images and other visual features to identify and categorise the product; thus enabling the generation of expectations (Smith et al., 2015). While the role played by linguistic signs and some visual signs such as colour in these processes have been widely studied to date (Kauppinen-Räisänen, 2014; Lähteenmäki, 2013; Magnier & Schoormans, 2017; Piqueras-Fiszman & Spence, 2015; Spence & Piqueras-Fiszman, 2014; Sütterlin & Siegrist, 2015); the specific effect of the images displayed on the packaging in the communication between package and consumer has received less attention.

Compared to textual claims, the role of images in the categorisation process is especially prominent because they are the first elements from which the consumer infers meaning: images capture the attention faster than texts (Honea & Horsky, 2012; Silayoi & Speece, 2007; Venter, van der Merwe, de Beer, Kempen, & Bosman, 2011) and their processing require less cognitive effort (Mueller, Lockshin, & Louviere, 2009; Underwood & Klein, 2002). Images access the semantic representation of a concept with more speed than words (Pellegrino, Rosinski, Chiesi, & Siegel, 1977; Potter & Faulconer, 1975; Smith & Magee, 1980), so the consumer generates expectations more quickly by seeing an image than by reading a text (Underwood & Klein, 2002). Controlling the first impact produced by a package through the way in which the image is interpreted is crucial, since the first impression tends to influence the judgment of the consumer and may condition the subsequent attitude towards the product (Epley & Gilovich, 2006; Madzharov & Block, 2010).

However, it should be noted that not all images are processed in the same way. The rhetorical style of an image conditions the way in which its meaning is processed. The rhetorical style of an image refers to whether its meaning is literal or metaphorical (Jeong, 2008; Phillips & McQuarrie, 2002). From a cognitive point of view, the process by which a metaphorical message is decoded is more complex than that to interpret a literal message, since it evokes a set of more complex semantic associations in the memory of the observer (Gentner, 1983; Jeong, 2008). The rhetorical style of an image is assumed to be literal when its possible meanings are directly related to the object represented (e.g. showing an image of a strawberry on a food package reminds the consumer that the strawberries have some relation with the flavour, aroma or shape of the product; Smith et al.,

1 2015), while it is assumed that the rhetorical style is metaphorical when the possible meanings of the
2 image are related to another domain than that of the represented object (e.g. showing an image of a
3 lion (source domain) as a metaphor of force in a coffee package (target domain); Fenko, Vries, &
4 Rompay, 2018). It may even be the case that the same image has an ambiguous rhetorical style and
5 can adopt both literal and metaphorical meanings within the same context: e.g. showing an image
6 that represents fire on a food package can have a literal meaning (barbecue) or a metaphorical one
7 (spiciness).

8 In practice, it is not easy for a designer to anticipate the meaning a consumer will infer from an image
9 displayed on a food package. An image by itself is propositionally indeterminate and can evoke many
10 interpretations in the mind of the consumer, since it lacks the syntactic devices necessary to emit an
11 explicit propositional meaning (Messaris, 1994, 1997; Smith et al., 2015). For example, consider the
12 case of depicting a strawberry on a food package: the consumer may interpret the product as tasting
13 of strawberries, made of strawberries and so on (Smith et al., 2015). Although this propositional
14 indeterminacy can be broken by making the meaning of the image explicit by using supporting text
15 (Barthes, 1977; Phillips, 2000), the paths by which the meanings of both components are decoded
16 (text and image) are different and can lead to different interpretations. In that case, an additional
17 process is required through which a definitive meaning is selected and the conflict thus resolved
18 (Lewis & Walker, 1989), which can negatively affect the processing fluency and the overall attitude
19 toward the product (Alter & Oppenheimer, 2009). However, for a packaging designer, knowing the
20 factors responsible for the same image evoking one meaning or another in different contexts is
21 essential to achieving effective communication with the consumer through packaging. This research
22 aims to shed light in this regard by proposing that the congruence between the possible meanings of
23 an image displayed on a food package and the product in which it is applied is key in the process by
24 which consumers infer meaning from that image.

25 The context in which an image is depicted (e.g. the signs and cues that surround it) helps the
26 observer's brain to consider its possible meanings (Miller, Malhotra, & King, 2006). Thus, it is
27 assumed that the same image will elicit a different set of associations according to its context since,
28 according to Sperber and Wilson's principle of relevance (Sperber & Wilson, 1995), the consumer will
29 assume that the presence of the image is relevant in that context and discard the meanings that do
30 not fit it. For example, it is reasonable to think that the same image of fire will convey meanings
31 related to danger if displayed on a chemical container (e.g. hazardous or flammable), or meanings
32 related to food if displayed on a food package (although it is worth noting that there may be some
33 exceptions, as in the case of icons referring the food package itself). Therefore, in the context of food
34 packaging, a fire image could elicit literal meanings (directly related to fire, e.g. barbecue) or
35 metaphorical meanings (related to the sensory domain, e.g. spiciness; Caterina, Schumacher,
36 Timinaga, & Rosen, 1997; Tu, Yang, & Ma, 2016).[1] As a result, we propose:

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[1] It is worth noting that, strictly speaking, for the fire image meaning to be considered purely 'literal', it should refer to nothing but fire itself. However, in the present paper the term 'literal meaning' will be used to intuitively refer to meanings that are directly related to fire (such as *barbecue* or *roast*). Additionally, although both literal and metaphorical meanings may still contain different possible

H1a. The meanings elicited by an image of fire depicted on food packaging will be directly related to food.

H1b. The meanings elicited by an image of fire depicted on food packaging will have a literal and/or a metaphorical meaning.

Once the possible meanings have been limited after this categorisation process, different interpretations for the same image may still exist. Following the previous example, when depicted on a food package fire can still convey meanings like barbecue and/or spiciness. In the fields of semantics and language, some lines of analysis have been developed that seek to understand the factors by which an indeterminate stimulus evokes a particular meaning. Discussing the existing literature on this subject, Smith et al. (2015) distinguish between two approaches: the slot/filler approach and the analogy approach. The slot/filler approach assumes that if one of the possible meanings of the sign (filler) fits well with any of the possible attributes of the object (slot), the probabilities of opting for that meaning will be greater (Fillmore & Baker, 2010; Lynott & Connell, 2010; Smith, Osherson, Rips, & Keane, 1988). On the other hand, the analogy approach states that the interpretation that has proved valid in similar past combinations will be preferred (Estes & Jones, 2006; Gagné & Spalding, 2006; van Jaarsveld, Coolen, & Schreuder, 1994; see also Gregan-Paxton & John, 1997). According to these approaches, consumers look for congruent associations already existing in their memory when assigning a meaning to a propositionally indeterminate image. Consequently, continuing with the example of fire, the determining factor that would cause the consumer's brain to opt for a specific meaning (literal or metaphorical) would be the congruence of the product with some of these meanings (for an elaboration on congruence/incongruence see Heckler & Childers, 1992). For example, consider a jar of pickles: these can be spicy (i.e. it would be congruent with the metaphorical meaning of fire) but they are not directly related to fire, as they are eaten raw and cold (i.e. it is incongruent with the literal meaning of fire). In that case, we would expect that showing a fire image on a jar of pickles would evoke a metaphorical meaning in the consumer's brain and not literal, as it is the meaning most consistent with that category of product. Thus, we propose:

H2. The meaning assigned by the consumer to an image of fire depicted on food packaging will tend to be that which is more congruent with the product attributes.

According to this reasoning, displaying a fire image next to a product opens up two possibilities. If the product category is congruent with any of the possible meanings of fire (e.g. a steak), the consumer will have a previous congruent association accessible in their memory (barbecue) and processing the pairing will require low cognitive effort. However, if the product category is not consistent with any of the possible meanings of fire (e.g. yoghurt), the consumer will not have any prior congruent

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meanings in their interior (e.g. the literal meaning includes concepts such as *barbecue* or *roast*), for the sake of clarity from now on we will refer to the possible meanings for an image of fire depicted on food packaging as being simply 'literal' or 'metaphorical'.

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association accessible in his memory and processing the pairing will require greater cognitive effort. Accordingly, we hypothesise:

> H3. The classification of a product category congruent with a meaning of fire will be faster if it is displayed with (vs. without) an image of fire. Similarly, the classification of a product category incongruent with any meaning of fire will be faster if it is displayed without (vs. with) an image of fire.

Finally, as previously stated, we know that metaphorical reasoning requires greater cognitive processing and preparation than literal reasoning, due to the greater number of semantic concepts mobilised (Gentner, 1983; Jeong, 2008; Messaris, 1997). Therefore, we hypothesise:

> H4. When displayed with an image of fire the classification of a product category congruent with a literal meaning of fire will be faster than the classification of a product category congruent with a metaphorical meaning of fire.

To summarise, consumers interpret and assign meaning to the images shown on a food package, which influences how they identify and categorise the product and the expectations it generates. Understanding this process is fundamental to ensure that the meaning the consumer assigns to the images depicted on a package is that intended by producers and designers, as well as to promote laws that hinder the use of deceptive messages (Smith, Barratt, & Selsøe Sørensen, 2015; Smith, Møgelvang-Hansen, & Hyldig, 2010). A well-designed package that is easy to interpret and process may improve the global attitude towards the product by reducing processing fluency (Alter & Oppenheimer, 2009) and diminishing the risk of a disconfirmation of expectations (Deliza & MacFie, 1996; Piqueras-Fiszman & Spence, 2015; Schifferstein, 2001). This study goes a step further in this direction by investigating the way in which displaying an image of fire on a food package influences the associations accessed by the consumer and the cognitive effort necessary to process them.

2. Methods

In order to test the proposed hypotheses, two pretests and a main study were conducted. Pretest 1 aimed to assess whether showing a fire image on a food package produces either literal or metaphorical meanings related to food (H1). Pretest 2 aimed to analyse if showing a fire image on a food package makes consumers tend to elicit a meaning that is congruent with both the fire image and the product's possible attributes (i.e. makes a possible product attribute congruent with the fire image more easily accessible on consumers' mind, H2). Finally, the main study aimed to investigate whether the congruence between the image's possible meanings and the product's potential attributes influences the easiness of classifying the product on a speeded classification task (H3), and whether the image's rhetorical style (i.e. literal or metaphorical) affects the cognitive effort required to process it (H4).

2.1. Pretest 1

A group of 35 participants (18 male, mean age 20.8 years) completed an open-ended task. They had to imagine they were shopping in a supermarket and had to complete the sentence: *When I see fire represented on a food package label, I think it means this product is…* The participants were asked

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to give as many answers as they wanted and respond as quickly as possible. A panel of 3 experts analysed and grouped the answers according to their meaning (e.g. *must be done on a barbecue* or *has been cooked on the grill* would be included under the category *Barbecue*). The meanings elicited were: *Picante* (Spanish for *spicy hot*, N=34, 97.1%), *Caliente* (Spanish for *temperature hot*, N=9, 25.7%), *Barbacoa* (Spanish for *barbecue*, N=5, 14.3%) and *Tostado* (Spanish for *roasted*, N=2, 5.7%). These results support H1a and H1b, since all meanings are related to food and can be grouped into literal meanings (*Temperature hot*, *Barbecue*, *Roasted*) and metaphorical meanings (*Spicy hot*)[2].

2.2. Pretest 2

Two jars of pickles visuals were designed which differed only in the depiction of an image of fire on the label (with fire vs. without fire, Fig. 1). 50 participants (26 male, mean age 21 years) took part in a free elicitation task responding to the request: *Say the first 5 things that come to your mind when you see this product*. A between-subject design was used, where each participant saw only one of the two jars. Once that task was completed, the participants indicated the degree of congruence of the pickle category with the literal and metaphorical meanings of fire by stating whether or not they agreed with the following phrases: *Pickles can be done on the barbecue, have a barbecue flavour or be roasted* (congruence with the literal meaning) or *Pickles can be spicy* (congruent with the metaphorical meaning). Checks were carried out to ensure there were no differences in terms of age, gender or level of congruence of the product between the two groups. As in the previous pre-test, a panel of 3 experts analysed the responses and excluded all those not related to any possible meaning of fire (e.g. *jar*, *transparent* or *black*). In the group that saw the jar without the image of fire, none elicited any concept related to fire. However, 20 participants of the group that saw the jar with the fire image elicited the 'spicy' concept (N=20, 80%). No participant elicited a literal concept of fire. This result is explained by this product being considered congruent with the 'spicy' concept and incongruent with the literal meanings of fire, as shown by the participants' answers to the questions related to the congruence of the product with the literal and metaphorical meanings of fire. Thus, it can be seen that a majority of these 20 participants considered the product congruent only with the metaphorical meaning (i.e. it could make sense that some pickles are spicy, N=11, 55%); some considered it consistent with the metaphorical and literal meanings (i.e. it may make sense that some pickles are spicy and cooked on the barbecue, have a barbecue flavour or be roasted, N = 6, 30%); while some did not consider it congruent with any (i.e. it did not make sense that pickles are spicy or that they have been barbecued, have a barbecue flavour or are roasted, N=3, 15%). These results show that displaying a fire image on a food package makes concepts accessible in the consumer's memory that would otherwise remain hidden and which align with the most congruent attributes for that product; supporting H2.

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[2] From now on, we will refer to *Spicy hot* simply as *Spicy*.

Fig. 1. Stimuli used in the second pretest

2.3. Main study

2.3.1. Participants

The participants consisted of 65 students (35 female, mean age 20.7 years, sd=2.5) from the University of Zaragoza, in exchange for being included in a raffle for 6 gift vouchers for a well-known online store. All the participants were unaware of the real objective of the study and participated voluntarily.

2.3.2. Procedure

The main study consisted of two speeded classification tasks and a manipulation check. The speeded classification tasks aimed (1) to study the effect of the congruency between an image and a product category on the easiness of classifying the product, i.e. H3; and (2) to assess the effect of the rhetorical style of the image on the cognitive effort required to process it, i.e. H4. The objective of the manipulation check was to determine if the stimuli chosen for each speeded classification task were adequate.

2.3.2.1. Speeded classification tasks

Two speeded classification tasks were conducted: The *Literal speeded classification task* (Literal SCT) and the *Metaphorical speeded classification task* (Metaphorical SCT). The aim of the Literal SCT was to analyse the effect of displaying an image of fire on classifying product categories congruent or incongruent with the literal meanings of fire (i.e. barbecue, roasted); whereas the aim of the Metaphorical SCT was to analyse the effect of displaying an image of fire on classifying product categories congruent or incongruent with the metaphorical meaning of fire (i.e. spicy). Thus, the participants' task in the Literal SCT was to classify, as quickly and accurately as possible, if the product shown on the screen *could be barbecued, have barbecue flavour or be roasted* vs. *cannot be*

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barbecued, have barbecue flavour or be roasted. On the other hand, in the Metaphorical SCT participants had to quickly and accurately classify if the product shown on the screen *is spicy/could be marketed as spicy* vs. *is not spicy or could not be marketed as spicy*. A within-subject design was followed, so that all the participants performed both the Literal SCT and the Metaphorical SCT. The task that each participant had to perform first was randomly assigned, and a distractor task was conducted between both SCTs in order to avoid priming (Johnston & Dark, 1986). The structure of both tasks was identical and was designed following the Semin & Palma (2014) procedure.

At the beginning of each SCT a screen with instructions was displayed indicating how the product categories should be classified. Responses were given by pressing either the E or the I keys on the keyboard. The response keys were counterbalanced across participants, so that in each SCT half of the participants classified a set of products with one key and the other set with the other. At the beginning of each trial, a grey (R:159, G:159, B:159) fixation cross on a dark background was shown for 500ms. Next, the name of a product category was displayed for 1000ms, at which time the participant had to give an answer. A response window of 1000ms was established after pretesting with volunteers who did not participate in the final experiment. If participants made an error or did not answer within 1000ms, feedback of a red cross on the screen was shown. After each response, a dark screen was displayed for 500ms. In total, each SCT consisted of 64 trials. Each SCT was preceded by a set of 8 practice trials with 2 products corresponding to one category and 2 products corresponding to the other, which did not appear in the main trials and were not analysed.

2.3.2.2. Manipulation check

Once both the Literal SCT and the Metaphorical SCT were completed, the participants performed a manipulation check by answering a questionnaire in order to verify that the product categories selected as congruent and incongruent for each task really were so. The participants indicated the degree of congruence of each of the product categories shown in each speeded classification task with both the literal and metaphorical meanings of fire, indicating whether or not they agreed with the following sentences: *This product can be barbecued, have barbecue flavour or be roasted* (congruency with the literal meaning) and *This product can be spicy* (congruency with the metaphorical meaning).

2.3.3.   Apparatus and materials

The test took place in a quiet room with stable and homogeneous conditions of light and temperature. Upon arrival, each participant was seated in a single cubicle about 50cm in front of a 17" CRT monitor with a resolution of 1366 x 768px and a refresh rate of 60Hz, and performed the experiment following the instructions shown on the screen. OpenSesame 3.1.9 software was used to present the stimuli and collect the data (Mathôt, Schreij & Theeuwes, 2012).

In each speeded classification task, a total of 16 product categories had to be classified, of which 8 were congruent and 8 were incongruent with the corresponding meaning (Table 1). The product categories selected as congruent and incongruent for each task were selected and agreed upon by a panel of 3 experts before conducting the experiment (and subsequently evaluated with a manipulation check, see next section). Care was taken so that the size of the names was as

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1 homogeneous as possible between categories. Each of the 16 products could be displayed either
2 together with a fire image or on their own, resulting in a total of 32 stimuli for each task. Each
3 stimulus consisted of the name of the product category displayed in grey (R:159, G:159, B:159),
4 upper case Open Sans Condensed 40pt font against a dark background. The stimuli with fire had an
5 image of fire placed above the category name (Fig. 2). Care was taken so that the fire image size
6 was always the same. The stimuli were designed with Adobe Photoshop CC 2017.1.1 (Adobe
7 Systems Incorporated, 2006). Each of the 32 stimuli shown in each task was shown twice, resulting
8 in a total of 64 trials per task (128 trials in the whole experiment, including the 64 trials of the Literal
9 SCT and the 64 trials of the Metaphorical SCT). Trial order was randomised across participants in
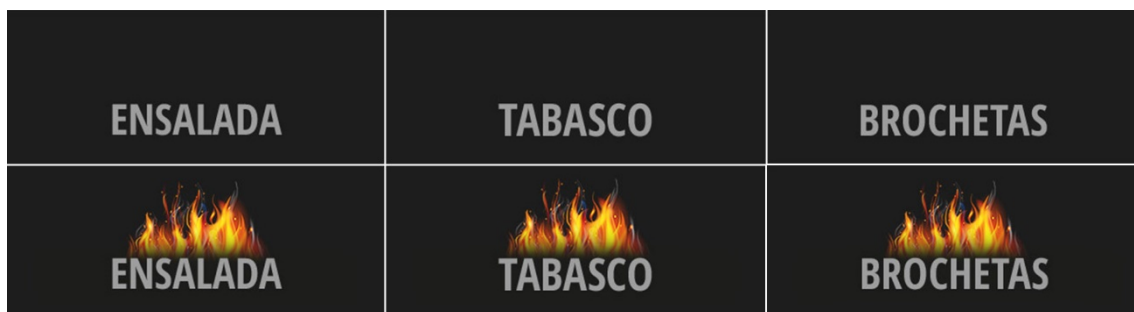10 each task.

Table 1

Product categories used in the speeded classification tasks

Literal SCT (literal meaning; i.e. barbecued, roasted)		Metaphorical SCT (metaphorical meaning; i.e. spicy)	
Congruent	Incongruent	Congruent	Incongruent
Skewers	Mineral water	Peanuts	Mineral water
Peanuts	Salad	Cayenne pepper	Strawberries
Burger	Strawberries	Chili pepper	Lemonade
Potato chips	*Gazpacho*[1]	Potato chips	Ice cream
Sliced turkey	Lettuce	Kebab	Milk
Kebab	Melon	*Salsa brava*[2]	Lettuce
Ribs	Whipped cream	Tabasco	Whipped cream
Sausages	Grapes	Wasabi	Natural yoghurt

[1] A cold soup well known in Spain

[2] A spicy pepper sauce well known in Spain

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13 **Fig. 2.** Examples of the stimuli (salad, tabasco, and skewers, from left to right) without fire (above)
14 and with fire (below) used in the speeded classification tasks.

15 2.3.4. Data analyses

16 2.3.4.1. Manipulation check

17 The congruency of the products chosen to be displayed in each task with the corresponding meaning
18 of fire (i.e. the literal meanings in the Literal SCT or the metaphorical meaning in the Metaphorical
19 SCT) was analysed separately by means of a chi-square in contingency tables. In addition, in order
20 to check if the product categories chosen to be classified as congruent/incongruent could be

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subsequently analysed as single congruent/incongruent product category sets, a Ward's hierarchical cluster analysis using squared Euclidean distances as proximity measures was conducted for the product categories of each SCT.

2.3.4.2. Effect of congruency between fire image meaning and product category on classification easiness

The data of each SCT was analysed separately in a 2 x 2 repeated measures ANOVA with product category congruency (congruent, incongruent) and fire depiction (with fire, without fire) as the two factors and the mean reaction time (RT) required to classify each product category as the dependent variable (measured in ms). The RTs of the incorrect trials (i.e. wrong answers and participants who did not respond within 1000ms, 12.62% in the Literal SCT and 11.85% in the Metaphorical SCT) or who deviated by more than 3 standard deviations from the participants' conditional mean (0.79% of the correct answers in the Literal SCT and 0.65% of the correct answers in the Metaphorical SCT) were excluded from the analyses (Semin & Palma, 2014).

2.3.4.3. Effect of fire image rhetorical style on the cognitive effort required to process it

A one-way repeated measures ANCOVA was conducted in order to verify if the mean RTs needed to classify the congruent products shown with fire in the Literal SCT was lower than the mean RTs needed to classify the congruent products shown with fire in the Metaphorical SCT. As the congruent products classified in each SCT were not the same, there is a risk that the products used in one task were easier to classify than those used in the other task. To eliminate this possible effect, the difference between the RTs of the congruent products shown without fire in both SCTs was included as a covariate ($\Delta = RT_{\text{congruent without fire (Literal SCT)}} - RT_{\text{congruent without fire (Metaphorical SCT)}}$).

In all cases, effects were considered statistically significant when $p < 0.05$. The data was processed and analysed by using SPSS Statistics 23 (Armonk, NY, USA).

3. Results

3.1. Manipulation check

3.1.1. Literal SCT stimuli

A chi-square test was done to analyse the congruence of the products chosen to be classified as congruent or incongruent with the literal meanings of fire (i.e. barbecue, roasted) in the Literal SCT. The chi-square association was statistically significant ($\chi^2 = 922$, $p < 0.001$; Table 2), indicating that the selection of products was adequate. Thus, the response latencies for all products were analysed.

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Table 2

Evaluation of the participants regarding the congruence of each product displayed in the Literal SCT with the literal meanings of fire.

Note: Figures denote number of subjects. Not all products add up to 65 responses, as some participants left some questions unanswered.

Products proposed as congruent			Products proposed as incongruent		
Product	Congruent	Incongruent	Product	Congruent	Incongruent
Skewers	62 (100%)	0 (0%)	Mineral water	1 (1.6%)	61 (98.4%)
Peanuts	61 (98.4%)	1 (1.6%)	Salad	2 (3.1%)	63 (96.9%)
Burger	65 (100%)	0 (0%)	Strawberries	0 (0%)	65 (100%)
Potato chips	56 (88.9%)	7 (11.1%)	*Gazpacho*	7 (10.8%)	58 (89.2%)
Sliced turkey	62 (96.9%)	2 (3.1%)	Lettuce	1 (1.6%)	63 (98.4%)
Kebab	64 (100%)	0 (0%)	Melon	2 (3.1%)	62 (96.9%)
Ribs	64 (98.5%)	1 (1.5%)	Whipped cream	0 (0%)	64 (100%)
Sausages	65 (100%)	0 (0%)	Grapes	3 (4.7%)	61 (95.3%)

The results of the cluster analysis revealed that the eight product categories chosen to be classified as congruent with the literal meanings of fire made up a single congruent cluster, and that the eight product categories chosen to be classified as incongruent with the literal meanings of fire made up a single incongruent cluster (Table 3; see also Dendrogram in Fig. 3a). Thus, the eight congruent product categories were subsequently analysed as a single congruent product category set, whereas the eight incongruent product categories were analysed as a single incongruent product category set.

Table 3

Ward's hierarchical cluster analysis of the products chosen as congruent/incongruent with the literal meanings of fire

Stage	Cluster combined		Coefficients	Stage cluster first appears		Next stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	Strawberries	Whipped cream	,000	0	0	5
2	Kebab	Sausages	,000	0	0	3
3	Skewers	Kebab	,000	0	2	4
4	Skewers	Burger	,000	3	0	6
5	Strawberries	Lettuce	,667	1	0	7
6	Skewers	Ribs	1,467	4	0	8
7	Mineral water	Strawberries	2,300	0	5	10
8	Skewers	Peanuts	3,167	6	0	11
9	Salad	Grapes	4,667	0	0	12
10	Mineral water	Melon	6,367	7	0	12
11	Skewers	Sliced turkey	8,129	8	0	14
12	Mineral water	Salad	10,857	10	9	13
13	Mineral water	*Gazpacho*	15,554	12	0	15
14	Skewers	Potato chips	21,250	11	0	15
15	Skewers	Mineral water	237,625	14	13	0

3.1.2. Metaphorical SCT stimuli

As in the previous case, a chi-square test was done to analyse the congruence of the products chosen to be classified as congruent or incongruent with the metaphorical meanings of fire (i.e. spicy) in the Metaphorical SCT. The chi-square association was statistically significant ($\chi^2 = 859$,

12

1 p<0.001; Table 4), indicating that the selection of products was also adequate. The response
2 latencies for all products were thus analysed.

Table 4

Evaluation of the participants regarding the congruence of each product displayed in the Metaphorical SCT with the metaphorical meanings of fire.

Note: Figures denote number of subjects. Not all products add up to 65 responses, as some participants left some questions unanswered.

Products proposed as congruent			Products proposed as incongruent		
Product	Congruent	Incongruent	Product	Congruent	Incongruent
Peanuts	55 (88.7%)	7 (11.3%)	Mineral water	1 (1.6%)	61 (98.4%)
Cayenne pepper	61 (98.4%)	1 (1.6%)	Strawberries	2 (3.1%)	63 (96.9%)
Chili pepper	62 (100%)	0 (0%)	Lemonade	8 (12.3%)	57 (87.7%)
Potato chips	61 (95.3%)	3 (4.7%)	Ice cream	19 (29.2%)	46 (70.8%)
Kebab	64 (100%)	0 (0%)	Milk	0 (0%)	64 (100%)
Salsa brava	65 (100%)	0 (0%)	Lettuce	1 (1.6%)	63 (98.4%)
Tabasco	64 (100%)	0 (0%)	Whipped cream	1 (1.6%)	63 (98.4%)
Wasabi	63 (98.4%)	1 (1.6%)	Natural yoghurt	4 (6.3%)	60 (93.8%)

3

4 The results of the cluster analysis showed that the eight product categories chosen to be classified
5 as congruent with the metaphorical meanings of fire made up a single congruent cluster, and that the
6 eight product categories chosen to be classified as incongruent with the metaphorical meanings of
7 fire made up a single incongruent cluster (Table 5; see also Dendrogram in Fig. 3b). Thus, the eight
8 congruent product categories were subsequently analysed as a single congruent product category
9 set, whereas the eight incongruent product categories were analysed as a single incongruent product
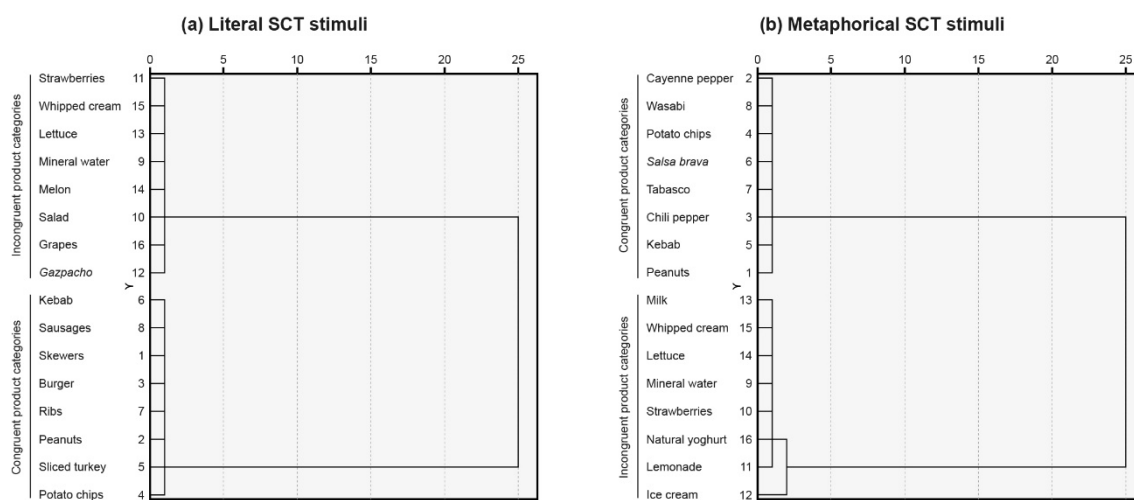10 category set.

Table 5

Ward's hierarchical cluster analysis of the products chosen as congruent/incongruent with the metaphorical meanings of fire

Stage	Cluster combined		Coefficients	Stage cluster first appears		Next stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	Cayenne pepper	Wasabi	,000	0	0	8
2	*Salsa brava*	Tabasco	,000	0	0	3
3	Chili pepper	*Salsa brava*	,000	0	2	4
4	Chili pepper	Kebab	,000	3	0	10
5	Milk	Whipped cream	,500	0	0	6
6	Milk	Lettuce	1,333	5	0	7
7	Mineral water	Milk	2,250	0	6	9
8	Cayenne pepper	Potato chips	3,583	1	0	10
9	Mineral water	Strawberries	5,333	7	0	11
10	Cayenne pepper	Chili pepper	7,429	8	4	12
11	Mineral water	Natural yoghurt	10,595	9	0	13
12	Peanuts	Cayenne pepper	15,917	0	10	15
13	Mineral water	Lemonade	21,321	11	0	14
14	Mineral water	Ice cream	33,750	13	0	15
15	Peanuts	Mineral water	239,000	12	14	0

11

(a) Literal SCT stimuli

Incongruent product categories:
- Strawberries 11
- Whipped cream 15
- Lettuce 13
- Mineral water 9
- Melon 14
- Salad 10
- Grapes 16
- *Gazpacho* 12

Congruent product categories:
- Kebab 6
- Sausages 8
- Skewers 1
- Burger 3
- Ribs 7
- Peanuts 2
- Sliced turkey 5
- Potato chips 4

(b) Metaphorical SCT stimuli

Congruent product categories:
- Cayenne pepper 2
- Wasabi 8
- Potato chips 4
- *Salsa brava* 6
- Tabasco 7
- Chili pepper 3
- Kebab 5
- Peanuts 1

Incongruent product categories:
- Milk 13
- Whipped cream 15
- Lettuce 14
- Mineral water 9
- Strawberries 10
- Natural yoghurt 16
- Lemonade 11
- Ice cream 12

1

2   **Fig. 3.** Dendrogram obtained by means of Ward's hierarchical cluster analysis for the products

3   chosen as congruent/incongruent with the (a) literal meanings of fire (i.e. barbecue, roasted) and (b)

4   metaphorical meaning of fire (i.e. spicy)

5   3.2. Effect of congruency between fire image meaning and product category on classification

6   easiness

7   3.2.1.   Literal SCT

8   For the literal meanings of fire (i.e. barbecue, roasted; assessed in the Literal SCT) the predicted

9   interaction between product category congruency and fire depiction was significant, $F(1,64)=51.59$,

10    $p<0.001$, $\eta^2_p=0.45$, supporting H3 (Fig. 4a). Participants classified the congruent product categories

11   significantly faster when they were displayed with fire ($\bar{X}=584$ ms, SD=51) than when they were

12   displayed without fire ($\bar{X}=605$ ms, SD=59), $t(64)=4.18$, $p<0.001$. Furthermore, participants classified

13   the incongruent product categories significantly faster when they were displayed without fire

14   ($\bar{X}=567$ ms, SD=44) than when they were displayed with fire ($\bar{X}=602$ ms, SD=44), $t(64)=7.74$,

15    $p<0.001$. The effect on the response times of depicting fire was greater for the incongruent products

16   than for the congruent products, as the difference in times needed to classify the incongruent

17   products with fire and without fire ($\bar{X}=35$ ms, SD=37) was larger than the difference in the times

18   needed to classify the congruent products with fire and without fire ($\bar{X}=21$ ms, SD=40), $t(64)=2.60$,

19    $p=0.012$. These results were not influenced by counterbalancing the response keys, as neither of the

20   possible interactions was significant (Congruence × Keys $F(1,63)=0.36$, $p=0.55$, $\eta^2_p<0.01$; Fire ×

21   Keys $F(1,63)=1.60$, $p=0.21$, $\eta^2_p=0.025$; Congruence × Fire × Keys $F(1,63)=2.70$, $p=0.10$, $\eta^2_p=0.04$).

22   3.2.2.   Metaphorical SCT

23   For the metaphorical meaning of fire (i.e. spicy; assessed in the Metaphorical SCT) the hypothesised

24   interaction between product category congruency and fire depiction was also significant:

25    $F(1,64)=36.75$, $p<0.001$, $\eta^2_p=0.36$, supporting H3 (Fig. 4b). Participants classified the congruent

26   product categories significantly faster when they were displayed with fire ($\bar{X}=607$ ms, SD=69) than

27   when they were displayed without fire ($\bar{X}=620$ ms, SD=62), $t(64)=2.15$, $p=0.035$. However,

28   participants classified the incongruent product categories significantly faster when they were

14

1 displayed without fire (X̄=578 ms, SD=56) than when they were displayed with fire (X̄=617 ms,

2 SD=54), t(64)=7.33, p<0.001. Similarly to the Literal SCT, the effect of depicting fire on the response

3 times was larger for the incongruent products than for the congruent products, as the difference in

4 the times needed to classify the incongruent products with fire and without fire (X̄=38 ms, SD=42)

5 was larger than the difference among the times needed to classify the congruent products with fire

6 and without fire (X̄=13 ms, SD=48), t(64)=3.43, p<0.001. These results were not influenced by

7 counterbalancing the response keys, as neither of the possible interactions was significant

8 (Congruence × Keys $F_{(1,63)}$=3.21, p=0.08, η^2_p=0.05; Fire × Keys $F_{(1,63)}$=0.73, p=0.40, η^2_p=0.01;

9 Congruence × Fire × Keys $F_{(1,63)}$=0.18, p=0.68, η^2_p<0.01).

(a) Literal SCT **(b) Metaphorical SCT**
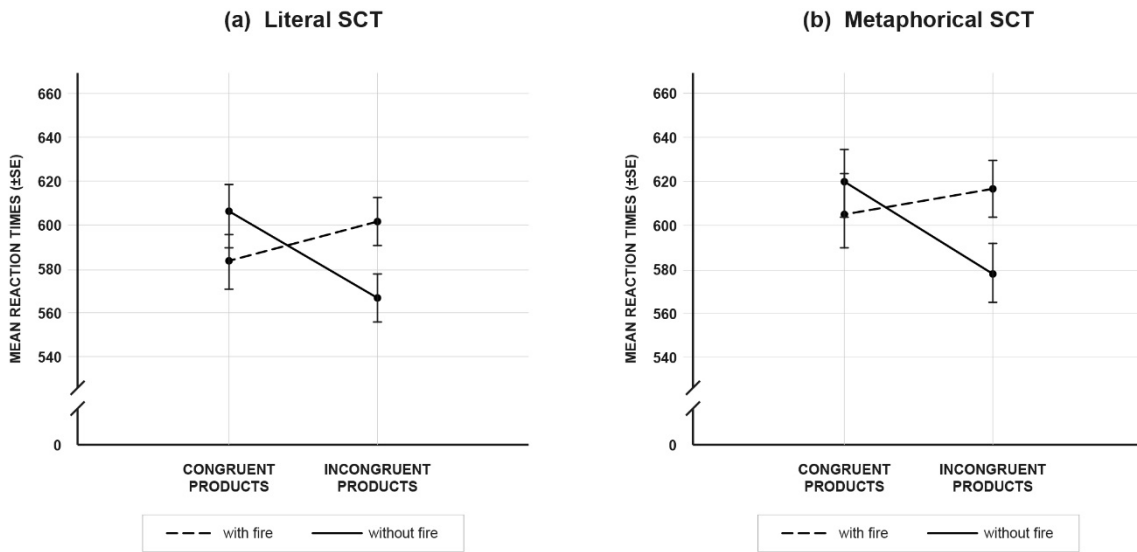
11 **Fig. 4.** Mean reaction times in milliseconds as a function of (a) product congruency with the literal

12 meanings of fire (i.e. barbecue, roasted) and the depiction of fire and (b) product congruency with the

13 metaphorical meaning of fire (i.e. spicy) and the depiction of fire (SE=standard error. The error bars

14 indicate 95% confidence intervals)

15 3.3. Effect of fire image rhetorical style on the cognitive effort required to process it

16 Regarding the cognitive ease by which participants processed the literal and the metaphorical

17 meanings elicited by the image of fire, the mean RTs of the congruent stimuli displayed with fire in

18 both speeded classification tasks were compared. To exclude the potential confounding effect

19 caused by the use of different products in each task, the difference in the RTs needed to classify the

20 products without fire in each task was used as a covariate. Consistent with H4, the ANCOVA results

21 show that participants needed less time to classify the congruent products when the elicited meaning

22 of fire was literal (X̄=584 ms, SD=51) than when the elicited meaning of fire was metaphorical

23 (X̄=607 ms, SD=69), $F_{(1,63)}$=5.34, p=0.024, η^2_p=0.08; Meaning × Covariate $F_{(1,63)}$=20.19,

24 p<0.001, η^2_p=0.24.

25 **4. Discussion**

26 The main objectives of this study were to investigate the way an image displayed on a food package

27 influences the associations accessed by the consumer, and to analyse how the rhetorical style of the

15

image (i.e. if its interpretation is literal or metaphorical) influences the cognitive effort necessary to process it. As an example, the case of fire was used and the results show that the image causes meanings congruent with the product in which it is applied to be more accessible from the memory, thus facilitating its categorisation. Conversely, categorisation is hindered if none of the meanings of the image is consistent with the product in which it is applied. In addition, the results also show that an image with a literal rhetorical style requires a lesser cognitive processing effort than an image with a metaphorical rhetorical style.

4.1. Contributions

This research contributes to the literature related to the study of food packaging and consumer research by empirically studying the influence of an image on the associations accessed by the consumer. To date, the specific effect of images shown on packaging in the communication between packaging and consumer has not been thoroughly studied. For example, Smith et al. (2015) showed that having an image on the package of the major taste-giving ingredient instead of a text description makes consumers believe there is a greater proportion of it in the product, while Rebollar et al. (2016) showed that products accompanied with the main product in the serving suggestion shown on a package of fresh cheese influence the time of day it is considered most suitable to consume it. In addition, the same research team showed that communicating that the potato chips contained in a package had been fried in olive oil by showing an image of an oil dispenser instead of by stating in by a text increases the sensory, non-sensory and hedonic expectations of the product and increases the predisposition to buy it (Rebollar et al., 2017). More recently, Gil-Pérez et al. (2019) showed that the interpretation given to an image can be modulated by manipulating the image's shape, since angular fire icons were more associated with spiciness than rounded fire icons (which were rather more associated with roasted flavour). The results reported here help better understand these previous findings by showing the role of congruence in the process of decoding the images shown on a package.

The results of this study can be framed both in the literature related to semantics and language, as well as the processes of categorisation and generation of expectations. According to the findings from these fields, food packaging communicates information to the consumer through its different elements, which act as signs from which the consumer infers meaning (Ares et al., 2011; Piqueras-fiszman et al., 2011; Smith et al., 2015) so that the product can be identified and categorised (Loken, 2006; Loken et al., 2008). The images shown on the packaging are an important part of this process (Smith et al., 2015; Underwood & Klein, 2002). According to the principle of relevance (Sperber & Wilson, 1995), consumers assume that the information given by a sign on the packaging is relevant to that context and, therefore, initiate a process by which its meaning is inferred. However, the result of this process is not easily predictable because an image by itself can evoke different meanings in the mind of the observer (Messaris, 1994, 1997; Smith et al., 2015). The results of this study thus add to previous findings that suggest that the presence of congruent signs encourage a faster and easier interpretation in specific directions (e.g. Altmann & Kamide, 1999; Brodbeck & Pylkkänen, 2017; Kleinman, Runnqvist, & Ferreira, 2015; Sedivy, K. Tanenhaus, Chambers, & Carlson, 1999; cf. Pickering & Gambi, in press), and show that the consumer's mind searches for possible congruent combinations between the image and the product to break the image's intrinsic propositional

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indeterminacy. In the same way an image is propositionally indeterminate because it can give rise to different interpretations (Smith et al., 2015), the product category is also indeterminate in the absence of any further information. While showing an image of fire on a food container may mean that the product is barbecued, roasted or spicy, the product 'pickles' may be fine herbs, bittersweet or spicy (just to name a few). If a consistent combination among all these options is found in the consumer's memory (in this example, the spicy meaning is congruent with both 'fire' and 'pickles'), the association between the two concepts is activated and that meaning is made accessible. On the other hand, if no consistent combination between image and product is found in the consumer's memory (as in the case of fire and yogurt), the cognitive effort increases to try to make sense of the pairing. Thus, in line with Sperber and Wilson's principle of relevance (Sperber & Wilson, 1995), our results indicate that the presence of the image in a free elicitation task makes concepts accessible from the memory that are not accessible if it is absent (see also González et al., 2006). Our results also show that, in a speeded classification task, there is an interaction between the congruence of the product and the presence of the image, despite the fact that the participants did not receive any indication as to how to react to this image. This suggest that the image generates its own connotative meaning, which is processed independently of that generated by the product category in which it is applied (Ares et al., 2011; Piqueras-Fiszman et al., 2011).

These results also agree with the findings of previous research in the processing differences between words and images. The different experiments in studies such as those by Potter & Faulconer (1975), Pellegrino et al. (1977) and Lewis & Walker (1989) show that both displaying images next to the text (Pellegrino et al., 1977; Potter & Faulconer, 1975) and the visual typeface features of the text (Lewis & Walker, 1989) produce interactions similar to the one reported in this research. In fact, according to Doyle & Bottomley (2004), a generalised result of these studies is that images access a semantic meaning stored in the consumer's memory faster than words, which is usually interpreted as the processing routes for both elements being independent of each other. Therefore, the impact of combining an incongruent image with a congruent text in a speeded classification task is greater than the effect of combining an incongruent text with a congruent image (Lewis & Walker, 1989). The results of this research support these premises since, in the two speeded classification tasks, the impact of showing the fire image (measured as the difference between the latencies necessary to classify the products with or without the image) was significantly greater when classifying incongruent products than when classifying congruent products.

In addition, this study experimentally shows that decoding an image with a literal meaning requires less cognitive effort than decoding an image with a metaphorical meaning, indicating that the rhetorical style of an image influences the way it is processed. This result agrees with the existing literature, as it is considered that processing a metaphorical message from a cognitive point of view requires more effort than processing a literal message, as it evokes a set of more complex semantic associations in the memory of the observer (Gentner, 1983; Jeong, 2008). In other words, implicit visual arguments require a greater cognitive process and preparation (Messaris, 1997), so that it can be assumed they have a lower processing fluency than literal messages. Although a lower processing fluency is related to a worse overall attitude of the consumer towards the product (Alter & Oppenheimer, 2009; Lee & Labroo, 2004), studies that analyse how the use of metaphors influences

consumer response show that their use improves the attitude towards the brand and the product (McQuarrie & Mick, 2003; McQuarrie & Phillips, 2005; Phillips & McQuarrie, 2009). This is explained because solving the puzzle that the metaphor poses is stimulating and rewarding (Fenko et al., 2018; Machiels & Karnal, 2016) unless it is too difficult (McQuarrie & Mick, 1999; van Rompay & Veltkamp, 2014). In the case of this experiment, the metaphor 'spiciness is fire' is successful due to the perception of the increased temperature that occurs in the mouth when eating spicy foods (Caterina et al., 1997; Tu et al., 2016), and this is well known and recognisable to observers for it to be considered a cognitive challenge to them (which explains why the difference in processing found between the literal and metaphorical meanings of fire is modest).

4.2. Limitations and future research

Beyond its contributions, this study has some limitations that must be taken into account. For example, there may be a bias in the main study regarding the diversity and features of the participants. All participants were university students living in the same country (Spain). As a result, further testing would be needed to see if these results could be extrapolated to other markets and other cohorts of consumers and to check if individual differences exist (Lidón et al., in press; Piqueras-fiszman et al., 2011). In addition, while we believe that the results of the second pretest suggest that the presence of the image in a free elicitation task makes concepts accessible from the memory that are not accessible if it is absent, it may be argued that in the case of pickles the 'spicy' concept is not accessible without the image of fire because they are interpreted as "normal" pickles (which are usually not spicy). It may be worth to do further research in this regard studying how a given image favours the elicitation of an attribute shared by all the stimuli studied (e.g. vinegar flavour, which is usually shared by all pickles). Moreover, it should be highlighted that although the term 'literal' is used throughout this paper to refer to meanings directly related to fire (such as *barbecue* or *roast*), it would be more correct to refer to it as a case of metonymy, where the cause stands for the effect (i.e. the image of fire is used to mean an effect of it). However, the term 'literal' was used in order to intuitively distinguish the meanings directly related to fire from the metaphorical ones (such as *spicy*).

It is worth noting that several products used as being congruent with the meaning assessed in one of the speeded classification tasks may also be congruent with the meaning assessed in the other one (e.g. skewers, peanuts or burgers may be considered as being congruent both with the literal and with the metaphorical meanings of fire), which may raise some concern about the validity of these results. It could be argued that one product being congruent with other meanings that the ones being assessed in a given task may lead to confusion or a higher cognitive load, which in turn may tarnish response times. However, it should be noted that the order of the speeded classification tasks was randomised and that when participants performed the first speeded classification task they did not know that there was going to be another one (and therefore, another meaning to assess), so the chance of being influenced by it (or by any other alternative concept to the one being assessed in the first one) is modest. For example, in the Metaphorical speeded classification task participants just had to classify products as being spicy or not, and no reference was made to concepts like barbecue or roast (which were assessed in the Literal speeded classification task).

On the other hand, different products were used in each speeded classification task to ensure that the products chosen for each one represented unequivocally congruent and incongruent choices with the assessed meaning (literal or metaphorical), which implied that there could be internal differences within each group of products in terms of ease or difficulty of processing, understanding or readability. Although it can be argued that this makes it difficult to analyse data as sets of congruent/incongruent product categories as it has been done in this study, a panel of 3 experts agreed on the product categories before conducting the speeded classification tasks and a manipulation check was carried out in order to verify that this could be done. Indeed, the results of the manipulation check reveal that the product categories considered as being congruent or incongruent with each meaning of fire made up robust clusters, making it possible to analyse them jointly rather than by individual product categories.

Finally, it could also be argued that the fact that different product categories were displayed in each speeded classification task makes impossible to compare the response times of the products displayed with fire on each, so that it would not be possible to assess if, as hypothesised, the metaphorical rhetorical style takes more time to process that the literal rhetorical style. To solve this problem, an ANCOVA was carried out in which the difference between the time needed to classify the products displayed without fire in each speeded classification task was included as a covariate. However, despite all the precautions taken, we believe it is necessary to consider all these aspects as limitations of this study.

Moreover, it is important to emphasise that one must be cautious about drawing conclusions from the study results related to the hedonic and affective response of the consumer to the product. The processing fluency literature suggests that a lower cognitive effort is related to greater fluency and a better consumer attitude (Alter & Oppenheimer, 2009), although it is not clear that the latencies of a speeded classification task, such as the one used in this experiment, really represent processing fluency (Graf, Mayer, & Landwehr, 2017). On the other hand, while several studies suggest that displaying an incongruent association on the package may improve the consumer's attitude toward the product, due to the surprise or interest it may generate (Heckler & Childers, 1992; van Rompay, Pruyn, & Tieke, 2009; Van Rompay & Pruyn, 2011), others warn that showing information considered irrelevant can negatively influence consumer expectations (Meyvis & Janiszewski, 2002). Further research is needed from these results in order to better understand the relationship between the response latencies of a speeded classification task and the hedonic and affective responses of the consumer.

This study leaves some unanswered questions that open the door to future lines of research. For example, this research shows that the consumer relies on the congruence of possible meanings for the image with possible features of the image by studying when a fire image evokes literal meanings (barbecue, roast) and when it evokes a metaphorical one (spiciness). However, it does not address how the consumer decides which of the literal meanings is appropriate for a given product. Although it can be assumed that the process will be the same and will be based on the congruence of each of them with the product (e.g., we may expect that while displaying a fire image on a bread package transmits *roasted*, showing a fire image on a veal fillet would suggest *barbecue*), experimental analysis would be needed to verify if this is the case. Moving forward in this direction would allow for

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a better understanding of the factors responsible for the consumer assigning meanings to images displayed on food packaging.

5. Conclusion

An image shown on a food package label helps the consumer categorise the product and contribute to the process of generating expectations, as the consumer's brain tries to assign meaning to it. This investigation shows that, when a possible meaning of the image is consistent with the product to which it is applied, the association between the two is strengthened and the consumer finds it easier to categorise the product. However, showing an incongruent image with the product confuses the consumer and makes it difficult to understand, thus increasing the time needed to categorise it. The research results also show that the rhetorical style of an image influences the cognitive effort needed to process it, since a literal interpretation of an image allows for access to its meaning more quickly than a metaphorical one.

These results are of interest to producers, designers and legislators, since help to improve our understanding of the process by which consumers interpret messages elicited by food packaging and enable the design of packages which are more understandable and easy to interpret.

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1   https://doi.org/10.1111/j.1470-6431.2010.00936.x

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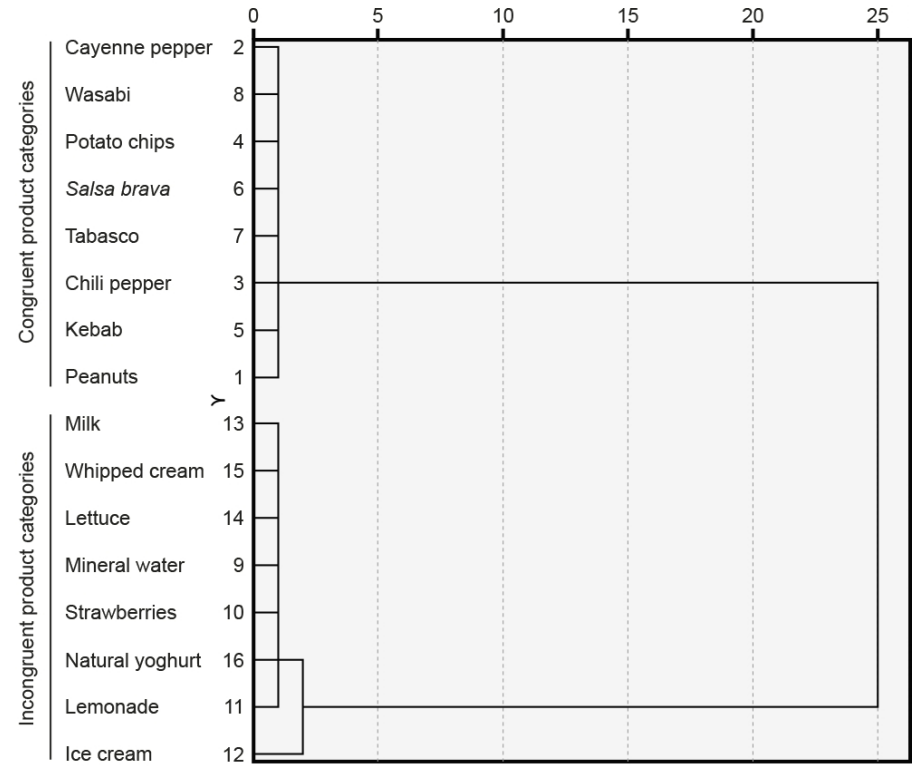FairField's

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(a) Literal SCT stimuli

(b) Metaphorical SCT stimuli

(a) Literal SCT
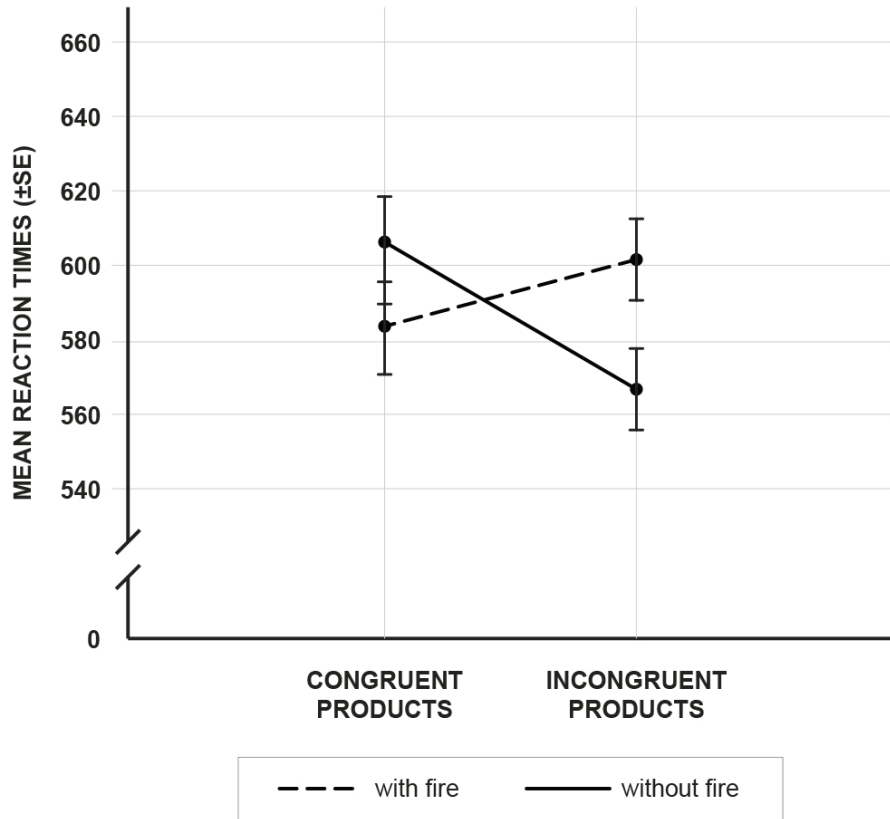
(b) Metaphorical SCT

Table 1

Product categories used in the speeded classification tasks

Literal SCT (literal meaning; i.e. barbecued, roasted)		Metaphorical SCT (metaphorical meaning; i.e. spicy)	
Congruent	Incongruent	Congruent	Incongruent
Skewers	Mineral water	Peanuts	Mineral water
Peanuts	Salad	Cayenne pepper	Strawberries
Burger	Strawberries	Chili pepper	Lemonade
Potato chips	*Gazpacho*[1]	Potato chips	Ice cream
Sliced turkey	Lettuce	Kebab	Milk
Kebab	Melon	*Salsa brava*[2]	Lettuce
Ribs	Whipped cream	Tabasco	Whipped cream
Sausages	Grapes	Wasabi	Natural yoghurt

[1] A cold soup well known in Spain

[2] A spicy pepper sauce well known in Spain

1

Table 2

Evaluation of the participants regarding the congruence of each product displayed in the Literal SCT with the literal meanings of fire.

Note: Figures denote number of subjects. Not all products add up to 65 responses, as some participants left some questions unanswered.

Products proposed as congruent			Products proposed as incongruent		
Product	Congruent	Incongruent	Product	Congruent	Incongruent
Skewers	62 (100%)	0 (0%)	Mineral water	1 (1.6%)	61 (98.4%)
Peanuts	61 (98.4%)	1 (1.6%)	Salad	2 (3.1%)	63 (96.9%)
Burger	65 (100%)	0 (0%)	Strawberries	0 (0%)	65 (100%)
Potato chips	56 (88.9%)	7 (11.1%)	*Gazpacho*	7 (10.8%)	58 (89.2%)
Sliced turkey	62 (96.9%)	2 (3.1%)	Lettuce	1 (1.6%)	63 (98.4%)
Kebab	64 (100%)	0 (0%)	Melon	2 (3.1%)	62 (96.9%)
Ribs	64 (98.5%)	1 (1.5%)	Whipped cream	0 (0%)	64 (100%)
Sausages	65 (100%)	0 (0%)	Grapes	3 (4.7%)	61 (95.3%)

Table 3

Ward's hierarchical cluster analysis of the products chosen as congruent/incongruent with the literal meanings of fire

Stage	Cluster combined		Coefficients	Stage cluster first appears		Next stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	Strawberries	Whipped cream	,000	0	0	5
2	Kebab	Sausages	,000	0	0	3
3	Skewers	Kebab	,000	0	2	4
4	Skewers	Burger	,000	3	0	6
5	Strawberries	Lettuce	,667	1	0	7
6	Skewers	Ribs	1,467	4	0	8
7	Mineral water	Strawberries	2,300	0	5	10
8	Skewers	Peanuts	3,167	6	0	11
9	Salad	Grapes	4,667	0	0	12
10	Mineral water	Melon	6,367	7	0	12
11	Skewers	Sliced turkey	8,129	8	0	14
12	Mineral water	Salad	10,857	10	9	13
13	Mineral water	*Gazpacho*	15,554	12	0	15
14	Skewers	Potato chips	21,250	11	0	15
15	Skewers	Mineral water	237,625	14	13	0

Table 4

Evaluation of the participants regarding the congruence of each product displayed in the Metaphorical SCT with the metaphorical meanings of fire.

Note: Figures denote number of subjects. Not all products add up to 65 responses, as some participants left some questions unanswered.

Products proposed as congruent			Products proposed as incongruent		
Product	Congruent	Incongruent	Product	Congruent	Incongruent
Peanuts	55 (88.7%)	7 (11.3%)	Mineral water	1 (1.6%)	61 (98.4%)
Cayenne pepper	61 (98.4%)	1 (1.6%)	Strawberries	2 (3.1%)	63 (96.9%)
Chili pepper	62 (100%)	0 (0%)	Lemonade	8 (12.3%)	57 (87.7%)
Potato chips	61 (95.3%)	3 (4.7%)	Ice cream	19 (29.2%)	46 (70.8%)
Kebab	64 (100%)	0 (0%)	Milk	0 (0%)	64 (100%)
Salsa brava	65 (100%)	0 (0%)	Lettuce	1 (1.6%)	63 (98.4%)
Tabasco	64 (100%)	0 (0%)	Whipped cream	1 (1.6%)	63 (98.4%)
Wasabi	63 (98.4%)	1 (1.6%)	Natural yoghurt	4 (6.3%)	60 (93.8%)

Table 5

Ward's hierarchical cluster analysis of the products chosen as congruent/incongruent with the metaphorical meanings of fire

Stage	Cluster combined		Coefficients	Stage cluster first appears		Next stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	Cayenne pepper	Wasabi	,000	0	0	8
2	*Salsa brava*	Tabasco	,000	0	0	3
3	Chili pepper	*Salsa brava*	,000	0	2	4
4	Chili pepper	Kebab	,000	3	0	10
5	Milk	Whipped cream	,500	0	0	6
6	Milk	Lettuce	1,333	5	0	7
7	Mineral water	Milk	2,250	0	6	9
8	Cayenne pepper	Potato chips	3,583	1	0	10
9	Mineral water	Strawberries	5,333	7	0	11
10	Cayenne pepper	Chili pepper	7,429	8	4	12
11	Mineral water	Natural yoghurt	10,595	9	0	13
12	Peanuts	Cayenne pepper	15,917	0	10	15
13	Mineral water	Lemonade	21,321	11	0	14
14	Mineral water	Ice cream	33,750	13	0	15
15	Peanuts	Mineral water	239,000	12	14	0