

# The role of figurative complexity in the comprehension and appreciation of advertisements

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## The role of figurative complexity in the comprehension and appreciation of advertisements

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**The role of figurative complexity in the comprehension and appreciation of advertisements**

**1. Introduction**

To be effective, advertisements need to capture attention, and be emotionally engaging and persuasive. Research from the field of marketing has shown that advertisers can achieve these aims through the use of non-literal (or figurative) language and, more importantly, figurative images (McQuarrie and Mick 2003; McQuarrie and Phillips 2005; Mitchell and Olson 1981). A retrospective study of the rhetorical features employed by US magazine advertisements from 1954 to 1999 (Phillips and McQuarrie 2002), showed that the incidence of visual metaphor increased throughout this period, and it has continued to do so since.

This has been paralleled by an increased academic interest in the role of multimodal metaphor in advertising. Scholars working on figurative language (Forceville and Uriós-Aparisi 2009; Hidalgo and Kraljevic 2011; Author 1 2017) have explored the advantages of exploiting metaphor in advertising and have noted that it is particularly effective because it connects a well-connoted scenario (source domain) with the promoted product or service (target domain), creating a positive brand image. In application to advertising, pictorial and multimodal metaphors are more likely to increase product/brand recognition and recall, and have a positive effect on consumer preferences (see Kitchen 2008; Tynan, McKechnie and Chhuon 2006). A recent development in this line of research is the exploration of the effects of visual irony, a type of figurative language that consists in contrasting opposite scenarios, for advertising (Burgers, van Mulken and Schellens, 2014). In fact, different types of irony have been found to have an effect on the perceived strength of the advertisement (Iles and Nan, 2017).

With the interconnectedness of international markets, trade, brands and – via social media - consumers, it is essential to investigate how the perception of multimodal metaphor varies across people of different nationalities. Recent research into the understanding of visual metaphor suggests that different types of visual metaphor are significantly related to variation in the perception of advertisements by audiences from different nationalities (Van Mulken, le Pair, and Forceville 2010). It also suggests that the strategic inclusion of visual metaphors in software application (app) logos is likely to multiply number of app downloads, compared with logos that do not contain visual metaphor (Burgers, Eden, de Jong, and Buningh 2016). However, such work has focused only on the relative effectiveness of visual metaphor. Other figurative mechanisms, such as metonymy and metaphor-metonymy combinations (that are relatively frequent in advertising, as shown in Author 1 2017) remain untested.

Inspired by the work of Van Mulken, le Pair, and Forceville (2010) on the one hand, and Burgers, Eden, de Jong, and Buningh (2016) on the other, this study seeks to investigate how metaphor, but also metonymy, have an effect on appreciation of those advertisements by participants in the UK, Spain, and China. The study thus expands the scope of preceding work in three ways: (1) it takes into consideration metonymy and its patterns of combination with metaphor (rather than different types of metaphorical representation in images), (2) it investigates speed of processing, alongside perceived effectiveness and appreciation, and (3) it explores the variation

across the three national backgrounds (British, Spanish, and Chinese) that are more representative of global audiences (as these are the most widely spoken language in the world, according to Ethnologue 2017<sup>1</sup>). Thus, this paper contributes to further our understanding of how international audiences process non-literal forms of language in images and text. This paper also has implications for producers, advertisers and others stakeholders in multimedia advertising, who can adapt the findings herein when creating content intended for people of different nationalities.

This paper comprises eight sections. In *Section 2* we provide an overview of the different types of figurative operation investigated in our study, using real-world examples as our corpus of advertisements. In *Section 3*, we present our hypotheses as to how figurative language in advertisements might influence consumer responses in terms of speed of comprehension, appreciation, and perceived effectiveness. In *Section 4* we discuss two variables that potentially affect responses to advertisements alongside figurative language use: **need for cognition and nationality**. Study design and methodological considerations are discussed in *Section 5*. We report and discuss the results in *Section 6* (descriptive statistics) and *Section 7* (inferential statistics). A discussion of the findings, including implications for future research and practical applications is given in *Section 8*.

## 2. Types of figurative language that occur in advertisements

As mentioned in the introduction, our study is similar to van Mulken, Le Pair, and Forceville's (2010) study in that we look at the effect of figurative language on people's responses to advertisements. Van Mulken, Le Pair, and Forceville (2010) looked at different ways of presenting visual metaphor, classified according to Forceville's 2008 typology in hybrid, contextual and simile terms. Forceville's typology focuses on the type of visual arrangement, that is, how the source and target domain are represented visually, e.g. partially or in full, jointly or separately etc. Our angle here is slightly different: we do not look at the ways in which the visual metaphors are presented in the advertisements but, rather, at the complexity of the metaphors themselves and the ways in which they interact with metonymy. In this section, we explain how these two tropes (metaphor and metonymy) operate both in language and in multimodal discourse, and look at ways in which they interact with one another.

### 2.1. Simple figurative operations: Metaphor and metonymy

Cognitive linguistics and marketing studies have witnessed a growing research interest in the role and effect of metaphor in advertising, particularly multimodal metaphor. A metaphor involves a mapping from one domain to another such that the 'target' domain can be understood by means of its connection with the 'source' domain (Lakoff and Johnson, 1980/1993). For example, when we talk about a woman 'hitting a glass ceiling' in her career, we are making a metaphorical connection between the concrete source domain of a invisible blockage that looks like it can be overcome -although it cannot- and the abstract target domain of career progression, the main implication being that a woman's professional growth is stunted. Since the connection between the two discrete ideas operates at a conceptual level, metaphors are not restricted to the realm of words. They can also involve other modes of

<sup>1</sup> <https://www.ethnologue.com/> (Retrieved on 31<sup>st</sup> May 2017)

expression. When they do so, they are referred to as *multimodal metaphors*. These are metaphors in which there is a mapping between two domains involving “predominantly or exclusively different modes” (Forceville 2009a: 34). *Figure 1* shows an example of multimodal metaphor: A SHOE IS A HOT AIR BALLOON. The information about the metaphorical source and target domain can be found both in the words and the images (i.e., distinct modes): a picture of the ropes and basket of a hot air balloon in the sky (visual mode) plus the word “lightweight” for the source domain (verbal mode); and the picture of the shoe and the name of the brand for the target. This metaphorical mapping, and its combination with hyperbole, produces only one entailment: that the shoe is so light that it can ‘make you feel like flying’.

[insert Figure 1 here]

*Figure 1. Camper shoes (Spanish corpus). Lightweight*

As we saw above, research in advertising has to date focused almost exclusively on metaphor and irony with linguists and marketing scholars paying very little attention to other types of figurative language, such as metonymy. As we saw above, beyond the finding that metaphor leads to an increased appreciation of advertisements, and that the type of irony used affects their perceived effectiveness, there has been surprisingly little research into the effect of other figurative operations on the perceived effectiveness of branded content.

A recent study of 210 advertisements (Author 1 2016) showed that metaphor rarely occurs in advertisements on its own (11% of all advertisements studied). The study also drew attention to the fact that the role played by metonymy in advertising has been underestimated. Unlike metaphor, which draws attention to similarities between unrelated entities or events, metonymy is a process whereby one entity or event is used to refer to related, entity or event. For example, ‘Hollywood’ can be used to refer metonymically to the mainstream film industry in the United States (Author 2, 2015). Traditionally, metonymy has not been considered as a creative device in the same way that metaphor has, but recent research has shown that it can indeed serve as a powerful creative resource in everyday communication (Author 2 and Tagg, 2016). Research into the potential of metonymy to offer creative links between the product and its promoted features is yet sparse, but the few studies that exist highlight that the systematic use of metonymy in advertising offers promising avenues for further research. Forceville’s approach to pictorial metonymy (2009b) highlighted the cognitive affordances of metonymic relationships in printed advertising and art films. This process can involve pictures alone (thus rendering a monomodal pictorial metonymy, as in Forceville 2009b and Villacañas and White 2013), or it can be multimodal if such a process involves a mode-shift, i.e. from picture/sound to text or vice versa (Author 1 2014). *Figure 2* shows an example of pictorial metonymy: NOSE FOR PERSON, in which the single representation of the nose gives access to the idea of the person sunk into the mattress, which emphasizes the softness of the mattress. One might also note the hyperbolic nature of this visual representation, which equates ‘lying in bed’ with ‘sinking into the bed’ due to the extreme softness of the promoted mattress.

[insert Figure 2 here]

*Figure 2. Kuka (Chinese corpus). Text: Supersoft bed*

## 2.2. Complex types of figurative operation: metaphonymy, metonymic chain and metaphoric complex

Author 1's (2016) corpus-based study also highlighted that, in advertisements, 39% of the instantiations of metaphor and metonymy involved some form of complex figurative operation. Complex figurative operations can be divided into three types depending on the nature of the figurative operations involved and the type of interaction between them: metaphonymies, metonymic chains, and metaphoric complexes (Goossens 1999, Ruiz de Mendoza and Galera 2014). *Metaphonymies* involve a combination of metonymy and metaphor, in which the former **provides access to** and/or develops the source or target domain of the latter. The interaction between multimodal metaphor and metonymy has so far only been explored in a limited number of advertising examples (Uriós-Aparisi, 2009; Hidalgo and Kraljevic 2011). An example of a metaphonymy can be seen in *Figure 3*. Here, the visual metaphor **THE ICE-CREAM IS THE COW** requires metonymic mappings in both the source and target domains, respectively, to reach the intended meaning of the advertisement. In the source domain, COW gives access to the notion of MILK thanks to the constraining power of the lolly stick, which gives prominence to "milk" over other properties related to cows (such as "meat" or "leather"). **The implication is that the ice cream is not just made of milk (metonymy), but that it contains so much "pure milk" via the representation of the cow that is basically milk itself (metaphor).** The visual representation of the stick also activates the "metonymic chain" (linking two metonymies together) STICK FOR LOLLY FOR ICE-CREAM, which in turn gives access to the metaphorical target domain.

[insert Figure 3 here]

*Figure 3. Kaku ice cream (Chinese corpus). Pure milk*

We saw above that the Kaku ice cream advertisement involved a 'metonymic chain' (Brdar-Szabó and Brdar 2011, Hilpert 2006). In a metonymic chain, the first metonymic operation constitutes the point of departure for another metonymic mapping. *Figure 4* shows an example of two interconnected multimodal metonymic chains: LINES FOR ROAD FOR **DRIVING** and CLOSED EYES FOR FATIGUE FOR SLEEPING. **Here the metonymy takes advantage of the visual resemblance between road lines and closed eyes. This visual overlap prompts metonymic mappings in both directions (from "eyes" to "sleeping" and from "road lines" to "cars" and/or "driving").** Note, however, that these two metonymic mappings are connected at the visual level, but there is no conceptual link between eyes and road lines (other than the fact that the person who might sleep is the driver of the car).

[insert Figure 4 here]

*Figure 4. Audi fatigue detector (Spanish corpus). Wake up*

The third type of complex figurative operation considered in our study involves the interaction of several metaphors in the form of a *metaphoric complex* (Ruiz de Mendoza and Galera 2014). *Figure 5* shows an advertisement in which there is a visual hybrid between an elephant and a concertina to promote a van that can be enlarged. It should be noted that a visual juxtaposition of two different things does not necessarily mean that they need to be mapped onto each other. Moreover, and especially when dealing with the analysis of advertisements, it should be always born

in mind that the ultimate goal of advertising is to say something (usually positive) about a product, and therefore it is crucial to look at what metaphor and metonymy tell us about the product that is being promoted. In this case, AN ELEPHANT IS A CONCERTINA is clearly not the main metaphor at work in this advertisement, given that it does not convey any relevant information about the advertised van. Rather, it is the case that the hybrid elephant/concertina triggers two related metaphorical mappings onto the van, i.e. A CAR IS (as big as) AN ELEPHANT and A CAR IS A CONCERTINA (that can be expanded). The implication here is that the, already large, advertised van has become even more spacious, thus appealing to consumers with a need for more space.

[insert Figure 5 here]

Figure 5. Jinbei Big Sea Lion series (Chinese corpus). Text: Enlarged huge space

3. Measures of consumer responses to advertisements

Although there has been some research into the ways in which people respond to advertisements that contain metaphors, there have been very few investigations into their responses to combinations of metaphor and metonymy in advertisements. Inspired by Jeong (2008), we are interested in affective and motivational outcomes (i.e., how much people like an advertisement and how credible they perceive it to be) and investigating whether these responses relate in any way to the type of figurative operations an advertisement contains. In addition, the growth of social media and the need for brands to engage with consumers when multiple organisations battle for attention, the speed with which an advertisement is comprehended is increasingly important. The following section provides an overview of research in these areas (i.e. speed of comprehension, appreciation and perceived effectiveness).

3.1. Speed of comprehension

Speed of comprehension has been the focus of a number of studies involving metaphor and metonymy, and different findings have been made, depending on the type of metaphor or metonymy under investigation. Work that has used idioms as prompts has shown, for example, that metaphor is sometimes understood more rapidly than literal language, which gives rise to the ‘Direct Access’ hypothesis, according to which people go directly to the metaphorical meaning of well-known idioms rather than going via the literal meaning (Gibbs, 1994). Work that has used novel metaphors as prompts has shown that people with a ‘holistic’ cognitive style process metaphor more rapidly than people with an analytic cognitive style, suggesting that the ability to make rapid comparisons is a necessary part of comprehension (Author 2, 2001). Work using metonyms as prompts has shown that people spend longer processing metonymic expressions when they appear at the beginning of the sentence rather than at the end (Gibbs, 1990). Other studies employing techniques such as eye tracking and fMRI have shown that the type of construction within which the metonymy occurs affects the way in which it is processed (e.g., Frisson & Pickering, 1999).

There has also been some work on speed of comprehension of metaphors in advertisements. McQuarrie and Phillips (2005) found that people are able to find meaning in an advertisement faster if advertisement contains a visual metaphor rather than a verbal metaphor or a literal message. However, to date, little is known about

the time it takes to process other types of figurative operation (such as metonymy and metaphonymy) when they appear in a multimodal format. We will investigate whether it takes people longer to find meaning in advertisements containing complex figurative combinations because there are more mappings available, or whether the availability of multiple mappings makes the interpretation easier, and therefore, faster.

*RQ 1: Is there a relationship between the figurative complexity of an advertisement and the speed with which it is comprehended?*

*Hypothesis 1:* There will be a significant negative relationship between figurative complexity and comprehension speed, i.e. advertisements containing simple figurative operations will be comprehended more quickly than advertisements containing complex figurative operations.

### 3.2 Personal appreciation of the advertisement

It is not known whether multimodal figurative information evokes positive or negative attitudes towards products, as some viewers may find overt visual and verbal metaphors appealing whereas others may not like them. Sopory and Dillard (2002) argue that metaphorical rhetoric enhances the creation of a positive attitude towards the brand. Jeong (2008:61) adds that metaphors, when conveyed through images, “elicit pleasure since the initial ambiguity stimulates interest and motivation, and the subsequent resolution is rewarding”. Recent findings have shown that different types of visual metaphor correlate with different levels of appreciation of the advertisement (van Mulken, le Pair and Forceville 2010). More specifically, Phillips and McQuarrie (2009) have added that only novel and creative metaphors are likely to modify consumer beliefs. Because of the mixed findings in this area to date, we ask:

*RQ 2: Is there a relationship between the figurative complexity of an advertisement and the extent to which it is appreciated?*

*Hypothesis 2:* There will be a relationship between the figurative complexity of the advertisements and the extent to which they are appreciated but the exact nature of this relationship cannot be predicted.

### 3.3 Perceived potential effectiveness of the advertisement

Another issue that is of interest in our study is the extent to which figurative language makes viewers believe that the advertisement is likely to be effective. Unlike appreciation, which is more personal and subjective (“do I like this advertisement?”), this variable involves projecting the effect of the advertisement onto other people (“is this advert likely to make people want to buy the product?”). However, it should be noted that the perceived effectiveness of an advertisement is by no means an objective judgment. Consumers might overestimate or underestimate the actual effectiveness of an advert. In their meta-analysis of studies that have compared the perceived effectiveness of advertising campaigns with their actual effectiveness of an advertising campaign, Dillard et al. (2007) found a correlation of only .41, which underscores the unreliable nature of measures of perceived effectiveness.

Findings with respect to this variable are thus even more difficult to predict. Again, there are contradictory findings and opinions in the field: studies of visual persuasion

(e.g. Messaris, 1997; McQuarrie and Mick, 1999) suggest that visual metaphors are often more persuasive than verbal metaphors and argumentation because people are more likely to believe a proposition they have constructed, rather than one that is given; however, other scholars such as Ang and Lim (2006) have found that brands using metaphors, even though they are better appreciated, are perceived as less competent and sincere because of the incongruence they posit. In light of this complexity, we ask:

*RQ 3: Is there a relationship between the figurative complexity of an advertisement and its perceived effectiveness?*

*Hypothesis 3: There will be a relationship between the figurative complexity of advertisements and their perceived effectiveness but the exact nature of this relationship cannot be predicted.*

**4. Individual differences**

Variation in consumer responses to advertisements does not depend wholly on the content of the advertisement, but also on consumer attitudes, normative beliefs, affect, cognition and artifacts of the product/service advertised (see Holbrook and Batra, 1987; Olney, Holbrook and Batra, 1991). Thus, consumers may have varying preferences regarding the degree of visual or verbal processing that advertisements require, according to their personality and to the normative beliefs surrounding advertisements within the context of their societal culture. We explore the role of need for cognition and national background in interaction with figurative operations, to establish whether they account significantly for the variation in participant responses.

**4.1 Need for Cognition**

Drawing on the field of cognitive psychology, we investigate need for cognition as a personality variable reflecting the extent to which individuals are predisposed towards effortful cognitive activities (Cacioppo and Petty, 1982; Cacioppo, Petty, Feinstein, and Jarvis 1996). The ‘Need for Cognition Scale’ (<http://www.liberalarts.wabash.edu/ncs/>) is an assessment instrument that measures quantitatively “the tendency for an individual to engage in and enjoy thinking” (Cacioppo and Petty, 1982: p. 116). In one of the rare applications to the study of advertising comprehension, Chang and Yen (2013) showed that people with a high need for cognition (that is, people who are inclined towards a high level of elaboration in terms of appreciation of debate, idea evaluation, and problem solving) are more likely to succeed in the interpretation of visual metaphors compared with people with a low need for cognition. This operationalization and discovery by Chang and Yen (2013) suggests that *Need for Cognition* will be a critical variable to measure in our investigation of metaphor/metonymy interpretation, such that individuals with a high need for cognition will prefer greater figurative complexity in advertisements than those with a low need for cognition. Thus, we ask:

*RQ 4: Is a person’s need for cognition related to the speed with which they are able to find meaning within an advertisement, the appreciation that they have for an advertisement, and the level of effectiveness that they perceive an advertisement to have?*

*Hypothesis 4i:* Individuals with a *greater* need for cognition will (a) comprehend adverts that contain *greater* figurative complexity more quickly, (b) have greater appreciation for these adverts, and (c) perceive these adverts as more effective than people with *lower* need for cognition.

*Hypothesis 4ii:* Individuals with *less* need for cognition will (a) comprehend adverts that contain *lower* figurative complexity more quickly, (b) have greater appreciation for these adverts, and (c) perceive these adverts as more effective than people with *greater* need for cognition.

## 4.2 Nationality

Given the global nature of marketing, it is important to take account of the nationality of the consumer when preparing advertisements. It is not only large multi-national organizations that operate internationally; small and medium enterprises can access international markets more readily with the growth in technology capabilities (e.g. Todd and Javalgri, 2007). However, from a cognitive linguistic perspective, it is unclear whether figurative operations facilitate or impede successful cross-national communication in business-to-consumer and business-to-business relationships. Evidence exists of universal cross-sensory associations conveying brand features (Lan, Klink and Jiansheng 2013) verbally (such as the preponderance of words beginning with “r” in Indo-European languages to denote the characteristic of roughness, Winter, Perlman, Perry, and Lupyan 2017) and visually (such as the use of angular shapes in car logos to convey speed, Pérez-Hernández, 2014). On the other hand, figurative operations (in particular, metaphor) also present significant difficulties to speakers of other languages (Author 2 2001), though it is untested as to whether this remains so when metaphor occurs in multimodal settings or in combination with metonymy. Many of the intended meanings in metaphor can be closely tied to specific nationalities and cultures (Kovecses 2005), and thus fail to communicate to a global audience, even when rendered visually. Therefore, we anticipate that:

*RQ 5:* Do participants from different nationalities vary in terms of how they react to the adverts depending on the amount of figurative complexity?

*Hypothesis 5:* There will be a relationship between the figurative complexity of advertisements and the way people from different nationalities react to them in terms of (a) the speed of comprehension, (b) the appreciation, and (c) the perceived effectiveness, but the exact nature of this relationship cannot be predicted.

Figure 6 represents the hypothesised interrelations between figurative complexity in advertising and four relevant aspects of advertising comprehension: speed of comprehension, perceived effectiveness, appreciation, and possible interactions with individual differences, including need for cognition and the national background of the participant.

[insert Figure 6 here]

Figure 6. Summary of the working hypotheses in this study

## 5. Method

5.1. Participants

Our study focused on native speakers of the three most widely spoken languages in the world (according to Ethnologue 2017) because they are the most representative of global audiences: English, Spanish and Mandarin. Although studies suggest differences between Western and Chinese participants in terms of the ways in which they respond to emotions as expressed through metaphor (Jolley and Thomas 1998), this line of investigation has never been extended to the field of advertising.

Data collection took place in the United Kingdom (Birmingham), Spain (Logroño), and China (Ningbo). *Table 1 shows the distribution of participants according to gender and average age. All 90 participants* (30 from each linguistic background) were recruited via an online advertisement. All participants were either in Higher Education or had completed Higher Education.

[insert Table 1 here]

Table 1: Demographics of the sample

5.2. Materials and coding

To ensure the reliability of the identification of metaphor and metonymy in the advertisements selected for this study, two raters (Author 1 and Author 2) annotated a corpus of 60 adverts independently in two rounds. We formulated a set of instructions for the identification of figurative operations. In order to illustrate this protocol, we refer in detail to *Figure 3* (already discussed in Section 2.1), which is an advertisement for ice cream produced by a Chinese company.

1. *Identification of possible target domains.* This step involves examining the product/service advertised. In this case, the information in the lower right corner indicates that it is a milk ice cream. Likewise, the representation of the lolly sticks in the main image reinforces this interpretation indirectly.
2. *Identification of possible source domains in the surrounding pictorial context.* Next, we examine the pictorial context to establish what is being said about the product. In this case, it is evident that the advertisement is emphasizing *the high milk content of the ice cream*. This is conveyed directly in the verbal part of the advertisement (“puremilk ice cream”) and indirectly in the visual part (through the representation of cows, the source of the milk).
3. *Metaphoric or metonymic relationship?* We formulated a simple set of instructions to characterise the domains identified in the previous steps as metaphoric or metonymic. If the relationship between the image and its meaning could be phrased in an “A IS B” statement, as in *THE COW IS THE ICE CREAM*, we coded it as *metaphor*. If the relationship between the image and its meaning could be phrased in an “A IS RELATED TO B” statement, as in *THE COW IS RELATED TO MILK*, we coded it as *metonymy*.
4. *Patterns of interaction.* If a “RELATED TO” relationship supported an “IS” relationship, we labeled it as *metaphonymy*. In the example under consideration, both COW FOR MILK and STICK FOR LOLLY metonymies develop the visual metaphor ICE CREAM IS COW in order to convey the idea that the ice cream is made of pure milk. Additionally, if two metonymies identified in step 3 were interrelated, we coded

them as a chain of metonymies, whereas combinations of more than one metaphor were labeled as metaphorical complexes.

We made individual annotations of the selected advertisements for metaphor and metonymy and ran a series of inter-rater reliability tests using the Krippendorff's Alpha test (Hayes and Krippendorff 2007) to measure the degree of agreement between the two raters involved in the annotation task. We ran IRR tests to measure the agreement at step 3 (Does the advert contain a visual metaphor or metonymy?) and step 4 (If the advert contains a figurative message, is the message simple or complex?<sup>2</sup>). In addition to this, we also measured the degree with which the coders coincided in the labels attached to the source and target domains identified, although that was not the main focus of the study.

Table 2 lists the percentage of cases in which coders agreed (%Agreement) and Krippendorff's alpha value for each of the coding variables.

[insert Table 2 here]

*Table 2. Percentage of agreement between coders and Krippendorff's alpha values for the coding of the experimental stimuli*

As can be seen in Table 3, there was a high level of agreement between the two coders in the detection of metaphorically-related images but only a moderate-to-low level of agreement in the identification of metonymically-related visual cues. This is possibly due to the fact that metonymic meaning often shades into literal meaning rendering it difficult to distinguish between the two (Author 2, 2015).

The level of agreement was also moderate-to-low in the detection of potential interactional patterns between the metaphors and metonymies. Whereas for the previous dimensions there were two options available for the coders (yes or no), raters had now to choose among five categories (metaphor, metonymy, metonymic chain, metaphonymy and metaphoric complex). This might explain the slight decrease in the level of agreement between the coders.

Finally, there was a drop in the degree of agreement in terms of the labels used for the metaphors and metonymies identified. This should come as no surprise, given that the coders did not count on a closed set of labels for the task, thus rendering the labeling possibilities (almost) limitless. All in all, we deemed this protocol valid to achieve the purposes of the present study, as we were interested in the level of figurative complexity rather than the labeling of the mappings. Cases of disagreement were rectified through discussion, and only retained those advertisements for which 100% agreement between the raters was reached. Advertisements that yielded conflicting interpretations were discarded and replaced by new adverts, until the number of stimuli required for the study was reached (see below).

### 5.3. Stimuli

We used 30 advertisements in this study (10 from each of the respective countries). All advertisements were subject to a pre-test by native speakers to ensure that there

<sup>2</sup> This question was answered with the annotation 'simple' if a metaphor or metonymy appeared in isolation or 'complex' if they appeared in combination.

were no strong cultural impediments, such as the absence of the advertised product/service in one of the other countries, a reliance on cultural background knowledge, or word puns, that would impede the understanding of the advertisement by participants from the other groups<sup>3</sup>. The proportion of figurative operations was kept as consistent as possible, in line with Author 1’s (2016) findings, but such that our sample was representative of naturally-occurring advertisements. Text was translated and the advertisements modified using Photoshop to contain the translations whilst preserving the colour, imagery and typography of the original advertisement. *Table 3 provides an example of an original Chinese advert and the two corresponding manipulated versions in English and Spanish.* Each participant group viewed the same advertisements in their native language.

[insert Table 3 here]

*Table 3. Original Chinese advert and the corresponding manipulated versions in English and Spanish*

**5.4. Design and measures**

A reaction time (RT) experiment was designed using ePrime 2.0, whereby all 30 advertisements were shown to participants. The order of presentation was randomised to reduce any order effects and counter balance the stimuli. *Before being presented with the stimuli, participants were informed of the procedure and given two practice trials. Participants were then presented with a series of advertisements. For each advertisement, they were asked to consider the following question “What do you think this advertisement is saying about the product?”. They were instructed to keep their fingers resting on the space bar such that they could press the button as soon as they had identified its message. Participants were then shown a white screen with a minimised rendering of the advert just shown. They were instructed to say out loud their interpretation of the advertisement, and to say whether it had evoked any strong emotional reaction (positive or negative). Their responses were audio recorded in audio without any time restriction (as we did not want to constrain the interpretations offered by the participants) and later transcribed and translated to allow for annotation.*

Participants then pressed the space bar to move on to two questions *that appeared in random order one after the other: “How much did you like this advertisement?” and “How effective did you think this advertisement was?”. These two questions formed the operationalisation of the variables *Appreciation* and *Perceived Effectiveness*. Responses were given on a 5-point Likert-type scale using the keyboard for responses between 1 (“I don’t like it at all” / “Not effective at all”) and 5 (“I like it a lot” / “Very effective”). In order to reinforce (visually) the different nature of these two questions choices were accompanied by a set of increasingly happy faces for the question appreciation and images of thumbs down and thumbs up for the question on perceived effectiveness. The wordings of these questions were piloted to ascertain item validity, and thus eliminating the need to employ multiple item measures (Alexandrov 2010:1).*

Once participants had viewed and responded to all 30 advertisements, they were presented with 18 items from the abbreviated version of the Need for Cognition scale (Cacioppo, Petty, and Kao 1984). These were presented randomly to reduce order

<sup>3</sup> We would like to thank our Chinese consultants Danyi and Helen for their help with this part of the study.

effects and to counter balance the items. The items were shown in the form of statements such as, “I prefer solving abstract problems over easy ones”. Participants had to rate the extent to which they **agreed with these statements** on a 5-point Likert scale from 1 “Completely disagree” to 5 “Completely agree”).

### 5.5. Annotation protocol for participant interpretation of advertisements

We annotated the types of different interpretations that participants produced for each of the 30 advertisements. Participants replied in their native language, and native speakers translated the Spanish and Chinese responses into English for subsequent annotation in UAM Corpus Tool (<http://www.corpustool.com/>). This software allows the retrieval of both quantitative and qualitative data, and shows any significant difference between the data sets, i.e. the interpretations given by participants from the UK, Spain and China.

### 5.6. Data analysis procedures

We used the R statistical programming environment (v3.4.0; R Core Team, 2017) for statistical analyses, including “lme4” (Bates, Maechler, Bolker & Walker, 2015) for generalized linear mixed effects models and “MuMIn” package for computing  $R^2$  values for mixed models following Nakaga and Schielzeth (2013).

Mixed regression models are particularly suitable for this analysis as **they allow the analyst to factor in** random effects such as *participant* (i.e., some subjects may be faster or slower responders than others, regardless of the stimulus) and *advertisement* (i.e., some advertisements may be easier or harder to process regardless of the figurative operation they contain).

In order to make our study fully reproducible, we have published our data and scripts in a public repository which can be retrieved online:

[https://github.com/paulapsobrino/static\\_advertisements](https://github.com/paulapsobrino/static_advertisements)

## 6. Descriptive statistics

**Table 4** presents the mean evaluations and standard deviations (SD) of the processing time, appreciation, and perceived effectiveness for each of the five figurative language types. Each observed variable will be discussed in more detail in the ensuing subsections.

[insert Table 4 here]

*Table 4. Mean scores and standard deviations on processing time, appreciation and perceived effectiveness as a function of figurative language type*

a: milliseconds

b: 1 = I don't like it at all, 5 = I like it very much

c: 1 = Not effective at all, 5 = Very effective

### 6.1. Reaction time

Descriptive statistics revealed a difference between the time taken to process simple and complex operations. However, the direction of this relationship was the reverse of that predicted in *Hypothesis 1*. Advertisements featuring complex figurative

operations resulted in shorter mean RTs (in increasing order: metonymic chain, 7442.07 ms; metaphonymy, 8569.20 ms; metaphoric complex, 9012.05 ms) than those containing simple figurative operations (metaphor, 9840.22 ms; metonymy, 10977.27 ms)<sup>4</sup>.

6.2. Appreciation

Advertisements containing metaphor and metonymy alone (simple figurative operations) were rated lower in appreciation (mean appreciation score in increasing order: metaphor, 3.29; metonymy, 3.37), than their combinations in complex figurative operations, (metonymic chain, 3.47; metaphonymy, 3.59; metaphoric complex, 3.66). As argued in Pérez Sobrino (2016: 81), complex types of figurative language, such as metaphonymy, usually combine the advantages of both metaphor (cross domain mapping) and metonymy (highlighting potential), and thus they facilitate the interpretation of the advertisement in an economic yet creative manner. Likewise, metaphoric complexes might have scored higher appreciation ratings because they offer several routes (in terms of cross-domain mappings) to interpret the advertisement, thus engaging with the viewer in a more creative and cognitively rewarding process.

6.3. Perceived effectiveness

Mean ratings for perceived effectiveness mirrored to some extent the trend observed for appreciation. Simple figurative operations received lower scores for perceived effectiveness (although there was no observable difference between metaphor and metonymy, since they both registered the same mean appreciation score: 3.44) than complex figurative operations, that were perceived to convey more convincing messages (to virtually the same extent, as the mean appreciation scores show: metaphonymy, 3.71; metaphoric complex, 3.71; metonymic chain: 3.72).

6.4. Individual variation: Need for Cognition

Table 5 shows the mean Need for Cognition (NFC) and the number of participants within ‘High NFC’ (for positive values) and ‘Low NFC’ (for negative values).

[insert Table 5 here]

Table 5. Average value for high and low NFC and number of participants in each category

Table 6 reports the mean evaluations and standard deviations (SD) registered for high and low NFC participants for simple and complex figurative operations in terms of processing time, appreciation, and perceived effectiveness.

[insert Table 6 here]

Table 6. Mean and SD processing time, appreciation score and perceived effectiveness ratings for different levels of figurative complexity exhibited by high and low NFC participants

a: milliseconds

<sup>4</sup> At request of one of the reviewers, we would like to clarify that these reaction times are usually longer than the standard ones assessed in psycholinguistic experiments.

b: 1 = I don't like it at all, 5 = I like it very much  
 c: 1 = Not effective at all, 5 = Very effective

In order to facilitate the interpretation of *Table 6*, we include below boxplots for each observed variable to visualize the responses provided by high and low NFC participants. As can be seen from *Figure 7*, people with high NFC (in red) responded faster to adverts with high levels of figurative complexity than they did to adverts with low levels of figurative complexity, and also liked them better and found them more effective. *Hypothesis 4i a* is thus confirmed. However, people with low NFC (in blue) did not respond faster to adverts with low levels of figurative complexity than they did to adverts with high levels of figurative complexity. Their responses resembled those of respondents with high NFC in the sense that they responded faster to complex adverts than to simple ones, although overall they took longer than people with high NFC to process both simple and complex adverts. Hence, *Hypothesis 4ii a* is refuted.

[insert Figure 7 here]

*Figure 7. RTs registered for high and low NFC participants for simple and complex figurative operations*<sup>5</sup>

In terms of appreciation, *Figure 8* reveals that people with high NFC did indeed like better complex than simple adverts, thus confirming *Hypothesis 4i b*. However, and converging with the trend observed for RT, people with low NFC were more likely (on average) to prefer complex than simple adverts, thus contradicting *Hypothesis 4ii b*. Overall, people with high NFC rated higher (on average) complex adverts than people with low NFC.

[insert Figure 8 here]

*Figure 8. Appreciation ratings registered for high and low NFC participants for simple and complex figurative operations*

Finally, *Figure 9* shows that when judging the effectiveness of the adverts both high and low NFC participants produced similar responses to those produced for appreciation. People with high NFC thought that complex adverts were more effective (thus confirming *Hypothesis 4i c*) but so did people with low NFC (thus contradicting *Hypothesis 4ii c*), although to a lesser extent.

[insert Figure 9 here]

*Figure 9. Appreciation ratings registered for high and low NFC participants for simple and complex figurative operations*

Overall, both high and low NFC participants behaved in the same way (shorter processing time, greater appreciation, and greater perception of effectiveness for complex adverts), although participants with high NFC showed faster processing time, and rated the adverts higher for appreciation and perceived effectiveness than participants with low NFC.

<sup>5</sup> Due to the high positive skew of the data, RT times have been normalized using the log() function in R. For a more detailed discussion, see section 7.1

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6.5. Nationality

Table 7 reports the mean scores and standard deviations for the three nationalities on processing time, appreciation and perceived effectiveness

[insert Table 7 here]

Table 7. Mean scores and standard deviations on processing time, appreciation and perceived effectiveness as a function of nationality

- a: milliseconds
- b: 1 = I don't like it at all, 5 = I like it very much
- c: 1 = Not effective at all, 5 = Very effective

Participants from the UK were quickest to report that they have understood the meaning of the advertisements (mean RT: 6988ms), followed by Spanish (mean RT: 9008ms) and Chinese participants (mean RT: 11662ms). In turn, Spanish participants were more likely (on average) to rate adverts higher in terms of both appreciation and perceived effectiveness. English and Chinese participants responded in a similar fashion to the questions of appreciation and perceived effectiveness.

Table 8 reports the findings for each of the five figurative operations considered in this study.

[insert Table 8 here]

Table 8. Mean scores and standard deviations on processing time, appreciation and perceived effectiveness as a function of type of figurative language and nationality

- a: milliseconds
- b: 1 = I don't like it at all, 5 = I like it very much
- c: 1 = Not effective at all, 5 = Very effective

In order to illustrate the trends observed in Table 8, we now provide examples from our corpus that reflect the national variation in the responses given to the advertisements. In terms of RT, let us now consider the metaphonymy featured in a Chinese advert for energy-saving light bulbs (Figure 10). The mean reaction times per nationality for this specific advertisement reflect the general pattern shown in Table 8. The UK participants responded most quickly (8713 ms), followed by the Spanish (10003 ms) and Chinese (13540 ms). Some of the participants stated that it took them a bit longer to understand the advertisement because the main image shows a competitor light bulb, whereas the promoted energy saving bulb appears in a much smaller size and in the upper left corner.

[insert Figure 10 here]

Figure 10: Midea lightning (Chinese). Text: So lazy! Replace it immediately<sup>6</sup>

<sup>6</sup> The metaphor FAT MAN IS HIGH ENERGY-CONSUMING LIGHBULB is accessed via the metonymies CARELESSLY-TIED TIE, TROUSERS THAT DO NOT FIT ROUND THE WAISTLINE, LARGE STOMACH WITH DISAPPEARING BELLY BUTTON, which trigger the idea of an OBESE, LAZY MAN.

For the sake of illustration, we use the case of metaphonymy to illustrate the variation across the three nationalities in terms of appreciation. Chinese participants expressed a strong dislike of the advertisement shown in *Figure 11*<sup>7</sup>. Although the advertisement was about tourism in China, they found it cryptic and difficult to understand.

[insert Figure 11 here]

Figure 11. TUI: "The Temple of Heaven is Not China" (UK corpus)

We use the example given in *Figure 12*, once again featuring metaphonymy<sup>8</sup>, to illustrate the responses given by participants of different nationalities. The UK and Spanish participants rated this advert as highly effective (mean score=4.40 and 4.31, respectively). Whereas the mean rating of perceived effectiveness by Chinese participants was lower (mean=3.61). UK participants reported several versions of a similar theme, that homelessness is an issue that requires our attention and that active involvement is required to fight it. Chinese participants, however, produced a different but equally viable interpretation, that one should not waste and dispose of food unnecessarily, or they did not understand the advertisement at all. This difference at the level of interpretation is likely to have affected their ratings of appreciation and perceived effectiveness, as the intended message was not understood by the Chinese participants.

[insert Figure 12 here]

Figure 12. Too many people eat on the streets (UK corpus)

## 7. Inferential statistics

### 7.1. Reaction time

Reaction time scores were normalized before fitting them into the mixed model with the log function (1/RT) in order to reduce the effects of outliers. A log function was applied as RT data are typically skewed (Luce, 1986).

Two regression models (with subsequent likelihood ratio calculation to compare model 1 and 2) were conducted for RT to establish inferential statistics for differences in speed of comprehension. Figurative complexity was entered as a sole predictor in model 1. The interaction term *figurative complexity* \* *need for cognition* was entered

<sup>7</sup> Metaphor: CHINA IS ICEBERG, of which Temple of Heaven is the tip. In connection with tourism in China, it implies there is more to see than the Temple of Heaven. The primary metaphor UNDERSTANDING IS SEEING and the cause-effect metonymy TUI FOR VISITING CHINA (BEYOND THE TEMPLE OF HEAVEN) support the interpretation of the iceberg metaphor, thus combining in the form of metaphonymy.

<sup>8</sup> The visual depiction of a sewer metonymically represents the streets (verbal part of the advert). The visual depiction of the plates in the sewer prompts the connection with a dish drainer, which metonymically represents eating (verbal part of the advert). Both metonymies connect the visual metaphor DISH DRAINER IS SEWER with the verbal part of the advertisement.

as predictor in model 2. For both models, participants and advertisement were entered as random effects.

Figurative complexity (model 1) was not significantly associated with RT ( $\chi^2(1) = 2.953, p=.56$ ), and thus *Hypothesis 1* should be rejected. In turn, model 2 was significant overall ( $\chi^2(1) = 33.983, p<.01$ ). These findings suggest that *Need for Cognition* plays a role in the relationship with figurative complexity and RT, thus supporting *Hypothesis 4i a*. However, the exploration of the adjusted residuals yielded a relatively weak model only accounting for 5% of the variance observed (Adj.  $R^2=.05$ ). A weak model suggests that other variables not taken into account in this study might play a significant role in the time required to process and image by participants, such as colour, spatial arrangement, and visual density (Hansen, Pracejus, and Gegenfurtner, 2009; Hettiarachchi and De Silva, 2012; Kieras and Hornof, 2014).

A significant relationship was identified between nationality and speed of comprehension ( $\chi^2(1) = 26.638, p<.001$ ) which accounted for 11% of the variance observed (Adj.  $R^2=.11$ ), and thereby confirming *Hypothesis 5a*. In addition to this, participant nationality was investigated for any significant role it may play on the speed of comprehension for different levels of figurative complexity. We entered into the model the interaction between the nationality of the participants, their need for cognition, and the figurative complexity as a function of speed of comprehension<sup>9</sup>. A significant effect was found between nationality, figurative complexity and need for cognition ( $\chi^2(1)=93.686, p<.001$ ), which explained 14% of the variance observed (Adj.  $R^2=.14$ ).

7.2. Appreciation

Figurative complexity was entered into a mixed generalised linear model as a fixed effect with appreciation entered as the dependent variable. However, the model was not significant overall, but the data appeared bimodal. The five figurative complexity types were recoded into a dichotomous variable as simple vs. complex operations. Here, t model was significant overall, but remained relatively weak, accounting for 1% of the variance observed ( $\chi^2(1) = 4.7257, p<.05$ , Adj.  $R^2=.01$ ). Hence, *Hypothesis 2* should be accepted with caution. We speculate that a dimension that seems relevant here is the way the picture is visually arranged (rather than the type of mapping expected from the viewer). In van Mulken, Le Pair and Forceville 2010, it was shown that metaphors in which the two terms are merged into one single unit (hybrid metaphors) were more likely to be appreciated than other visual renderings.

The interaction *figurative complexity* \* *NFC* reduced the overall model significance ( $\chi^2(1) = 6.258, p=.09$ , Adj.  $R^2=.01$ ), suggesting *need for cognition* was not a contributing factor in advertisement appreciation and that *Hypothesis 4i b* should be rejected.

A strong negative relationship was found between *appreciation* and *RT* ( $\chi^2(1) = 187.13, p<.001$ , Spearman's Rho:  $-0.218, p<.01$ ) which explained 4% of the variance observed (Adj.  $R^2=.04$ ). This suggests that participants were more likely to appreciate

<sup>9</sup> In lmer syntax: `lmer(LogRT~Nationality_Participant*Complexity2*NFC + (1|Subject) + (1|Ad_Trial), data = static)`

the advertisements that they understood more quickly, or alternatively, that they understood them more quickly because they liked them.

Nationality was not found to be a significant predictor of either appreciation of advertisement ( $\chi^2(1)=1.7516$ ,  $p>.05$ ). No effect was found either when fitted in the model the interaction *nationality \* figurative complexity \* appreciation*<sup>10</sup> ( $\chi^2(1)=40.519$ ,  $p=0.7$ ). We thus initially reject *Hypothesis 5b*.

### 7.3. Perceived Effectiveness

Figurative complexity (model 1), and its interaction with *Need for Cognition* (model 2), were entered into mixed generalised linear models with *perceived advertisement effectiveness* as the DV. However, no overall significant effect was found for either predictor ( $p$ 's $>.05$ ), suggesting that *Hypothesis 3* and *Hypothesis 4i c* should be rejected.

RT and *perceived advertisement effectiveness* correlated significantly ( $\chi^2(1) = 287.27$ ,  $p<.001$ , Adj.  $R^2$ :.06) and negatively (Spearman's  $Rho=-.277$ ,  $p<.001$ ). This means that participants processed advertisements more quickly if they were perceived as more effective, or alternatively, found them more effective if they understood them more quickly. In addition to this, there was a strong, significant correlation between *appreciation of advertisement* and *perceived advertisement* ( $\chi^2(1) = 47282$ ,  $p<.001$ , Adj.  $R^2$ :.53, Spearman's  $Rho=.757$ ,  $p<.001$ ), and accounted for 53% of the variance observed. However, a causal relationship cannot be inferred from these data, and the most that we can say here is that there is a significant relationship between the two.

Finally, nationality was found in a statistically reliable way to be a predictor of the perceived effectiveness of advertisement ( $\chi^2(1)=47.327$ ,  $p=0.17$ , Adj.  $R=0.3$ ). We thus accept *Hypothesis 5c*.

## 8. Discussion

In this paper, we have identified a number of patterns which may be of use to advertisers interested in promoting their product to a global market. These are as follows:

1. *Complex metaphor-metonymy combinations are processed faster than simple operations*. Our findings indicate a negative relationship between figurative complexity and RT: the most complex metaphor metonymy combinations (metonymic chain, metaphonymy, and metaphoric complex) were processed faster than metaphor and metonymy on their own. These results became statistically significant when need for cognition was factored into the analysis; individuals with a high need for cognition reacted significantly more quickly to complex figurative operations than people with a low need for cognition. These results contradict our initial expectations, as we predicted that the simple operations would be processed faster. This finding suggests that advertisers need not worry too much about making their advertisements so creative that they will become impossible to understand;

<sup>10</sup> In lmer syntax: `lmer(Appreciation~Nationality_Participant*Complexity2*NFC + (1|Subject) + (1|Ad_Trial), data = static)`

`lmer(Effectiveness~Nationality_Participant*Complexity2*NFC + (1|Subject) + (1|Ad_Trial), data = static)`

people will still manage to find meaning in such advertisements, and it will not necessarily take them long to do so, particularly if they have high levels of need for cognition.

2. *Complex metaphor-metonymy combinations are more strongly appreciated.* Complex figurative operations were perceived as more appealing (but not more convincing). Descriptive results show that metaphor and metonymy in isolation were scored lower for both appeal and perceived effectiveness. These results support our hypothesis and are reassuring for advertisers; potential consumers are unlikely to be put off by complexity. Need for cognition was not a contributing factor here.

3. *Participants find pleasurable what they think is convincing; and they are able to find meaning in advertisements that they find pleasurable.* Perceived appreciation and perceived effectiveness are strongly related in a positive way, and both correlated in a negative with RT. In other words, people tend to like what they think is true (or the other way round), and this results in (or is a consequence of) shorter processing periods.

4. *All participants processed complex adverts faster than simple ones, and they also liked them better and thought they were more convincing.* However, people with high NFC were comparatively faster than people with low need NFC, and rated complex adverts higher for appreciation and perceived effectiveness.

Figure 13 shows the significant relationships between the different variables of investigated herein: figurative complexity, RT, perceived effectiveness and appreciation for the advertisement.

[insert Figure 13 here]

Figure 13. Summary of significant interactions between the variables of study

5. *Nationality accounts for the variation in terms of speed of processing, appreciation and perceived effectiveness of advertisements.* British participants were found to respond significantly faster to the advertisements, whereas the Spanish were more likely to rate advertisements higher for appreciation and perceived effectiveness. Likewise, significant differences between the three groups were found for how pleasurable and convincing they considered the advertisements to be. In particular, Chinese subjects preferred adverts that contained metonymy and metonymic chains, whereas the Spanish and the English preferred adverts that contained metaphonymy. Finally, we observed consistent differences across the three nationalities with respect to the extent to which they liked the advertisements depending on how convincing they thought they were, although these differences could only be observed for the most positive and negative ratings of the advertisements. Overall, then, we have shown that whilst people's nationality played a statistically significant role in the speed of comprehension of advertisements, it did not affect levels of appreciation and perceived effectiveness. On the other hand, when we look at the actual interpretations provided by participants from different nationalities, a slightly different picture emerges. In many cases, the participants misunderstood the main message of the advertisement and this appeared to affect their levels of appreciation and perceived effectiveness.

Individual descriptors, such as need for cognition, played a role in explaining the differences between the three nationalities. These findings suggest that advertisers should factor in the amount of figurative complexity, and the nature of the figurative operations that they employ when honing their advertising campaigns to meet the needs of different national groups.

Some caution should be exercised in interpreting the findings from this study. First, the number of participants recruited for this experiment was moderate; future studies could usefully be conducted with larger groups of participants. The issue of calculating statistical power in mixed models is tricky, as there is no analytical solution for power analysis in mixed models, that is, no plug-in formula that solves the equation and tells you how many participants a study needs. A very recent study by Brysbaert and Stevens (2018) points out that the only way to obtain the statistical power in mixed models is to estimate it numerically by simulation on a much larger dataset. Future studies following our design should calculate a priori the number of participants needed to design a properly powered study. On the other hand, one advantage in having a smaller pool of participants is that it allowed us to collect qualitative data on their responses to the advertisement and some of this data was useful in accounting for statistical trends identified in the quantitative part of the study.

A second potential weakness of the study is that participants were required to indicate when they had found meaning in the advertisements and we do not know what level of understanding was deemed sufficient by each of the participants. However, all participants were made aware of the fact that they would have to provide reasons for their responses so this should have prevented them from clicking at random.

A third limitation of our study relates to the lengthy reaction times that were recorded, as other types of reasoning may have taken place during that time period that we are unaware of. To our knowledge there are no previous experiments (from the field of applied linguistics or psycholinguistics) that have assessed reaction times in the comprehension of multimodal metaphor. This is uncharted territory and therefore we cannot conclude whether these values are extraordinarily high or low. Research on processing times for verbal metaphor (e.g. Johnson, 1996) report mean reaction times around 3000 ms., which is a value also slightly above the standards for psycholinguistic enquiry. The stimuli used in his experiment were verbal and also highly controlled, and therefore it can be expected that real advertisements, that include text and images as well as other co-occurring meaningful elements such as colour, typography, spatial arrangement etc, can only but increase the necessary processing time. It is not widespread practice in psycholinguistic experiments to use unadulterated real data as stimuli, researchers in this field tend to isolate certain features and create artificial prompts that allow for the manipulation of these features (e.g. Phillips and McQuarrie 2009; Chang and Yen, 2013) This was not our approach as our goal was to make inferences based on real data. In our study we tread a fine line between ecological validity and experimental control and accept that there may be disadvantages to this approach.

Finally, a fourth limitation of the study is that it did not focus on factors such as the gender of the participants, the visual characteristics of the advertisement (such as visual complexity, minimal vs. detailed design, or colour properties such as hue or

saturation), or other more complex factors such as the role of humour and irony in the advertisements. Future studies could usefully incorporate these factors.

The contributions of our study to metaphor theory more generally are: that figurative complexity does not necessarily entail longer reaction times or lead to lower levels of appreciation; that speed of response and levels of appreciation interact, that need for cognition is a variable that should be taken into account in studies of metaphor interpretation and appreciation, and that nationality can shape people's responses to metaphor and metonymy in advertisements. We would suggest that future studies take these factors into account.

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## Secondary References

- Figure 1. Camper shoes. Lightweight  
Agency: Swing Swing  
Released on: June 2010  
Source: <http://es.coloribus.com/archivo-de-publicidad-y-anuncios/impresos/camper-shoes-beetle-13897055/>
- Figure 2. Kuka. Supersoft bed  
Agency: BC&T Hangzhou  
Released on: October 2012  
Source: <https://www.coloribus.com/adsarchive/prints/kuka-sink-nose-16070605/>
- Figure 3. Kaku ice cream. Pure milk  
Agency: Brand 8  
Released on: July 2012  
Source: <https://www.coloribus.com/adsarchive/prints/kaku-puremilk-icecream-cow-15648405/>
- Figure 4. Audi fatigue detector. Wake up  
Agency: DDB Madrid  
Released on: March 2012  
Source: <https://www.coloribus.com/adsarchive/prints/audi-vaesa-wake-up-15035355/>
- Figure 5. Jinbei Big Sea Lion series. Enlarged huge space  
Not available anymore in Coloribus and Adsoftheworld.com
- Table 3. Kosamon. Super strong blast.  
Agency: Brand 8  
Released on: May 2012  
Source: [https://www.adsoftheworld.com/media/print/kosamon\\_boxing](https://www.adsoftheworld.com/media/print/kosamon_boxing)

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Figure 10: Midea Lightning  
Agency: Guangdong  
Released on: July 2010  
Source: [https://www.adsoftheworld.com/media/print/midea\\_chair](https://www.adsoftheworld.com/media/print/midea_chair)

Figure 11. TUI: “The Temple of Heaven is Not China”  
Agency: Grey Beijing  
Released on: August 2011  
Source: <https://www.coloribus.com/adsarchive/design/tui-travel-agency-iceberg-17194005/>

Figure 12. Too many people eat on the streets  
Agency: Shalmor Avnon Amichay  
Released on: October 2007  
Source: [https://adsoftheworld.com/media/print/plates\\_0](https://adsoftheworld.com/media/print/plates_0)

For Peer Review



Figure 1. Camper shoes (Spanish corpus). Lightweight

146x214mm (72 x 72 DPI)



Figure 2. Kuka (Chinese corpus). Text: Supersoft bed  
146x103mm (72 x 72 DPI)



Figure 3. Kaku ice cream (Chinese corpus). Pure milk

146x107mm (72 x 72 DPI)



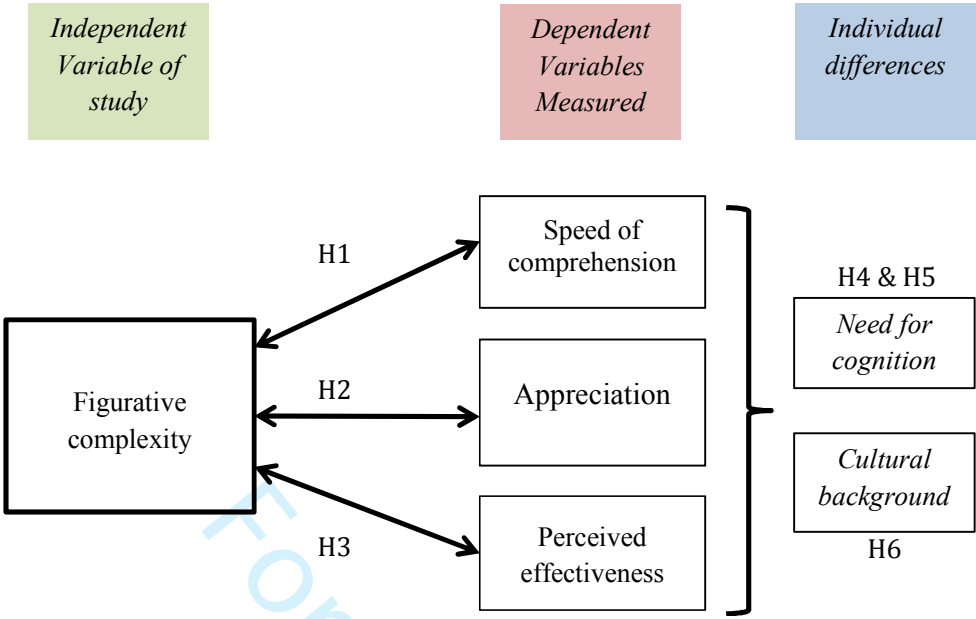
Figure 4. Audi fatigue detector (Spanish corpus). Wake up  
146x103mm (72 x 72 DPI)



Figure 5. Jinbei Big Sea Lion series (Chinese corpus). Text: Enlarged huge space

146x103mm (72 x 72 DPI)

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Nationality	Female	Male	Average age
UK	12	18	23
Spain	21	9	26.5
China	15	15	25

*Table 1: Demographics of the sample*

For Peer Review

Variable	Agreement	Krippendorff's Alpha
Step 3a. Does the advert contain a metaphor?	90.2%	0.71
Step 3b. Does the advert contain a metonymy?	80%	0.45
Step 4. Is the message simple or complex?	73.3%	0.41
Do the labels attached to the source and target domains identified by the raters coincide?	62.2%	-0.226

Table 2. Percentage of agreement between coders and Krippendorff's alpha values for the coding of the experimental stimuli




<div>ORIGINAL</div> <div>(Chinese corpus)</div>	
<div>MANIPULATION 1</div> <div>(English corpus)</div>	
<div>MANIPULATION 2</div> <div>(Spanish corpus)</div>	

Table 3. Original Chinese advert and the corresponding manipulated versions in English and Spanish

Figurative language type	Processing time <sup>a</sup>		Appreciation <sup>b</sup>		Perceived effectiveness <sup>c</sup>	
	Mean	SD	Mean	SD	Mean	SD
Metonymy	10977.27	7898.71	3.37	1.12	3.44	1.20
Metaphor	9840.22	7215.70	3.29	1.19	3.44	1.25
Metonymic chain	7442.07	4893.26	3.47	1.05	3.72	0.96
Metaphonymy	8569.20	6089.94	3.59	1.13	3.71	1.16
Metaphorical complex	9012.05	4904.85	3.66	1.02	3.71	0.96

Table 4. Mean scores and standard deviations on processing time, appreciation and perceived effectiveness as a function of figurative language type

a: milliseconds  
b: 1 = I don't like it at all, 5 = I like it very much  
c: 1 = Not effective at all, 5 = Very effective

	<b>High NFC</b>		<b>Low NFC</b>	
<b>Participants</b>	<b>N</b>	<b>Average value</b>	<b>N</b>	<b>Average value</b>
	55	0.53	35	-0.17

*Table 5. Average value for high and low NFC and number of participants in each category*

For Peer Review

Figurative operations	Processing time				Appreciation				Perceived effectiveness			
	High NFC		Low NFC		High NFC		Low NFC		High NFC		Low NFC	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Simple (metaphor and metonymy)	9366.63	7533.15	11708.73	7301.20	3.37	1.13	3.26	1.20	3.52	1.23	3.32	1.21
Complex (metonymic chain, metaphtonymy, metaphorical complex)	7675.76	5380.52	9696.57	6309.46	3.60	1.10	3.55	1.12	3.77	1.12	3.62	1.10

Table 6. Mean and SD processing time, appreciation score and perceived effectiveness ratings for different levels of figurative complexity exhibited by high and low NFC participants

- a: milliseconds  
b: 1 = I don't like it at all, 5 = I like it very much  
c: 1 = Not effective at all, 5 = Very effective

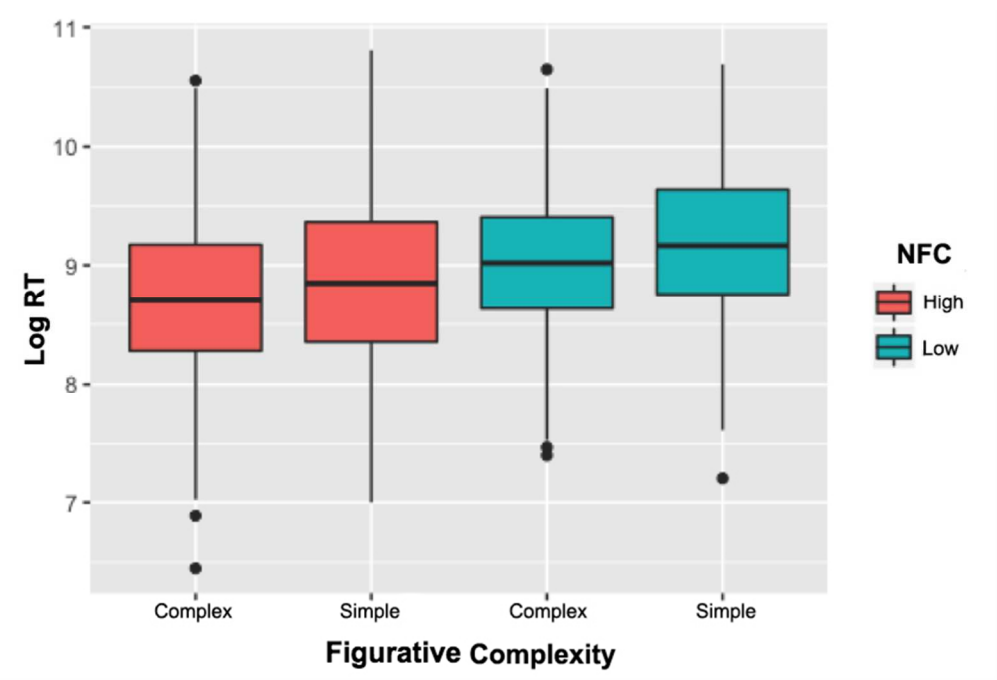


Figure 7. RTs registered for high and low NFC participants for simple and complex figurative operations

297x198mm (72 x 72 DPI)

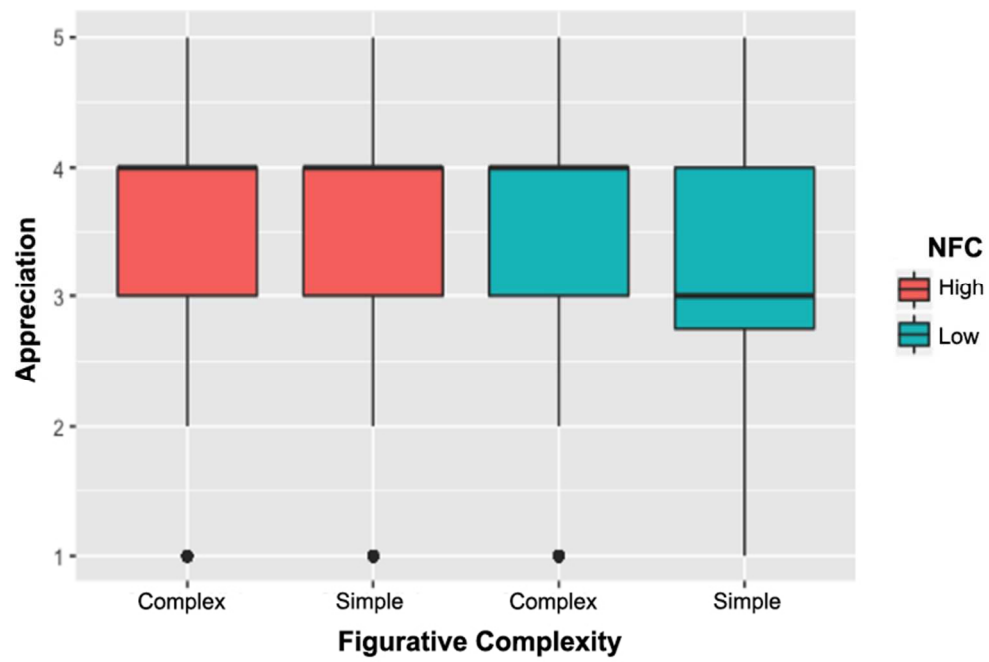


Figure 8. Appreciation ratings registered for high and low NFC participants for simple and complex figurative operations

142x95mm (150 x 150 DPI)

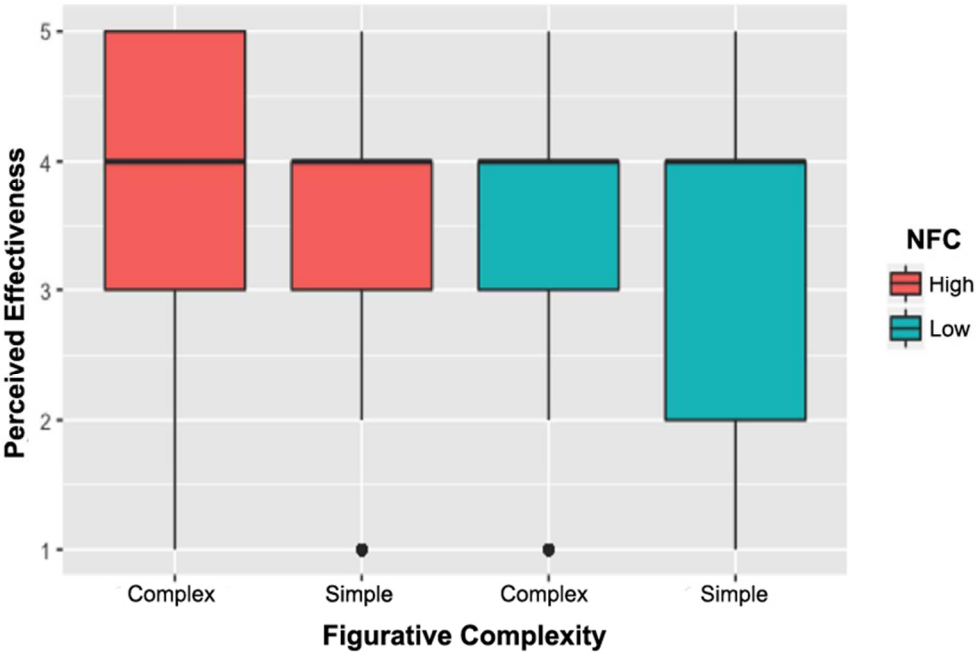


Figure 9. Appreciation ratings registered for high and low NFC participants for simple and complex figurative operations

142x95mm (150 x 150 DPI)

Nationality of participant	Processing time <sup>a</sup>		Appreciation <sup>b</sup>		Perceived effectiveness <sup>c</sup>	
	Mean	SD	Mean	SD	Mean	SD
British	6987.66	5257.35	3.43	1.11	3.57	1.20
Spanish	9008.11	6107.53	3.56	1.13	3.72	1.14
Chinese	11661.60	7481.18	3.44	1.16	3.51	1.15

Table 7. Mean scores and standard deviations on processing time, appreciation and perceived effectiveness as a function of nationality

a: milliseconds  
b: 1 = I don't like it at all, 5 = I like it very much  
c: 1 = Not effective at all, 5 = Very effective

Figurative language type	Nationality of participant	Processing time <sup>a</sup>		Appreciation <sup>b</sup>		Perceived effectiveness <sup>c</sup>	
		Mean	SD	Mean	SD	Mean	SD
Metonymy	British	8236.29	6786.24	3.37	1.10	3.38	1.22
	Spanish	9884.01	6498.16	3.45	1.04	3.73	1.11
	Chinese	13870.47	10748.30	3.44	1.20	3.62	1.21
Metaphor	British	7640.02	6609.92	3.33	1.15	3.43	1.26
	Spanish	8641.47	6003.43	3.35	1.16	3.63	1.29
	Chinese	12656.25	8791.08	3.35	1.18	3.51	1.21
Metonymic chain	British	5824.80	3900.24	3.38	1.01	3.73	0.97
	Spanish	6871.56	4116.18	3.44	1.37	3.69	1.09
	Chinese	10411.45	7417.85	3.63	0.85	3.82	0.85
Metaphonymy	British	6312.62	4373.91	3.60	1.12	3.75	1.23
	Spanish	7219.60	4434.65	3.67	1.06	3.87	1.07
	Chinese	11055.03	7197.13	3.60	1.12	3.75	1.12
Metaphorical complex	British	8518.40	4951.01	3.44	1.04	3.48	0.98
	Spanish	8736.12	4233.26	3.75	1.11	3.88	1.04
	Chinese	10494.18	6828.13	3.77	1.15	4.00	0.93

Table 8. Mean scores and standard deviations on processing time, appreciation and perceived effectiveness as a function of type of figurative language and nationality

a: milliseconds

b: 1 = I don't like it at all, 5 = I like it very much

c: 1 = Not effective at all, 5 = Very effective



Figure 10: Midea lightning (Chinese). Text: So lazy! Replace it immediately

97x137mm (72 x 72 DPI)



Figure 11. TUI: "The Temple of Heaven is Not China" (UK corpus)

146x219mm (72 x 72 DPI)



Figure 12. Too many people eat on the streets (UK corpus)  
146x207mm (72 x 72 DPI)

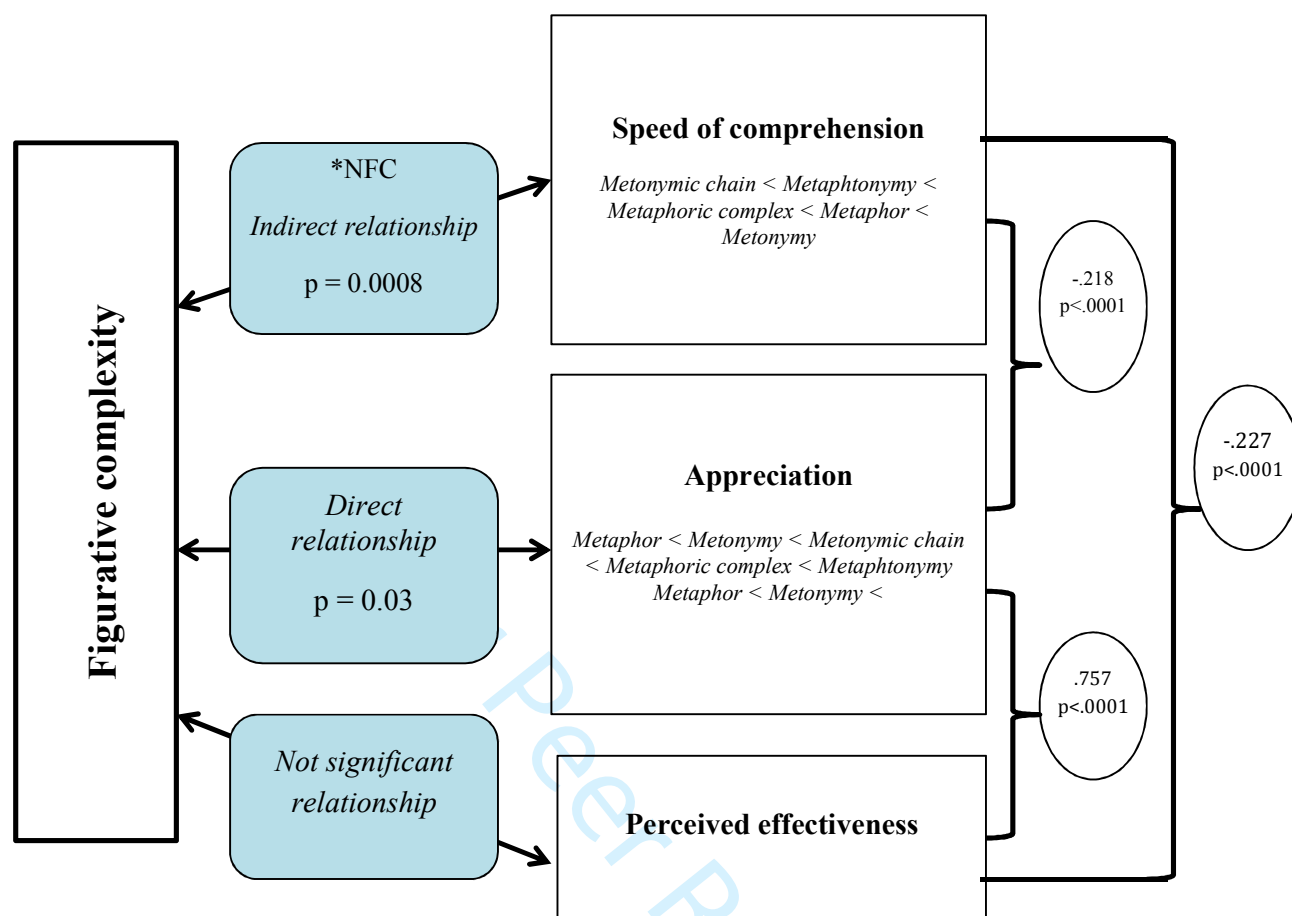


Figure 13. Summary of significant interactions between the variables of study