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Conventionality in visual metaphor

Didier Hodiamont, Hans Hoeken and Margot van Mulken

Independent / Universiteit Utrecht / Radboud Universiteit Nijmegen

7.1 Introduction

Metaphor has long been regarded as a relatively rare rhetorical figure, one that can only be established in language, and as a phenomenon that is mainly used by poets and literary authors. In the early eighties of the previous century, this view was intensively and successfully challenged (see e.g. Lakoff & Johnson 1980; Ortony 1979). Basically, the claim was made that metaphors are pervasive in our thinking and speaking, that language is only one mode in which metaphors can be expressed next to other modes, and that these expressions provide a window on fundamental human thought processes (see Steen 2007, for a review).

This view on metaphor as a cognitive phenomenon rather than a literary one, has inspired both theoretical and empirical research. For instance, the question to what extent metaphors can be expressed in modes other than the verbal mode alone has received a lot of research attention (see Muller & Cienki 2009). This is especially true for the expression and evaluation of metaphors in the visual mode (see e.g. Forceville 1996; Phillips & McQuarrie 2004; Maes & Schilperoord 2008; Van Mulken et al. 2010). The existence of visual equivalents of verbal metaphors provides interesting venues for testing fundamental claims about the mode-independency of the cognitive processing of metaphors.

In this chapter, we focus on one of the factors that has been documented to influence the processing of verbal metaphors, namely the extent to which a metaphor is perceived as conventional. Bowdle and Gentner (2005) have shown that a metaphor's conventionality plays an important role in the processing of metaphors with more conventional metaphors being processed in a qualitatively different way than more novel ones. If the cognitive processing of metaphors is largely independent of the mode in which they are expressed, the processing of visual metaphors should exhibit a similar sensitivity to conventionality. Furthermore, if the metaphorical relation is represented at a deeper conceptual level, then one would expect the perceived conventionality of a verbal metaphor to be similar to that of

its visual counterpart. This latter hypothesis is tested in a study described in this chapter. First, we will discuss Conceptual Metaphor Theory and the role ascribed to conventionality in the processing of metaphors.

7.2 Conceptual Metaphor Theory and the role of conventionality

Probably the most influential theory representing the cognitive turn in the study of metaphor is Lakoff and Johnson's Conceptual Metaphor Theory (1980; 1999). According to Conceptual Metaphor Theory (CMT), metaphor is primarily a mode of thought. The thought process entails the mapping of two (or more) conceptual domains. For instance, to communicate that a certain make of car is very fast, one may use the metaphor 'this car is a rocket'. In this metaphor, two domains are connected: the domain of the car and the domain of a rocket. The rocket domain acts as a source for characteristics that are relevant to the car domain, therefore the rocket is referred to as the source domain and the car as the target domain. To interpret the metaphor, a characteristic of the source, in this case: 'speed', is mapped onto the target resulting in the interpretation: 'this car is fast'. In more general terms: metaphoric constructions result in our understanding of the target domain becoming suffused with a prototypical characteristic of the source and changes as a result of this mapping process. So in a salient interpretation of this metaphor, this car is not literally a rocket, but it must be faster than just a regular car.

Lakoff (1993, p. 20) claims that metaphor is not primarily a figure of language and therefore it is not solely restricted to the verbal domain. Holyoak and Thagard (1995, p. 218) state in a similar vein that "metaphoric correspondences are not fundamentally between words, but rather between systems of concepts". This implies that the same metaphorical relations could be expressed via different representational systems, a claim which has been put forward by several scholars (see e.g. Forceville 2009; Müller & Cienki 2009).

There is ample evidence that similar metaphorical relations can be expressed both verbally and visually. One very common metaphoric relation is the one between ANGER and the idea of HOT FLUID IN A PRESSURISED CONTAINER¹ (Kövecses 2005). This relation is reflected in verbal expressions such as "he was boiling with anger" or "why don't you cool down a bit". With regard to the visual mode, Forceville (2005) has shown several representations of this same conceptual idea of anger in

1. Conceptual metaphors are traditionally described in capitals, but this does not mean that conceptual metaphors are primarily anchored verbally. These descriptions are only an attempt to capture the meaning of an abstract, conceptual idea into a lexicalised definition.

an Asterix comic book. The image of a person with steam coming out of his ears can be considered as an idiom in cartoon language, but also more challenging manifestations (like bulging eyes or jagged connecting lines) are considered to be motivated by the same conceptual idea of anger. Thus, it seems safe to conclude that the same metaphorical relation can be expressed in a verbal and a visual mode.

Visual metaphors are frequently encountered in both print advertising (Phillips & McQuarrie 2004; Van Enschoot et al. 2008) and commercials (Van Enschoot & Hoeken 2015). In Figure 7.1 two advertisements can be seen in which a car is compared to a rocket (Figure 7.1a) or to a dolphin (Figure 7.1b).

Hoeken, Swanepoel, Saal and Jansen (2009) argue that the popularity of metaphors (but also of other tropes such as ellipsis, irony) in advertising is the result of the fact that the same message (e.g., this car is fast) has to be communicated over and over again. If the advertisers were to use exactly the same message format again and again (e.g., this car is fast), consumers would grow tired of the message and would ignore it, because it does not contain any new information. By using different tropes (e.g., by comparing the car to a rocket, a leopard, a jet plane), advertisers can communicate the message in different forms thereby prohibiting the consumers to grow tired of the identical message claim.

The frequent occurrence of visual metaphors in genres such as cartoons, comic books and advertising, metaphors for which a verbal equivalent is present, confirms CMT's claim that the same metaphor can be expressed in different presentation modes. However, CMT goes further than that. If metaphor and metaphor processing is to be located at the conceptual level, visual metaphors should be processed in a similar way as verbal metaphors. Obviously, interpreting words is different from interpreting images. However, Quiroga et al. (2005) show that different representations (e.g. pictures of objects, or words referring to these objects) can activate the same subset of neurons, so the activation of these mappings may be relatively independent of the input modality. Likewise, the metaphorical relation between concepts could be established irrespective of whether the original input is in a verbal or in a visual format.

Although CMT claims that metaphors can be expressed in different modalities and processing should proceed modality independent, the empirical research has mainly been conducted employing verbal metaphors. Several scholars (e.g., McGlone 2007; Murphy 1997, p. 99) have called for research on the processing of metaphors in other modalities in order to assess the validity of the idea that manifestations of metaphors in different modalities are a result of the same underlying conceptual process. Visual metaphors provide an excellent opportunity for such a research enterprise.



Figure 7.1a

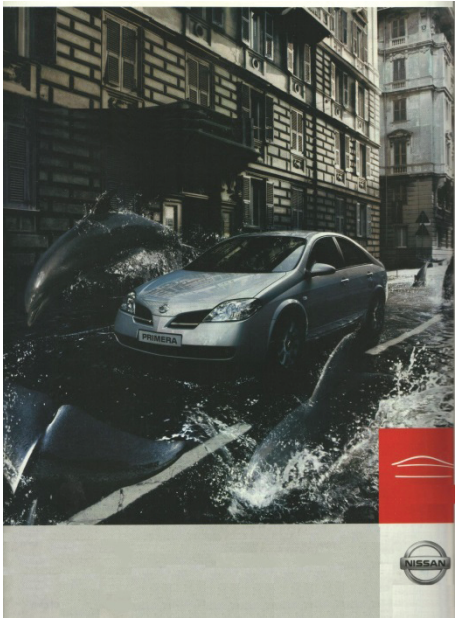


Figure 7.1b

Figure 7.1 Two car advertisements
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7.3 Metaphor processing: The career of metaphor

Bowdle and Gentner's (2005) concept of 'career of metaphor' is an interesting approach to assess the claim that metaphor processing is independent of the modality in which the metaphor is presented. To establish a metaphorical relation, one has to select characteristic(s) in the source domain that are mapped onto the target domain. Two different processes have been suggested: comparison and categorisation. Comparison entails comparing the (relations between) characteristics in the source domain to similar (relations between) characteristics in the target domain. For instance, to interpret the metaphor 'this car is a dolphin', one has to compare characteristics of a dolphin (e.g., grey, smooth, elegant, mammal, intelligent) to what may be relevant characteristics of a car. This comparison process is more likely to result in the selection of 'smooth mode of transportation' or 'intelligent' as relevant characteristics than selecting 'mammal' or 'grey'.

On the other hand, comparing the two domains is not necessary when processing by categorisation. The source domain automatically evokes the relevant characteristic because this characteristic is more or less quintessential for this concept. For instance, one may consider the characteristic 'fast' as being prototypical for a rocket. When interpreting the metaphor 'this car is a rocket' through a categorisation process, no comparison is needed: the rocket more or less automatically evokes the characteristic 'fast'.

Whether the interpretation of a metaphor is the result of a comparison or a categorisation process depends to a large extent on the metaphor's conventionality (see, e.g., Giora 1997; Bowdle & Gentner 1999). Conventionality arises from a person's repeated exposure to, and interpretation of metaphors containing the same concept as the source. If one is being confronted with a certain metaphor for the first time, for instance, 'this helmet is a sea shell', this is considered a novel metaphor. The combination of the two domains is quite novel and unexpected, and one has to compare the two domains involved to reach a satisfying interpretation. A more conventional metaphor involves a concept that has repeatedly been used to communicate the same characteristic. For instance, the concept of 'pearl' is frequently used in advertising as a metaphor to communicate the 'preciousness' of a certain product. Cars, chocolate, liquor have all been compared to a pearl. As experience with the pearl metaphor grows, it becomes easier to interpret the intended message as 'this product is precious'.

Metaphor conventionality is thus not static, but a factor that changes through a cognitive learning processes. When a certain concept is used very often as the source of a metaphor, it can become prototypical for a certain category. The alignment with its abstract, categorical meaning can become salient to the extent that it is included in dictionaries. In English and Dutch dictionaries lemmas like 'pearl'

or 'magnet' are not only described literally, the figurative meaning is mentioned as well. In certain cases, this figurative meaning of the concept may become even more salient than its original meaning. Metaphorical expressions such as 'our relationship has stranded' may no longer evoke thoughts about boats and shallow waters. Such highly conventional metaphoric expressions are often perceived as if they were literal, because people are no longer aware that two different domains are being compared (Lakoff & Johnson 1980, p. 5; Bowdle & Gentner 2005).

In some extraordinary cases, the metaphoric meaning replaces the original literal meaning and becomes a so-called 'dead' metaphor. An example is the 'block-buster' metaphor (Bowdle & Gentner 2005, p. 209). The literal meaning of a block-buster used to be "a very large bomb that can demolish an entire city block". Later people started to use this term metaphorically, as "anything that is highly impactful". As generations passed, fewer people knew the original meaning of this word. Bowdle and Gentner (2005) have coined the development of a metaphor from novel, via conventional to dead as the "career of metaphor".

The career of metaphor depicts the development of a metaphor's conventionality on a continuum, but more importantly: it also relates different levels of conventionality to different mapping processes. Metaphors that are processed more frequently can become more conventional. When a metaphor reaches a certain level of conventionality, metaphors can also be interpreted by direct categorisation. For instance, in interpreting a conventional metaphor like 'this car is a rocket', the category 'fast' is (probably) evoked automatically as the ground of the metaphor. This is a result of the repeated metaphoric use of the concept 'rocket' as a source domain, usually chosen to stress the speed of its target. By frequently using this concept in this specific manner, a relation is formed that connects the concept of a 'rocket' directly to a more abstract category of 'speed' or 'something that is fast'. Therefore, metaphors using 'rocket' as a source domain do not need to be understood through comparison, but can be interpreted immediately by categorisation.

In a series of experiments, Bowdle and Gentner (2005) have been able to document this implication of their career of metaphor concept in language use. They were able to manipulate the extent to which a metaphor was conventional by having a group of participants process several metaphors with the same ground (W is an acrobat; X is an acrobat; Y is an acrobat) and then compare the way in which they process a new metaphor (Z is an acrobat), to the way in which another group of participants who had not been exposed to metaphors involving acrobat as the source domain process the same 'Z is an acrobat' metaphor. They were able to show that the group for which the acrobat metaphor had been conventionalised used categorisation to interpret the metaphor, whereas the other group employed a comparison process. As such, they provide compelling evidence for the importance of conventionality for the processing of verbal metaphors. The question is whether conventionality plays an important role in the processing of visual metaphors as well.

7.4 The career of visual metaphor

7.4.1 Introduction

If CMT is correct in claiming that metaphoric processing is largely independent of the mode in which the metaphor is presented, then one would expect the conventionality of a metaphor that is verbally expressed to be correlated to the same metaphor when it is visually expressed. This implies that visual metaphors, similar to verbal metaphors can vary with respect to their conventionality.

According to Bowdle and Gentner (2005), novel metaphors constitute one end of the continuum. Novel metaphors require people to compare the source and target domain to identify characteristics of the source that should be mapped onto the target domain. An example of such a novel metaphor is the car advertisement in which the car is compared to a dolphin (see Figure 7.1b). To establish the metaphorical meaning of this advertisement, participants need to select one or more characteristics of a dolphin that could be relevant to this car.

The more frequently someone has encountered a metaphor in which a certain source domain is used to communicate a certain characteristic, the more conventional this metaphor becomes. Within the visual domain, certain metaphors are used relatively frequently. Figures 7.2a and 7.2b show two ads in which the advertised product is compared to a pearl (while the context of a pearl is still available, the pearl itself is replaced by the product). Instead of referring solely to the valuable and rare gem that grows inside oysters, the pearl has come to stand almost exclusively for preciousness and pricelessness, as if the object were a concept or an abstraction. The pearl has undergone this evolution both in the visual and in the verbal domain. Also in words, it is possible to refer to the great value of something by making use of a pearl metaphor, in expressions such as ‘he has some pearls of wisdom to offer’. Apparently, both visual and verbal pearls have undergone the same evolution. And although with pearls the visual metaphor has probably been inspired by the pre-existing verbal variety, this order of things is not mandatory.

For light bulbs (another source domain that is used quite frequently in advertising), it is less common to come across verbal equivalents. Still, everybody knows that the depiction of a light bulb only rarely refers to a glass bulb that has to be inserted into a socket, but more probably refers to the concept of a bright idea (see Figures 7.2c–d). Here too, the concrete object has come to stand for an abstraction.



Figure 7.2 Illustrations of advertisements

At the other end of the continuum, Bowdle and Genter (2005) position “dead” metaphors, that is, metaphors for which the literal meaning of the source concept is no longer activated, but only the figurative meaning is. It is questionable whether such visual images can become “dead” in this sense because of their iconic nature. For activating the concept, the image has to be recognized as such. That is, to visually express the fact that one’s relation has stranded, a boat stranded on a beach has to be depicted and needs to be recognized as such in order for the metaphoric relation to be processed. The verbal expression will most likely not activate such images (anymore). Still, there may be some visual metaphors that no longer activate the relevant concept. The ♥ image is used abundantly to express that someone or something is loved. It is possible that people no longer identify this image as “heart” but immediately activate its intended figurative meaning “loves”. The same might be true for the light bulb mentioned above. Especially if the light bulb were to be depicted in a pencil drawing, or in a cartoon context, it is very questionable whether the original light spreading capacities of the object is still thought of by the onlookers. In this sense, the ♥ and the light bulb may have become dead metaphors. These examples suggest that there is enough reason to believe that visual metaphors can differ from each other on conventionality.

In this paper, we set out to test Conceptual Metaphor Theory’s claim that the processing of metaphors needs to be situated at the conceptual level and is largely independent of the mode in which these metaphors are expressed. Most research on metaphor processing has focused on the processing of verbal metaphors. The insights acquired through these studies provide an interesting framework to test CMT’s claims.

CMT would predict that a visual metaphor is processed in a way similar to a verbal metaphor. Given that conventionality plays an important role in the processing of verbal metaphors, it should play a similar role in the processing of visual metaphors as well if CMT is correct. That is, conventional visual metaphors would be processed through categorization, novel visual metaphors through comparison. To set up such a study, it is pivotal to establish whether visual metaphors vary with respect to their perceived conventionality. This leads to the first research question:

To what extent do visual metaphors vary with respect to their perceived conventionality?

In addition, it would be interesting to assess whether the perceived conventionality of a metaphor depends on whether it is presented in a verbal or a visual format. The difference in processing verbal and visual metaphors may lie in the identification of the concepts involved in the metaphor. Neuro-scientific evidence suggests that regardless of whether a concept is verbally presented or visually depicted the same neuron sets are activated (Quiroga et al. 2005). If Holyoak and Thagard (1995) are

correct in claiming that metaphors are about the relation between concepts rather than about the relation between words, then the perceived conventionality of a metaphor should not depend on its presentation mode. This leads to the second research question:

To what extent is the perceived conventionality of a verbally expressed metaphor similar to that of its visually expressed counterpart?

If no correlation is found between the verbal and visual versions of a metaphor, this would raise serious doubts about the claim that metaphors should be situated at the conceptual level.

7.4.2 Method

To address the research questions, an experiment was conducted in which participants rated the conventionality of either verbally presented metaphors or their visually presented equivalents. The participants were told that they had to rate ideas for print advertisements. Given that metaphors are used frequently in advertisements, the task could be considered a realistic one. Participants received either the verbal expression, e.g., “this USB stick is a sponge” or a leaflet containing a picture of a the two concepts involved, e.g. USB-stick and next to it a picture of a sponge.

Pretest

For the visual representations of the metaphor, it was essential that the images were regarded as referring to the same concepts as the words used in the verbal equivalent. That is, the image of a sponge should evoke the concept SPONGE just as the word ‘sponge’. To assess whether that was the case, a pretest was carried out among 27 undergraduate students. Participants were asked to name the object shown in the image. If fewer than 5 out of 6 participants used the exact same word to describe the image, the image was adapted or replaced and presented to new participants. The pretest resulted in the selection of images for the main experiment that were described with the exact intended word by at least five out of six participants.

Participants

Eighty Dutch undergraduate students of the Radboud University in Nijmegen, aged between 17 and 29 years ($M = 20.43$, $SD = 2.63$) served as participants. For all participants, Dutch was their mother tongue and 48.5% of them were female. None of the participants was entered in a language or communication related program. All participants were paid four euros for their participation.

Materials

The material consisted of 17 metaphors, which were all represented in both a visual and a verbal format. All metaphors contained a concrete source domain (e.g., sponge, battery) being compared to a concrete product representing the target domain (e.g., USB-stick, muesli bar). The metaphors were created by the researchers but most of them were based on metaphors used in real advertisements. However, none of these metaphors had been used in recent national campaigns.

All visual metaphors consisted of two images. To limit the influence of perceptual features, the images were stripped down (employing Photoshop software) to greyscale visual representations without any context or logo's. The order in which the images were presented could influence the evaluation of the metaphor. Forceville (2007) contends that in most metaphorical television commercials the source is introduced before the target, which may have participants expect the source to be presented left and the target on the right. To control for the potential effect of (left-right) order of the images on the evaluation, two versions of each visual metaphor were created that only differed in the order of presentation of the images. In Figure 7.3, two examples of the visual metaphors are presented, the first with the source domain on the left side, the second with the source domain on the right side.



Figure 7.3 Two examples of stimuli in the visual condition

For each of the visual metaphors, two verbal equivalents were developed: in one version the relation was expressed as “This X is a Y” (e.g., “This mueslibar is a battery” or “This USB-stick is a sponge”), in the other version the metaphor was expressed as a simile (e.g., “This mueslibar is like a battery” or “This USB-stick is like a sponge”). Bowdle and Gentner (2005) reported that participants preferred the simile version when the metaphorical relation was considered novel, whereas they preferred verbal metaphor expressions when the relation was perceived as conventional. Bowdle and Gentner therefore concluded that the verbal metaphor realization (“This X is a Y”) induces the categorisation process, whereas the simile version (“This X is like a Y”) induces comparison.

As a consequence of this, control factors were different for both modalities. In the visual mode, we wanted to control for target presentation on the left or right: a factor that could not be introduced for the verbal mode without changing the meaning of the metaphor (e.g., compare ‘this muesli bar is a battery’ to ‘this battery is a muesli bar’). On the other hand, only verbal metaphors were controlled for type: whether they were presented as metaphor or simile. Note that with regard to the visual structure of the stimuli (the spatial layout of the pictorial elements in the picture frame), all visual metaphors had the structure of a juxtaposition (according to the terminology of Phillips and McQuarrie 2004) or a simile (according to the terminology of Forceville 1996). We deliberately opted for this design choice, because we were interested in the conventionality of metaphoric comparisons of two domains. Whether the comparisons that are presented as pictorial juxtapositions relate to verbal similes, just as pictorial fusions or hybrids (where the source and target are fused together into a single image) relate to verbal metaphors (see, e.g., Van Mulken et al. 2010) has yet to be explored in more detail, particularly with regard to processing. Besides that, the creation of pictorial hybrids would differ from item to item, and this would have influenced the ease with which participants could have identified the individual domains, and consequently the perceived conventionality of the metaphor. Therefore, in the pictorial domain, visual structure was held constant.

Design

Half of the participants were presented with the visual metaphors, the other half with the verbal metaphors. For those who had to rate the visual metaphors, half saw the metaphors with the source domain on the left side whereas the other half saw the metaphors in the reversed order. For those rating the verbal metaphors, half received the “is” version, the other half was exposed to the “is like” version. The design resulted in four different conditions. For each of these conditions, a second version was developed in which the order in which the metaphors were presented, was reversed.

Procedure

Participants were told that they would be presented with concept versions of print advertisements, which they had to evaluate using a print questionnaire followed by an interview. After reading the instruction containing an example of a concept version of a well-known advertisement (either in the verbal or visual mode), the questionnaire started with two examples of concept versions. Participants were then given the opportunity to ask for further explanation if needed. Subsequently, the questionnaire with the seventeen stimuli had to be filled out individually.

The level of conventionality was measured by three seven point semantic differentials with the ends of the poles being 'new – standard', 'obvious – far-fetched' and 'unusual – usual'.² The reliability of the scale was good ($\alpha = .82$), both for the evaluation of visual metaphors ($\alpha = .80$) and verbal metaphors ($\alpha = .84$).

After the questionnaire was filled out, participants were interviewed. In this part of the experiment, all of the stimuli were presented again, one at a time and each one on a single page (and in the same order as in the questionnaire). While pretesting the experiment, we found that participants particularly liked to elaborate about their appreciation of the stimuli and whether they found it apt for advertising. Therefore the interview started with two filler questions: for each stimulus participants were asked to indicate to what extent they appreciated the comparison (*I like this comparison*) and considered it to be apt for advertising (*This is an apt comparison*). Both appreciation and aptness had to be rated on a single seven point scale (1 = disagree, 7 = agree) which was presented in print in front of the participants to help them verbalize their level of agreement in a grade.

To control whether participants interpreted the stimulus as a metaphor, they were asked for their interpretation of each stimulus. If they found it difficult to verbalize their thoughts, additional questions were asked ("What do you think is the ad maker's message?" or "Could you name any shared characteristics?"). It was checked that only initial metaphoric interpretations were gathered. If participants acknowledged that they perceived the metaphoric nature only at this secondary phase (during the interviews), their ratings for that particular item were removed from the dataset ($n = 3$). Likewise, cases were removed if more than one of the scores on the three seven point scales for conventionality was missing or not filled out correctly ($n = 9$). Finally, it was checked whether participants in the visual condition actually identified both target and source correctly. Most participants spontaneously mentioned the depicted items during the interview, but if not they were asked to name them (another 9 cases were deleted because of incorrect naming).

2. The 'conventional' poles were respectively on the right, left and again on the right side. This was done to prevent participants giving all dimensions the same score, but let them consider each decision separately.

Statistical and control analyses

To assess whether the (verbal and visual) stimuli were interpreted as metaphors, the participants' initial interpretations during the interview were checked by three independent raters (after they had had a training session in metaphors). If positive characteristics of the source domain were transferred onto the target, the interpretation was considered metaphoric, such as, when the 'lipstick is magnet' metaphor was interpreted as "this lipstick attracts men" or "it sticks perfectly to your lips". Interpretations that were considered as not metaphoric were interpretations that did not clearly involve metaphoric thinking (like "both belong to the same brand"). Besides that, interpretations that were negative about the product (like "everything will keep sticking to it") were removed from the dataset as well. The interrater reliability of the three raters was high (Fleiss' generalised Kappa = .83; Landis & Koch 1977).

Interpretations that were considered to be not metaphorical by at least two of the raters, were excluded for further analyses (211 cases, so that finally 84.04% of all cases remained for analyses). Before that, we checked whether the incidence of a metaphorical interpretation was related to whether the metaphors were presented in a verbal or visual format. A t-test showed that this was not the case ($t(1327.11) = 1.44, p = .15$). An additional t-test ($t(672.01) = .51, p = .61$) shows that it did not matter for the verbal items whether they were presented as a simile (14.1% incorrect interpretations) or a metaphor (12.6% incorrect interpretations). In the visual mode however, the t-test ($t(638.19) = 2.37, p < .05$) shows that participants who received the items with the target depicted on the right side made more errors (19.6%) when interpreting the visual metaphor than participants who received the items with the target depicted on the left side (12.8%). Although this is a significant difference (that will be handled in more detail in the discussion section), this showed to have no effect on the ratings on conventionality, since all the errors were deleted and only items that were interpreted metaphorically were included for our analyses on conventionality.

7.4.3 Results

Table 7.1 contains the average scores for both the visual and the verbal metaphors.

The first research question was about the extent to which visual metaphors differ with respect to their perceived conventionality. To address that question, a oneway anova with stimulus as factor was conducted to assess the differences in conventionality scores for the items in the visual mode. This revealed a highly significant effect of stimulus ($F(16, 541) = 11.79, p < .001$). Post hoc pairwise comparisons (Tukey's HSD) revealed that of the 136 potential significant differences, 43 were indeed significant.

Table 7.1 Mean conventionality scores for each item in both modalities, ranging from 1 (very unconventional) to 7 (very conventional), standard deviation between brackets (* = significant difference between the visual and verbal modality)

stimulus	mean conventionality	verbal conventionality	visual conventionality
target, source	M (SD)	M (SD)	M (SD)
car, rocket	5.62 (1.08)	5.59 (1.06)	5.65 (1.11)
watch, diamond	5.08 (1.17)	5.06 (1.08)	5.10 (1.27)
muesli bar, battery	4.90 (1.48)	4.94 (1.22)	4.86 (1.72)
gin, cannon*	4.34 (1.38)	3.94 (1.36)	4.75 (1.30)
lawn mower, electric shaver	4.13 (1.44)	4.32 (1.51)	3.89 (1.33)
lipstick, magnet*	4.01 (1.36)	4.61 (1.19)	3.35 (1.24)
piece of candy, ice cube*	3.97 (1.55)	3.24 (1.23)	4.96 (1.41)
mobile phone, tool case	3.96 (1.09)	3.96 (1.04)	3.95 (1.16)
chocolate, pearl	3.91 (1.36)	4.18 (1.37)	3.61 (1.30)
chain saw, tiger	3.81 (1.47)	3.84 (1.40)	3.77 (1.57)
microwave, robot	3.74 (1.39)	3.80 (1.42)	3.65 (1.37)
condom, umbrella	3.72 (1.39)	3.64 (1.35)	3.80 (1.45)
helmet, sea shell	3.48 (1.14)	3.63 (1.22)	3.30 (1.03)
beer, ventilator*	3.43 (1.56)	2.46 (1.13)	4.00 (1.51)
detergent, boxing glove*	3.41 (1.63)	2.66 (1.09)	4.20 (1.73)
USB-stick, sponge	3.03 (1.01)	3.24 (1.11)	2.81 (0.85)
laptop, dolphin	2.43 (1.26)	2.09 (0.99)	2.70 (1.40)

The second research question was about the extent to which the conventionality scores of the visual metaphors were similar to those of their verbal equivalents. A straightforward way to address this question is to compute the correlation between the conventionality scores for the verbal and visual metaphors. Indeed, the average verbal conventionality scores correlate significantly with the average visual conventionality scores ($r = .59, p < .05$). Although this correlation coefficient is considerable, it is far from perfect.

The question can also be addressed in a more complex way through a mixed model analysis. Our model included conventionality as dependent variable, modality as fixed factor and items and participants as covariates. To control for bias effects, several other factors (e.g., age, education, appreciation, aptness) were placed into the model, but for none of them did inclusion improve the model. This also holds for the fact whether a verbal item was presented as a metaphor or simile, and whether a visual item was presented with the target on the left or on the right side. This justifies that all verbal items were considered as one homogeneous group, and all visual items as another.

In the final model we found no overall significant main effect of the modality being verbal or visual ($F(1, 22.47) < 1, p = .48$) on the conventionality scores, implying that the average conventionality for verbal metaphors was equal to the visual metaphors. There were significant random effects of participants ($b = .16, SE = .04, p < .001$) and of items ($b = .42, SE = .21, p < .05$) implying that variation in scores could be attributed to both differences between participants and differences between metaphors. These differences between metaphors were found when presented visually ($b = .60, SE = .23, p < .05$; similarly to the one way anova) as well as when they were presented verbally ($b = .78, SE = .29, p < .01$). However, a significant interaction of modality and item was found in the covariance structure ($b = .27, SE = .11, p < .05$) implying that for some of the metaphors, their conventionality scores differed depending on whether they were presented in a verbal or in a visual mode.

To assess for which metaphors presentation mode mattered, separate t-tests were conducted for each pair of verbal and visual metaphors. For five pairs, the difference proved significant (in Table 1, these items are marked with an asterisk). For 'lipstick is magnet', the verbal metaphor was perceived as more conventional than its visual counterpart ($t(72) = 4.43, p < .001$). For the other four metaphors, the visual version was experienced as more conventional than the verbal one ('detergent is boxing glove': $t(64) = 4.37, p < .001$; 'gin is cannon': $t(71) = 2.61, p < .05$; 'piece of candy is ice cube': $t(57) = 5.02, p < .001$; and 'beer is ventilator': $t(55) = 4.05, p < .001$). When correlating the conventionality scores for the verbal and visual metaphors without these five items, the correlation coefficient was almost perfect ($r = .92, p < .001$).

7.4.4 Conclusion

Our research questions concerned whether visual metaphors vary with respect to their perceived conventionality and whether the perceived conventionality of a verbally presented metaphor is similar to that of its visually presented counterpart. With regard to the first question, we can conclude that indeed, visual metaphors can be placed on a continuum, ranging from novel to highly conventional metaphors. Whereas the juxtaposition of a laptop computer to a dolphin was considered to be the most novel comparison relative to the other juxtapositions in our experiment, the comparison of a car to a rocket was seen as fairly conventional. With regard to the second question, we found that the verbal and visual modalities indeed correlate substantially with regard to perceived conventionality. We have therefore reason to assume that metaphors are represented at a deeper conceptual level. The experienced conventionality of a metaphor seems to hold primarily for a specific comparison of concepts, rather than the verbal expressions that represent these concepts.

However, for five stimuli in our experiment, there were significant differences between the perceived conventionality of the verbal representation and the visual representation. Given that there was no main effect of modality, and the overall correlation of the items in the verbal and visual mode, these five metaphors are no reason to reject the hypothesis that the experienced conventionality of visual representations of metaphoric concepts is comparable to verbal metaphors that are based on the same conceptual comparison. This quintet of ‘dissident’ metaphors does raise the question whether these metaphors do not share a metaphoric relation at the conceptual level or whether there are other reasons why these metaphors are perceived differently depending on their mode of presentation.

An important assumption for the experiment was that the words and images in our materials would evoke the same underlying concepts. Through extensive pretesting, images were selected that would evoke the words used in the verbal version of the metaphor. The results of the main experiment revealed that in the vast majority of cases, participants indeed used these words when describing their interpretations. However, it was not possible to assess whether the words evoked the kind of image that was used in the visual versions. It is not unlikely that participants differed in the images that came to mind when processing the word ‘candy’, or ‘cannon’, or ‘ventilator’. High conventionality ratings for some of the visual metaphors may have been the result of the fact that the words evoked slightly different concepts than the visual image did, concepts that might be considered less easy to map onto the target domain.

In spite of the fact that we tried to select visual items that represent superordinate classes, there are more than one representative or prototypical images for these concepts. In addition, prototypical representations of these concepts may vary from person to person. In case of candy, someone can think of bonbons, sweets, liquorice or other confections. The candy in our experiment was the typical sourball in wrapping paper, but some participants may have thought of bulk candy, such as fudge, or ‘tumtum’ (a typical Dutch piece of candy). The same might be true for the ventilator, which can be represented mentally in several forms, such as a desk air blower, a propeller with blades hanging from the ceiling, air conditioners or even the computer fan. If the word ‘ventilator’ activated a concept other than the desk air blower, participants may have thought the relation between this type of ventilator and beer to be more unusual and far-fetched than when they were thinking about a desk air blower. It would be interesting to see what kind of image participants would draw when being presented with the word ‘candy’ or, when presented with images of different kinds of candy, to see whether they consider the image used in the experiment as being the most typical representation of the concept.

The concept of something seemingly simple as a car can be communicated in numerous ways, not only visually, but verbally as well (consider e.g. automobile, bolide,

convertible, motorcar, roadster or wagon). However, in the visual domain, visual grammar plays a considerable role: camera angle, point of view, framing, colours, contrast, focus, depth of field all matter when choosing a style of representation. This is much less a problem in the case of verbal representation (where only font and spacing are involved).

What is more, the informativeness of the visual items in our experiment was probably higher than that of the corresponding words. The inherent rich character of visuals may help to stimulate metaphorical thought. For instance, the picture of a piece of candy gave much more precise information about the particular kind of candy (the sourball in plastic wrap) than the verbal counterpart ('piece of candy') did, which may have made attribution mapping easier in the visual mode. The same may hold for the 'detergent is boxing glove', which was also perceived as more conventional in the visual mode. The image of a boxing glove appearing to be in upward movement may have evoked a stronger sense of "fighting dirt" compared to people who "saw" a boxing glove lying on the table or hanging on the wall when processing the word "boxing glove". Besides that, the image of detergent may be considered as a prototypical product in advertisements containing images, which might have biased the scores on conventionality for this particular comparison. Phillips (1997) has shown that familiarity with the target can influence the interpretation of metaphors.

Only one metaphor was experienced as more conventional in the verbal than in the visual mode: 'lipstick is magnet'. In Dutch, besides the literal meaning of 'magnet', also the figurative meaning has a lemma in the dictionary. Probably, the figurative meaning of 'magnet' is a dead metaphor in Dutch. In the context of a comparison or simile, the verbal meaning of magnet then no longer evokes its original meaning and the category 'attraction' is called for instantly, whereas a visual magnet still refers to its 'literal' self initially. The fact that the image still evokes the concept of magnet whereas the word no longer does, may be due to the inherent iconic character of visual representations of concepts. Besides that, a large part of conventionalization may occur at a conceptual level, while metaphors can have different careers depending on the frequency of use within a particular modality. The categorization process – the process of referring to categories instead of palpable objects – may evolve at a different pace in the two modalities, as a result of the extent to which they are perceived as conventional. Future research should investigate whether modality differences are indeed characteristic of these so called 'dead' or highly conventional metaphors.

Thibodeau and Durgin (2011) have already shown that conventionality is often hard to measure and therefore often confused with aptness by participants. We controlled for this effect and indeed we found a significant, but moderate correlation between conventionality and aptness ($r = .55, p < .001$). However, it is hard to

imagine that laymen judgments on conventionality would *not* extend along aptness. We believe that our operationalization of conventionality is fairly reliable, due to the fact that the three different scales ('new – standard', 'obvious – far-fetched' and 'unusual – usual') to measure conventionality were not only highly reliable (see Cronbach's alpha scores in the procedure section), but also quite comprehensible for laymen and therefore not likely to be mistaken for aptness (which was scored on a secluded scale). We controlled for aptness and appreciation in the mixed model analysis, but factors such as informativeness, iconicity and arousal could as well be considered to have an influence on conventionality judgments.

7.5 General conclusion

Although there are many factors that could be considered as significant factors on metaphor processing, verbal and visual representations of metaphors seem to be modality independent with regard to the evaluation of conventionality. Because conventionality is such an important factor in metaphor processing, this suggests that the way a metaphoric representation is processed rather depends on the conventionality of the conceptual idea, than on its mode of representation. Now that we know that visual metaphors can differ with respect to their perceived conventionality, the next question is whether conventionality influences the processing of visual metaphors in a similar way as it influences the processing of verbal metaphors. Future research should investigate whether novel visual metaphors are processed by making a comparison and more conventional ones by categorization. This would mean that a picture of a car juxtaposed to a rocket (a conventional metaphor) is processed relatively fast, whereas a helmet juxtaposed to a sea shell most likely requires more processing time.

If a metaphor's evaluation of conventionality is independent of modality, then the process of conventionalisation might be independent of modality as well. Many verbal metaphors seem to be derived from visual experiences. Lakoff & Johnson (1980, pp. 14–21) show e.g. how verbal expressions that are based on the conceptual idea that *MORE IS UP* (like 'prices are going through the roof' or 'temperature is rising') are derived from the visual experience of liquid levels rising upward when something is filled with more liquid. Experimental research could reveal whether the repeated activation of a metaphoric concept in one modality can cause a conventionality effect of the same metaphor in another modality. For instance, when one actively processes a series of verbal (or visual) metaphors containing the same novel source domain (like Bowdle and Gentner did in their 2005 *in vitro* experiment), this should lead to conventionalisation and hence a shift in processing from comparison to categorisation. A new realization of the conventionalised metaphoric

concept should then be processed via direct alignment with an abstract category, regardless whether the metaphor is presented visually (or verbally). Future research should investigate whether these expectations are true.

Future research could also focus on a surprising finding that was beyond the primary scope of this study: participants who received visual metaphors with the target depicted on the right side were less likely to come up with a metaphoric interpretation than participants who received visual metaphors with the target depicted on the left side. This is in the opposite direction of what can be expected on behalf of the findings of Forceville (2007), who found that in most tv-commercials the source is introduced before the target. Perhaps creators of advertisements have a tendency to 'start' an advertisement with an eye-catching element: a source domain that deviates from our expectations. Besides that, positioning of the product on the right side might be obvious, because in most cultures this side is associated with positive attributes (see, e.g., Wilson & Nisbett 1978; Lakoff & Johnson 1980; Sutton-Spence & Kaneko 2007). Our findings show that for an onlooker, target placement on the right side might be problematic for interpretation. In verbal language the typical 'X is Y' structure of metaphors follows the subject-verb-object or subject-object-verb order that is common in most languages. In the visual mode one would expect the subject to be introduced before the object as well. Based on the left to right reading direction in most cultures, this would be on the left side. Like in verbal language, one has to form an idea of the product before processing additional information that is taken from the source, and before interpreting the advertisement as a whole. This is a process that might have consequences for creators of pictorial advertisements. A cross-cultural study including cultures with contrasting reading directions and mirrored advertisements could give more insight into the function of source and target order in pictorial juxtapositions. In addition, eye movement patterns when viewing visual metaphors could be measured by making use of an eye tracker.

Finally, the question whether visual metaphors can 'die' like verbal metaphors still remains. Is it possible for an onlooker to overlook or forget the iconic character of an image? Although the light bulb is a highly conventional metaphor for a bright idea, it is difficult to ignore the representation of a physical object and what it stands for. However, now that governments around the world have passed measures to phase out incandescent light bulbs, it is not totally inconceivable that new generations will refer to brilliant ideas by using bulbs without knowing what the original function of this object was. The career of visual metaphor might also be a matter of time.

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