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DOI: 10.1017/9781108182324.007

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Document Version Peer reviewed version

Citation for published version (Harvard): Winter, B & Matlock, T 2017, Primary metaphors are both cultural and embodied. in B Hampe (ed.), *Metaphor:* Embodied Cognition and Discourse. Cambridge University Press, pp. 99-116. https://doi.org/10.1017/9781108182324.007

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Primary metaphors are both cultural and embodied

Bodo Winter & Teenie Matlock¹

Abstract

Cognitive linguists have argued that metaphors are anchored in our embodied experiences. Cultural, linguistic and gestural representations are often seen as reflections of underlying conceptual mappings. On the basis of three different metaphors, MORE IS UP, SIMILARITY IS PROXIMITY, and SOCIAL DISTANCE IS SPATIAL DISTANCE (a.k.a. INTIMACY IS CLOSENESS), we argue for a more active role of external representations in individual cognition. Rather than being mere "reflections" of the respective conceptual associations, external representations actively enhance and support these. Since two of the metaphors we discuss associate the same source domain (SPATIAL DISTANCE) with different target domains (SIMILARITY and SOCIAL CLOSENESS), we also discuss in how far primary metaphors are (by necessity) interrelated, and whether these metaphors can be treated as distinct conceptual entities at all.

Keywords

primary metaphor, metaphor and culture, gesture, embodiment

1. Introduction

Metaphor is far more than a rhetorical tool used in poetry and literature. Metaphors of all shapes and sizes permeate our everyday communication, written and spoken. They also appear in visual media, including sculpture, paintings, and in architecture, and in music. Metaphors, as argued by cognitive linguists, are anchored in our embodied experiences, and recruited to help us make sense of abstract and complex entities and situations in the world (Gibbs 1994; Johnson 1987; Kövecses 2002; Lakoff & Johnson 1980).

Metaphors can be analyzed in different ways, depending on the goals of the researcher. One common distinction made among cognitive linguists is between "primary" versus "nonprimary" metaphors (Grady 1997, 1999, 2005, *this volume*; Grady et al. 1999). Primary metaphors are thought to arise from our most basic physical and perceptual experiences in the world. On this view, the metaphor MORE IS UP, for instance, emerges from repeatedly observing the natural correlation between verticality and quantity (e.g. stacking cookies, piling up rocks, filling up glasses) (Lakoff 1987: 276-277). Repeatedly creating or observing a "higher" stack of cookies comes to be associated with a greater amount of cookies (the same goes for a "higher" pile of rocks or for "rising" water levels).

Cognitive linguists often contrast primary metaphors like these with "non-primary" metaphors, an example of which is THEORIES ARE BUILDINGS, which underlies statements such as, "He destroyed my theory" or "My theory rests on solid ground" (Grady 1997; cf. also Kövecses 2002: 108-110). CMT claims that, in understanding such statements, people map the source domain of BUILDINGS onto the target domain of THEORIES (for an extensive discussion of this point, see Steen, *this volume*). In contrast with MORE IS UP, there is no obvious

embodied correlation associated with THEORIES ARE BUILDINGS; the presence of buildings does not necessarily correlate with the presence of theories. Rather, there is a perceived resemblance between THEORIES and BUILDINGS. Moreover, primary metaphors such as MORE IS UP are assumed to be universal because the correlation between verticality and quantity is a fact of the natural world. By contrast, THEORIES ARE BUILDINGS presupposes a specific cultural context, a context where people theorize and talk about creating and maintaining theories (see also Cuccio, *this volume*).

This is not to say that primary metaphors are *acultural*. Primary metaphors have abundant cultural reflections. With MORE IS UP, for example, measuring cups, thermometers and graphs, reflect the mapping of verticality onto quantity that we often see in Western cultures. In this paper, we argue that such cultural reflections of primary metaphors are not merely reflections of metaphorical content, but they play a more active role, actively shaping the conceptual systems of people who witness those reflections (for closely related views, see Gibbs 1999; Kövecses 2015; Marghetis 2015). Once primary metaphors, perhaps originating from experienced embodied correlations, take hold and become part of multiple conceptual systems (i.e. of multiple speakers), the linguistic and cultural structures that emerge from this help maintain and strengthen the underlying metaphorical relationship. Linguistic and cultural reflections of primary metaphors may thus "feed back" into the underlying conceptual structure. This view resonates with approaches in cognitive science that emphasize the role of cultural artifacts in scaffolding conceptual knowledge (e.g. Hutchins 1995, 2005) and with the view that primary metaphors are not always purely "embodied" but may have different origins, (e.g. also linguistic, cultural ones) (Casasanto 2014, this volume). Cognitive linguists could

benefit from a broader perspective of metaphor, one that embraces the complex web of interactions between language, culture and embodied experience.

We focus on three primary metaphors: MORE IS UP (section 2.1), SOCIAL DISTANCE IS PHYSICAL DISTANCE (section 2.2), and SIMILARITY IS PROXIMITY (section 2.3). For each, we discuss linguistic reflections (for a larger cross-linguistic survey, see Grady, *this volume*), gestural reflections and non-linguistic cultural reflections, as well as the relevant evidence from behavioral experiments. In section 3, we argue that linguistic, gestural and cultural representations of metaphor should not be viewed merely as passive indicators of underlying conceptual mappings, but rather, as building blocks for creating and re-creating metaphor (cf. Gibbs 1999; Kövecses 2015; Marghetis 2015; Winter 2014). In section 4, we discuss how primary metaphors overlap and interact.

2. A complex web of language, culture and cognition

2.1 MORE IS UP

We first discuss linguistic, gestural, cultural and cognitive reflections of primary metaphors with MORE IS UP. This metaphor is expressed when English speakers make statements like "high tax rates," or when German speakers make statements like "Die Preise sind gestiegen" ('The prices have risen'). Besides these linguistic reflections, MORE IS UP is expressed via gesture. Metaphor is often expressed in manual gestures (Chui 2011; Cienki 1998; Cienki & Müller 2008; Sweetser 1998). Figure X.1, a still image from the TV News Archive, shows a gesture by Michael Hayden, former CIA Director (2006-2009).² Hayden is talking about employment in the CIA and specifically, about a division of the CIA that he classifies as "core support." According to Hayden, there is a "disturbingly high number of contractors" in this core support division. In Figure X.1, the palm of his left hand is facing toward the audience and toward the camera. As he says "high number," he moves the hand upward. This movement is consistent with the verticality implied in this instance of MORE IS UP. That the movement is time-locked with the verbal phrase suggests that gesture and the metaphorical semantics are tightly coupled in this example (for a close discussion of further examples, see Winter et al. 2013).

[insert Figure X.1 here, with images X.1a and X.1b to appear in the two fields of the table]





Insert image X.1b here (filling the entire cell)

a. (...) disturbingly *high number* ...

b. ... of contractors in core support

Figure X.1: MORE IS UP expressed in co-speech gesture on the phrase "high number": The hand starts low and moves up to a higher position (a), with the end point shown in (b).³

Cultural reflections of MORE IS UP are abundant. Floors in tall buildings are numbered with smaller numbers at the bottom. Doctors measure humans with scales with smaller numbers at the bottom and increasingly larger numbers going upward. Beakers and measuring cups have small numbers at the bottom and large numbers at the top, and so do thermometers. Cultural reflections of MORE IS UP are particularly prevalent in graphs (Tversky 2011), where it is a convention to put larger numbers higher on the "y-axis" than lower numbers. This characterizes particularly bar plots and line graphs, which are abundantly used in science and newspapers. Empirical work on graph understanding has furthermore shown that vertical bar plots that embody MORE IS UP are particularly easy to understand, more so than horizontal bar plots (Fischer et al. 2005).

Some researchers have pointed out exceptions in the cultural patterns of MORE IS UP (e.g. Holmes & Lourenco 2011, see also Tversky 2011). Consider numbers on cell phones, where smaller numbers are at the top rather than the bottom, or the rank orders of tournaments, where the first rank is listed at the top and lower ranks at the bottom. However, crucially, these number uses contrast with measurement cups and thermometers in that they do not imply a true sense of quantity, which is commonly called a "cardinal" use of number. Instead, cellphones present a primarily "nominal" use of numbers (e.g. the phone number +1-998-532-9193 is not "more" than the number +1-138-777-6124), while tournament ranks represent an "ordinal" use of number (see Nieder 2005, for excellent discussion). Hence, cultural reflections that do map true quantity onto verticality tend to obey the MORE IS UP principle (see Winter et al. 2015).

Experiments have provided abundant behavioral evidence to support the claim that people have a *mental* association between verticality and quantity (for a review, see Winter et al. 2015). For example, when people are asked to generate a sequence of numbers as randomly as possible, they tend to generate larger numbers after having moved their eyes upward (Loetscher et al. 2010), or after having moved their head upward (Winter & Matlock 2013). Similar associations between verticality and quantity have been found in more classic button-press paradigms. For example, when participants are asked to indicate whether a number is "even" or "odd" through using two buttons, they tend to respond faster to a larger number when the button is located at a relatively higher position (Ito & Hatta 2004; Müller & Schwarz 2007; Hartmann et al. 2014).

2.2. SOCIAL DISTANCE IS PHYSICAL DISTANCE

People often talk about social distance in terms of physical distance. For example, in talking about friendships or romantic relationships, English speakers make statements such as "The couple is slowly *drifting apart*," or "Bill and Marco have *gotten closer* lately." Such cases imply a change in social distance, not physical distance. German speakers also do this, as seen in "Wir waren uns einmal sehr nah" ('We were very close once'). In these and other linguistic reflections of the primary metaphor SOCIAL DISTANCE IS PHYSICAL DISTANCE (a.k.a. INTIMACY IS CLOSENESS), people talk about aspects of social relationships in terms of physical space. More precisely, the amount of space separating people reflects the nature of their relationship, such that larger distances indicate larger degrees of estrangement/alienation, etc.

An example of gesture related to SOCIAL DISTANCE IS PHYSICAL DISTANCE is shown in Figure X.2, also from the TV News Archive. In this example, Sir Paul McCartney is being interviewed by David Letterman. In describing his relationship with pop star Michael Jackson he says, "So, we kinda drifted apart." He describes how the relationship deteriorated, and in doing so, he gestures. He raises both hands to his chest, where they are momentarily held close together, and quickly moves them away from each other. Critically, the distance between McCartney's two hands is smaller at the beginning of the gesture than it is at the end, reflecting increased distance, showing how people spontaneously use the spatial modality of gesture to express state changes in social relationships.

[insert Figure X.2 here, with images X.2a and X.2b to appear in the two fields of the table]





a. (...) so we kinda *drifted*... b. ... *apart*

Figure X.2: Co-speech gesture expressing SOCIAL DISTANCE IS PHYSICAL DISTANCE: First the hands are close together (a), then farther apart (b).⁴

Beyond gesture, we see other cultural reflections of SOCIAL DISTANCE IS PHYSICAL DISTANCE. Social scientists have discussed "segregation effects" and "peer effects" in the context of human relationships.⁵ Segregation effects refer to cases in which people physically move closer to others they perceive as similar to themselves (Miller & Page 2007: 143-146; see also Bishop 2008). Peer effects refer to cases when people get physically close to each other, and then begin to pick up certain behaviors from each other (Christakis & Fowler 2009). So, people tend to move toward others they perceive as similar, and to become more like them once they are physically close. These two tendencies can lead to large-scale correlations of social distance and physical distance. This principle is not only characterizing modern societies, but has also been shown for old hunter-gather settlement sites (Wiseman 2014). Thus, culture at large reflects the principle of SOCIAL DISTANCE IS PHYSICAL DISTANCE.

The association between 'social distance' (/ 'intimacy') and 'physical distance' is also reflected in film, a form of cultural representations. Here we discuss a scene from *Before Midnight* (2013), the third movie in a trilogy about two characters in stormy relationship. The main characters, Jesse and Celine, husband and wife, are on vacation on a Greek island and, instead of having a romantic evening, have a heated discussion about Jesse's teenage son, Henry. The argument drags on for 20 minutes, spanning a wide range of heated topics, such as irrational thinking in men versus women, personal sacrifices in marriage, and infidelity. This part of the argument fluctuates in emotional intensity, becoming very loud and caustic at times, but

calm and subdued, at others. In the end, Celine leaves the room when she becomes enraged with Jesse.

Over the course of the argument, the physical distance between Jesse and Celine changes in ways that are consistent with SOCIAL DISTANCE IS PHYSICAL DISTANCE. When the argument becomes aggressive and heated, there appears to be greater physical distance between the characters. Figure X.3 shows two successive moments at the beginning of the argument. Jesse sits on the bed in (a), and Celine, on a couch in the adjacent room, in (b). Jesse pointedly asks, "So this is how you want to be spending this evening? I mean, this is what you wanna do tonight?," to which Celine curtly responds, "Well, you started it!" At this time, Jesse and Celine appear to be as far from each other as possible in the hotel room. Importantly, the distance between the viewer and the characters in the film is also accentuated via the camera. In (a), Jesse appears to be very far away, both from Celine and from the viewer. The physical distance is highlighted by the fact that the doorframe is included in the shot, showing physical separation between the two. Moreover, both shots in (a) and (b) show the full body (total shots). In the previous scenes were the couple was intimate, there were more close-ups, focusing on the face and suggesting physical proximity. Thus, both the relative positioning of the characters and the position of (and perspective taken by) the camera adhere to SOCIAL DISTANCE IS PHYSICAL DISTANCE.

[insert Figure X.3 here, with images X.3a and X.3b to appear in the two fields of the table]

Insert image X.3a here (filling the entire cell) Insert image X.3b here (filling the entire cell)



a. So this is how you want to be spending b. Well, you started it! this evening? (...)

Figure X.3: Spatial positions of characters expressing SOCIAL DISTANCE IS PHYSICAL DISTANCE in *Before Midnight*: (a) Jesse criticizes Celine for arguing when they should be making love instead, (b)
 Celine retaliates by blaming Jesse for having started it.

Figure 4 shows two shots from before the argument, where physical (and hence also social) distance appears smaller, even when Jesse and Celine do not share a frame. One way that physical proximity is suggested is by the size of the characters in each shot: Rather than the full total shots in Figure 3 (showing each body almost entirely), the characters are shown up close, with most of the image space taken up by their bodies. Further, Figure 4b shows the same doorframe as Figure 3a, but separation seems less because Celine is standing at the door.

[insert Figure X.4 here, with images X.4a and X.4b to appear in the two fields of the table]

Insert image X.4a here (filling the entire cell)



Stefanus and Ariadne got us a bottle
 of wine and a couple's massage



 They are so nice. We have to give them a present.

Figure X.4: Spatial positions of characters expressing SOCIAL DISTANCE IS PHYSICAL DISTANCE in *Before Midnight*: Jesse (a) and Celine (b) in a friendly interaction about a gift from their friends.

So far, we have talked about linguistic, gestural and cultural reflections of SOCIAL DISTANCE IS PHYSICAL DISTANCE. Several experimental studies suggest that the domain of physical distance is automatically accessed when thinking about likeability and intimacy. For example, in Matthews and Matlock (2011), people drew a path through a park depicted by a map. On the map, stick figures represented characters described as "friends" (low social distance) or "strangers" (high social distance). On average, lines intended to represent paths were closer to the "friends" than to the "strangers" on the map. In another experiment, Williams and Bargh (2008), people drew two points on a sheet of paper, either very close to each other or very far away from each other. People in the "far" condition reported that they felt less of an emotional attachment to family members than did people in the "close" condition (although Pashler et al. 2012 report a failure to replicate this result). These and other studies indicate that, when performing spatial tasks or when making social judgments, people automatically consider social distance and physical distance together. Such work supports the idea that SOCIAL DISTANCE IS PHYSICAL DISTANCE is not merely expressed in linguistic, gestural and cultural content; it is part of our conceptual system.

2.3. SIMILARITY IS PROXIMITY

English speakers often talk about SIMILARITY in terms of how PROXIMAL or DISTAL things are relative to each other. For example, your friend describes her political views as being "very far from" or "very close to" your political views (cf. examples in Casasanto 2008: 1047), or a chef tastes her sauce and says, "It's getting close now," referring to how similar the sauce is to the sauce she made a week ago. A comparable German example is seen in statements such as "Diese Ansichten sind weit voneinander entfernt" ('These views are far away from each other').

Just as with SOCIAL DISTANCE IS PHYSICAL DISTANCE, the primary metaphor SIMILARITY IS PROXIMITY can be expressed through gesture. The speaker in Figure 5, Michael Powell, CEO and President of the National Cable & Telecommunications Association, is asked by an interviewer whether wired and wireless markets should be regulated in the same way. He responds that regulations should be "harmonized" and that wired and wireless markets are "increasingly trending toward being more similar, not more different." When he is talking about wired and wireless technologies becoming "more similar," he moves his hands, palms facing toward each other, toward the middle of his body. While saying "not more different," he moves his hands apart. This sequence is integrated, with his hands continuously approaching each other and retracting again, beginning with "increasingly" in the utterance. The gesture makes it clear that two spatial positions are prominent, one being close (coinciding with the "similar" part of the sequence) and one being far (coinciding with the "far" part of the sequence). In this example, distance is primarily marked through dynamic movement toward or away from the midpoint of the body. The amount of distance between the hands is associated with the degree of similarity or difference.

[insert Figure X.5 here, with images X.5a and X.5b to appear in the two fields of the table]



- a. They are increasingly trending toward
- b. ... not more different.

being more similar...

Figure X.5: Co-speech gesture expressing SOCIAL DISTANCE IS PHYSICAL DISTANCE: Both hands move toward a location in the center of the body for expressing SIMILARITY (a). For expressing DIFFERENCE, the hands move apart (b).⁶

SIMILARITY IS PROXIMITY also appears in the spatial location and configuration of cultural artifacts. We see this in how rooms in houses are arranged. Things that are similar by virtue of function are grouped together. For instance, substances for cleaning the body are co-located in bathrooms. Edible things are found in kitchens. Clothing items are found together in bedrooms. This pattern is also seen in design, including web design, where things that perform similar functions, such as menu buttons, are positioned close to each other. This pattern is also seen in the design of virtual worlds (e.g. Waterworth et al. 2003). Humans intentionally use space to sort things in their environment according to similarity (cf. Kirsh 1995). Grouping like things together in space helps people perceive them as similar (Wertheimer 1938).

Again, these are relatively small-scale reflections of a larger cultural principle that is evident in society-wide scales. For example, people within a city tend to self-organize into districts that are relatively homogenous with respect to factors such as ethnicity or socioeconomic status (Schelling 1971; Bishop 2008). Often, similar people are located near each other because of necessity. Students are located near other students because they attend the same university and live near campus. Nurses are located in or close to hospitals or other medical facilities because they provide care for patients. Commuters are near other commuters because they share the same road or mode of transportation.

What is the experimental evidence for the conceptual nature of the metaphor SIMILARITY IS PROXIMITY? Casasanto (2008) asked participants to rate unrelated words while they were being presented on a computer screen at varying distances. When participants were presented with two words that were close to each other, they rated them as more similar than when they were presented with words that were relatively far from each other. Boot and Pecher (2010)

found that participants were quicker to judge colors (e.g. two shades of blue) as being similar when the colors were presented close together, and quicker to judge them as different when they were presented relatively far apart (see also Breaux & Feist 2008).⁷ Winter and Matlock (2013) showed that cities or people that were described as similar were subsequently placed closer to each other in a drawing task. Finally, Guerra and Knoerferle (2012) showed how visual depictions of various distances can affect the comprehension of sentences involving similarity. In their task, participants were shown concepts, i.e. words such as "stupidity" and "wisdom", on two cards that were near or far from each other, and then read the sentence, "Stupidity and wisdom are certainly different." Sentences about differences were read more quickly when the words "stupidity" and "wisdom" had been far from each other. Conversely, sentences about similarity were read more quickly when the concepts had been presented close to each other. Similar to our discussion of MORE IS UP and SOCIAL DISTANCE IS PHYSICAL DISTANCE, such research on SIMILARITY IS PROXIMITY suggest that this primary metaphor is deeply entrenched in our cognitive system, and there is much convergent evidence to support the hypothesis that SOCIAL DISTANCE IS PHYSICAL DISTANCE is a mapping not just in language and culture, but also in our conceptual systems.

3. A cultural feedback loop

In the preceding section, we reviewed MORE IS UP, SOCIAL DISTANCE IS PHYSICAL DISTANCE, and SIMILARITY IS PROXIMITY. Of key interest was how these exemplary primary metaphors are not purely conceptual. They are also expressed through language, gesture and culture. In this section, we discuss some implications from this co-expression through multiple channels (for related arguments, see Gibbs 1999; Kövecses 2015; Marghetis 2015; Winter 2014). We begin by discussing the traditional view of primary metaphors.

Primary metaphors are thought to come from repeatedly experiencing a set of embodied correlations. This is a plausible proposal given that we know that children are exceptionally good at detecting statistical regularities in their environment (Kirkham et al. 2002; Saffran et al. 1996; Saffran et al. 1999). Moreover, there is a plausible neuronal mechanism that can readily explain the cognitively entrenched nature of conceptual metaphors. This mechanism is "Hebbian learning" (Hebb 1949), often summed up in the slogan "neurons that fire together wire together" (cf. Lakoff 2012). For example, repeatedly experiencing the correlation between verticality and quantity will repeatedly activate neurons associated with the perception of space and neurons associated with numerical estimation. Over time this pattern strengthens the connections between the neurons thus frequently co-activated. Tapping into and entrenching such correlational structures is generally thought to be the source of primary metaphors (for more discussion, see *this volume*: Casasanto, Grady).

Yet, from the perspective of a learning child, there is no principled difference between environmental correlations commonly subsumed under the "embodied origins" of primary metaphors and the cultural correlations discussed above. That metaphors come to be expressed in language, gesture and culture means that language, gesture and culture yield a new set of correlations that provide input to a child's metaphor system. Children grow up in a cultural

world where they are surrounded by metaphors becoming expressed in cultural artifacts, gestures and metaphorical verbal language.

These correlations may continue to play a role once a particular metaphorical mapping has been learned in childhood. While growing up in a metaphor-infused culture, people are constantly "reminded" of the metaphorical mappings they learned at a young age. Such an argument is presented in Winter (2014) in an analysis of a specific cultural reflection: horror movies.⁸ The argument is that horror movies often reflect the primary metaphors BAD IS DOWN and BAD IS DARK (or, EVIL IS DARK). This is even evident in DVD stores: DVD covers get obviously darker as one goes from the comedy section to the horror section. Within a given horror movie, shifts in darkness and verticality are frequently expressed over the course of the narrative. For example, the 2012 movie The Cabin in the Woods follows a downward trajectory as things become progressively worse for the protagonists. Often, these primary metaphors are expressed more locally in a single shot, such as the camera panning down to a dark hole from which a monster emanates. So, nearly every time people watch such a movie, they (re-)experience (old, already entrenched) correlations between the source domains of VERTICALITY and DARKNESS and the target domain of GOOD/BAD. On this view, the horror movie serves as a "reminder" of the metaphorical mapping already engrained in the general cultural context, but it also extends and elaborates those mappings by giving them concrete, entertaining and emotionally engaging cultural representations (see also Forceville 2008).

This general principle is not limited to horror movies of course. All kinds of cultural "reflections" of metaphors (e.g. posters, advertisements, books) function as such "reminders," further strengthening the mapping and maintaining it in our culture. When we discussed MORE

IS UP, SOCIAL DISTANCE IS PHYSICAL DISTANCE, and SIMILARITY IS PROXIMITY in section 2, we talked about linguistic, gestural and cultural *reflections* because the representations are often analyzed as merely reflecting underlying conceptual content. In particular, in the domain of media, "multimodal metaphors" are often seen as passive "reflections" of our internal conceptual world, a view that is driven by the largely cognitive orientation of Lakoff and Johnson (1980), which sees underlying conceptual structures as the ultimate cause of metaphorical language. However, metaphor theory has to acknowledge that verbal, gestural, and cultural "reflections" are witnessed by others and when they are, external representations of metaphor affect the cognitive systems of those observers. Marghetis (2015) discusses a similar concept in what he calls "gestural contagion," the idea that co-speech gestures help in propagating metaphorical concepts. His research experimentally demonstrates that seeing a particular metaphor expressed in gesture changes the subsequent understanding of the target domain in a non-gestural task. For example, seeing a gesture in line with ARITHMETIC IS MOTION ALONG A PATH (Lakoff & Núñez 2000) activates spatial representations where small numbers are to the left of larger numbers more so than seeing a gesture in line with ARITHMETIC IS OBJECT COLLECTION.

A useful way of looking at the influence of culture and external representations of metaphor is presented in Kövecses (2002), who distinguishes three levels at which metaphor should be investigated: the "sub-individual" level (i.e. embodied experience), the "individual" level (i.e. cognitive mappings inside single minds) and the "supra-individual" level (cultural representations). Some metaphor theorists maintain that direction of causality goes from the sub-individual to the individual to the supra-individual level, in a feedforward manner (but see

this volume: Casasanto; Gibbs). Winter (2014), in line with Gibbs (1999), Marghetis (2015) and others, argues that it is important to remember that cultural representations of metaphors (understood broadly as including artifacts, gesture and linguistic expressions) *feed back* into the cognitive systems at the individual level. That is, if we view metaphor as a multi-scale phenomenon distributed across different levels, we should not assume that metaphors in the "underlying" conceptual systems (the individual level) lead to cultural representations (supra-individual), but that the connection between individuals and representations is a two-way street.

The precise ways through which cultural representations interact with cognitive metaphorical systems are still underexplored. Winter (2014) proposes at least three different ways in which culture and cognition come together with respect to metaphor. First, cultural representations elaborate on metaphors and enrich them with specific examples, e.g. a monster in a horror movie that instantiates the more general BAD IS DARK in a highly specific and concrete way (cf. the many examples in Forceville 2006, 2008, *this volume*; Forceville & Urios-Aparisi 2009). Second, cultural representations (including artifacts) may strengthen metaphorical representations, i.e. act as "reminders" in different ways and at different time points. Third, cultural representations that already exist in a new generation of speakers in a culture. In contrast to gesture and language, non-verbal cultural representations (e.g. artifacts, movies) play a special role because they are less ephemeral (e.g. a movie can be watched again and again) and distributed more widely (e.g. movies are watched by millions of people). Thus,

these cultural representations have a way of stabilizing metaphorical representations throughout a culture, hence also in the minds of its members.

Similar ideas have been offered by Daniel Casasanto, who argues against the idea that all metaphors are embodied, and proposes that metaphors have diverse origins. In discussing CONSERVATIVE IS RIGHT/LIBERAL IS LEFT, Casasanto (2014) argues that—given the lack of any obvious embodied correlations in the natural world for this association—this metaphor must be acquired on the basis of language use, specifically, exposure to phrases such as "the right-wing party" or "his political views are left-leaning" (and would thus not count as "primary", see Grady, this volume). Casasanto (ibid.) also proposes that the left-right orientation of time (in Western cultures), which is not reflected by linguistic metaphors (and would thus not count as "primary" either), is influenced by the frequent use of calendars and other cultural representations of time. Finally, he argues that GOOD IS RIGHT/BAD IS LEFT emerges from individual embodied experience (ibid.), viz. people's handedness (see also Casasanto 2009; Casasanto & Henetz 2012), essentially through correlations of feeling positive emotions when performing actions fluently with their dominant hand, i.e. the right one in the vast majority of cases. This metaphor-in contrast to THE FUTURE IS RIGHT/THE PAST IS LEFT-has some linguistic reflections (e.g. "this is the *right* thing to do", "He is not in his *right* state of mind."), but language does not reflect that handed people mentally associate GOOD with LEFT.

So, although embodiment is a powerful explanatory tool in metaphor analyses, we should avoid immediately defaulting to it, especially when evidence for it seems to be lacking (cf. Casasanto & Gijssels 2015). Some claims about the embodied origin of primary metaphors would be difficult to test experimentally (see also Casasanto 2014: 249). For instance, what

experiment would be capable of testing whether MORE IS UP is derived from perceiving the natural correlation of quantity and verticality and nothing else? This would require factoring out all cultural reflections associated with this mapping, likely to be impossible. As previously discussed, because our environment is so infused with metaphor, it is challenging to disentangle the relative contributions of various correlations.

4. Interactions and gradations between primary metaphors

If, as we argue, children and adults are sensitive to metaphorical correlations in the natural world, in language, including gesture, and culture, then we have to acknowledge that some correlations do not correspond as clearly to particular metaphors as we might expect. There is a tendency in metaphor research to characterize metaphors as discrete entities (see also Gibbs 2011). Yet, it is precisely the "embodied correlations view" that, when turned to its full logical conclusion, can lead us to question the discreteness of metaphors (see also *this volume*: Gibbs, Jensen).

Imagine a bar graph next to an upward pointing arrow of green color, a form of visual representation that features prominently in TV and online reports of sales, revenues and the stock market. In these financial contexts, the upward pointing arrow and the bar graph are conventionally interpreted in terms of numerical quantity, e.g. increased revenues. However, an affective or evaluative component may also come into play, with the upward arrow indicating that things are going in a POSITIVE direction, i.e. UPWARD. This emotional message is

highlighted by the fact that frequently in news reports, such arrows are in green color if they point upward and in red color if they point downward. In other words, the color scheme emphasizes the evaluative component on top of the association between quantity and verticality. A metaphor analysis of such a visual display thus needs to recognize that there is the potential for MORE IS UP and GOOD IS UP being co-present.

Similar cases of co-present metaphors are SIMILARITY IS PROXIMITY and SOCIAL DISTANCE IS PHYSICAL DISTANCE (/ INTIMICY IS CLOSENESS), discussed in section 2. The target domains SIMILARITY AND SOCIAL DISTANCE are both correlated in the social world, and co-vary with the source domain of PHYSICAL DISTANCE. People who are more similar to each other tend to like each other more. People who like each other tend to become more similar. And people who like each other and are similar to each other tend to be in close physical space. Hence, in the social world, the metaphors SIMILARITY IS PROXIMITY and SOCIAL DISTANCE IS PHYSICAL DISTANCE are often conflated, and this carries over to the linguistic instantiations of the respective metaphors.

Take, for example, the sentence "We're headed in opposite directions" (Gibbs 2011: 531), commonly discussed as an instance of the metaphor LOVE IS A JOURNEY. Depending on the intentions of the speaker and nature of the situation, this example reflects LOVE as a MOVEMENT ALONG A PATH, with "headed" and "directions" implying motion. Increased distance is also inferred, suggested by the physical movement of the two people in two different directions. The sentence also conveys the negative status of the relationship, with loss of intimacy and increased social distance. Thus, this specific instantiation of the complex metaphor LOVE IS A JOURNEY reflects SOCIAL DISTANCE IS PHYSICAL DISTANCE (/ INTIMACY IS

CLOSENESS), in addition to such primary metaphors as ACTION/PROGRESS IS MOTION, STATES ARE LOCATIONS and PURPOSES ARE GOALS (see Lakoff 2008). In addition, SIMILARITY IS PROXIMITY may play a role, as the experiential contexts overlap with those motivating some of these primary metaphors, such as RELATIONS ARE CONTAINERS and INTIMACY IS CLOSENESS. A couple that goes in different directions often does so because of insurmountable differences in attitudes, tastes, lifestyles, opinions or beliefs. Moreover, once "apart," the members of the separated couple are likely to become more dissimilar from each other over time because of the lack of frequent interaction. Thus, SIMILARITY IS PROXIMITY and INTIMACY IS CLOSENESS have partially overlapping correlations in the social world (Daniel Casasanto, p.c.). The statement "We're headed in opposite directions," said with the intended LOVE IS A JOURNEY reading is likely to lead to inferences about intimacy and similarity consistent with both SOCIAL DISTANCE IS PHYSICAL DISTANCE and SIMILARITY IS PROXIMITY. The same argument applies to other instances of LOVE IS A JOURNEY, as in "our relationship is at crossroads" (cf. Gibbs, ibid.).

Let us consider non-linguistic cultural representations that conflate coherent conceptual metaphors. Time lines, such as calendars, can represent both THE FUTURE IS TO THE RIGHT as well as MORE IS TO THE RIGHT. As one goes from left to right on a time line, temporal distance increases concomitantly with numerical quantity (for discussion, see Winter et al. 2015; Marghetis & Youngstrom 2014; Marghetis 2015). In a similar fashion, MORE IS BIG often correlates with IMPORTANCE IS SIZE because bigger quantities of any object are generally more important.

So, culture, language, and gesture provide speakers with many correlations, along with environmental/natural correlations. But just what is being correlated may not always be clear,

and this transfers over to metaphors, where there is ambiguity about which metaphor is highlighted in a given situation. This is also in line Gibbs' dynamic-systems approach to metaphors in discourse (2011: 553):

A given conceptual metaphor is not just activated, and employed as a single entity, to help interpret a metaphorical utterance. Instead, multiple conceptual metaphors, which may have arisen to prominence at a specific moment in time, given the particular dynamics of the system at that moment, may collectively shape the trajectory of linguistic processing so that no one conceptual metaphor has complete control over how an utterance is interpreted.

Observational evidence for the simultaneous co-activation of metaphor comes from Walker and Cooperrider (2015), who show for time metaphors that English-speaking gesturers simultaneously move their hands forward and to the right when talking about the future, and backward and to the left when talking about the past. Thus, in interactions about time, gestures indicate that speakers simultaneously conceptualize the target domain in terms of two distinct metaphors, one in which time is thought to extent along a front-to-back axis and one in which time is thought to extent along a left-to-right axis (as on a calendar). This discussion is not intended to criticize labels such as "MORE IS UP" or "SIMILARITY IS PROXIMITY." Delineating metaphors gives us a convenient way to talk about the recurrent patterns that they entail. Still, we need to remind ourselves that metaphors such as MORE IS UP, SOCIAL DISTANCE IS PHYSICAL DISTANCE, and SIMILARITY IS PROXIMITY are not discrete entities.

5. Conclusions

In this paper, we reviewed evidence for three primary metaphors: MORE IS UP, SOCIAL DISTANCE IS PHYSICAL DISTANCE, and SIMILARITY IS PROXIMITY. Apart from being entrenched conceptually, these are jointly expressed through language, gesture, and culture. We have taken this multitude of multimodal metaphorical "reflections" to argue that primary metaphors have multi-causal origins, and that embodied experience of natural correlations cannot be the only story.

We have argued that the conflation of (different, but coherent) metaphors in the natural and the sociocultural world is mirrored by a conflation in linguistic expressions of metaphor, as well as the manifestations of metaphor through other modalities. Finally, these considerations suggest that it is fruitful to focus on the interactions between different modalities of metaphorical expression, as well as interactions between different metaphors, rather than to focus exclusively on particular modalities or particular metaphors in isolation.

7. References

- Bishop, B. (2008). *The big sort: Why clustering of like-minded America is tearing us apart*. New York: Houghton-Mifflin.
- Boot, I., & Pecher, D. (2010). Similarity is closeness: Metaphorical mapping in a conceptual task. *The Quarterly Journal of Experimental Psychology*, 63, 942-954.
- Breaux, B. O., & Feist, M. I. (2008). The color of similarity. In B. C. Love, K. McRae, & V. M. Sloutsky (Eds.), *Proceedings of the 30th Annual Conference of the Cognitive Science Society* (pp. 253-258). Austin, TX: Cognitive Science Conference.
- Casasanto, D. (2008). Similarity and proximity: When does close in space mean close in mind? *Memory & Cognition*, 36, 1047-1056.
- Casasanto, D. (2009). Embodiment of abstract concepts: Good and bad in right- and lefthanders. *Journal of Experimental Psychology: General*, 138(3), 351-367.
- Casasanto, D. (2014). Experiential origins of mental metaphors: Language, culture, and the body. In M. Landau, M.D. Robinson, & B. Meier (Eds.), *The Power of Metaphor: Examining Its Influence on Social Life* (pp. 249-268). Washington, DC: American Psychological Association Books.
- Casasanto, D., & Dijkstra, K. (2010). Motor action and emotional memory. *Cognition*, 115, 179–185.
- Casasanto, D., & Gijssels, T. (2015). What makes a metaphor an embodied metaphor?. *Linguistics Vanguard*.
- Casasanto, D. & Henetz, T. (2012). Handedness shapes children's abstract concepts. *Cognitive Science*, 36, 359–372.
- Christakis, N. A., & Fowler, J. H. (2009). *Connected: The surprising power of our social networks and how they shape our lives*. New York: Little, Brown and Company.

Chui, K. (2011). Conceptual metaphors in gesture. *Cognitive Linguistics*, 22(3), 437-458.

Cienki, A. (1998). Metaphoric gestures and some of their relations to verbal metaphoric expressions. In Jean-Pierre Koenig (Ed.), *Discourse and cognition* (pp. 189–204). Stanford, CA: CSLI Publications.

- Cienki, A., & Müller, C. (2008). Metaphor, gesture, and thought. In R. W. Gibbs (Ed.), *The Cambridge handbook of metaphor and thought* (pp. 483–500). Cambridge, UK: Cambridge University Press.
- Coëgnarts, M., & Kravanja, P. (2012). Embodied visual meaning: Image schemas in film. *Projections*, 6, 84–101.
- Eggertsson, G. T., & Forceville, C. (2009). Multimodal expressions of the HUMAN VICTIM IS ANIMAL metaphor in horror films. In C. J. Forceville & E. Urios-Aparisi (Ed.), *Multimodal metaphor* (pp. 429–449). Berlin: Mouton de Gruyter.
- Fischer, M. H., Dewulf, N., & Hill, R. L. (2005). Designing bar graphs: Orientation matters. *Applied Cognitive Psychology*, 19(7), 953-962.
- Forceville, C. (2006). Non-verbal and multimodal metaphor in a cognitivist framework: Agendas for research. In G. Kristiansen, M. Achard, R. Dirven, F. Ruiz de Mendoza Ibañez (Eds.), *Cognitive linguistics: Current applications and future perspectives* (pp. 379–402). Berlin: Mouton de Gruyter.
- Forceville, C. (2008). Metaphor in pictures and multimodal representations. In R. W. Gibbs, Jr. (Ed.), *The Cambridge handbook of metaphor and thought* (pp. 462–482). New York: Cambridge University Press.
- Forceville, C. J., & Renckens, T. (2013). The GOOD IS LIGHT and BAD IS DARK metaphor in feature films. *Metaphor and the Social World*, 3, 160–179.
- Forceville, C. J., & Urios-Aparisi, E. (2009). (Eds.) *Multimodal metaphor*. Berlin: Mouton de Gruyter.
- Gibbs, R. W. (1994). *The poetics of mind: figurative thought, language, and understanding*. New York, NY: Cambridge University Press.
- Gibbs, R. W. (1999). Taking metaphor out of ours heads and into the cultural world. In R. Gibbs & G. Steen (Eds.), *Metaphor in cognitive linguistics* (pp. 145–166). Amsterdam: Benjamins.
- Gibbs Jr, R. W. (2011). Evaluating conceptual metaphor theory. *Discourse Processes*, 48(8), 529-562.
- Grady, J. (1997). THEORIES ARE BUILDINGS revisited. *Cognitive Linguistics*, 8, 267-290.

- Grady, J. (1999). A typology of motivation for conceptual metaphor: correlation vs. resemblance. In R. Gibbs & G. Steen (Eds.), *Metaphor in Cognitive Linguistics* (pp. 79-100). Amsterdam: John Benjamins.
- Grady, J. (2005). Primary metaphors as inputs to conceptual integration. *Journal of Pragmatics*, 37, 1595-1614.
- Grady, J., Oakley, T., & Coulson, S. (1999). Blending and metaphor. In R. W. Gibbs & G. Steen (Eds.), *Metaphor in Cognitive Linguistics* (pp. 101-124). Amsterdam: John Benjamin.
- Guerra, E., & Knoeferle, P. (2012). Abstract language comprehension is incrementally modulated by non-referential spatial information: evidence from eye-tracking. In L. Carlson, C. Hoelscher, & T.F. Shipley (Eds.), *Proceedings of the 33rd Annual Conference of the Cognitive Science Society* (pp. 1620-1625). Austin, TX: Cognitive Science Society.
- Hartmann, M., Gashaj, V., Stahnke, A., & Mast, F. W. (2014). There is more than "more is up":
 Hand and foot responses reverse the vertical association of number magnitudes. *Journal of Experimental Psychology: Human Perception and Performance*.

Hebb, D. O. (1949). *The organization of behavior: A neuropsychological theory*. New York: Wiley.

Holmes, K. J., & Lourenco, S. F. (2011). Horizontal trumps vertical in the spatial organization of numerical magnitude. In L. Carlson, C. Hölscher, & T. Shipley (Eds.), *Proceedings of the* 33rd Annual Conference of the Cognitive Science Society (pp. 2276-2281). Austin, TX: Cognitive Science Society.

Hutchins, E. (1995). *Cognition in the Wild*. Cambridge, MA: MIT press.

- Hutchins, E. (2005). Material anchors for conceptual blends. *Journal of Pragmatics*, 37, 1555–1577.
- Ito, Y., & Hatta, T. (2004). Spatial structure of quantitative representation of numbers: evidence from the SNARC effect. *Memory & Cognition*, 32, 662-673.
- Johnson, M. (1987). *The body in the mind: The bodily basis of meaning, imagination, and reason*. Chicago, IL: University of Chicago Press.
- Kirkham, N. Z., Slemmer, J. A., & Johnson, S. P. (2002). Visual statistical learning in infancy: Evidence for a domain general learning mechanism. *Cognition*, 83(2), B35-B42.
- Kirsh, D. (1995). The intelligent use of space. Artificial Intelligence, 73(1), 31-68.

Kövecses, Z. (2002). *Metaphor: A practical introduction*. Oxford: Oxford University Press.

- Kövecses, Z. (2015). *Where metaphors come from: Reconsidering context in metaphor*. Oxford: Oxford University Press.
- Lakoff, G. (1987). *Women, fire, and dangerous things: What categories reveal about the mind.* Chicago: The University of Chicago Press.
- Lakoff, G. (2008), The Neural Theory of Metaphor. In: Ray W. Gibbs *The Cambridge Handbook of Metaphor and Thought.* Cambridge, etc: CUP

Lakoff, G. (2012). Explaining embodied cognition results. *Topics in Cognitive Science*, 4, 1-13.

- Lakoff, G., & Johnson, M. (1980). *Metaphors we live by*. Chicago: Chicago University Press.
- Lakoff, G. & Núñez, R. (2000). Where mathematics comes from: How the embodied mind brings mathematics into being. New York: Basic Books.
- Loetscher, T., Bockisch, C., Nicholls, M. E. R., & Brugger, P. (2010). Eye position predicts what number you have in mind. *Current Biology*, 20, R264-265.
- Marghetis, T. (2015). Every number in its place: The spatial foundations of calculation and conceptualization. PhD thesis, University of California, San Diego.
- Marghetis, T., & Youngstrom, K. (2014). Pierced by the number-line: integers are associated with back-to-front sagittal space. In: Bello, P., Guarini, M., McShane, M., Scassellati, B. (Eds.), *Proceedings of the 36th Annual Conference of the Cognitive Science Society* (pp. 946-951). Cognitive Science Society, Austin, TX.
- Matthews, J. L., & Matlock, T. (2011). Understanding the link between spatial distance and social distance. *Social Psychology*, 42, 185-192.
- Miller, J. H., & Page, S. E. (2007). *Complex Adaptive Systems: An Introduction to Computational Models of Social Life*. Princeton: Princeton University Press.
- Müller, D., & Schwarz, W. (2007). Is there an internal association of numbers to hands? The task set influences the nature of the SNARC effect. *Memory & Cognition*, 35, 1151-1161.
- Nieder, A. (2005). Counting on neurons: the neurobiology of numerical competence. *Nature Reviews Neuroscience*, 6(3), 177-190.
- Ortiz, M. J. (2011). Primary metaphors and monomodal visual metaphors. *Journal of Pragmatics*, 43, 1568–1580.
- Pashler, H., Coburn, N., & Harris, C. R. (2012). Priming of social distance? Failure to replicate effects on social and food judgments. *PloS one*, 7(8), e42510.

- Saffran, J. R., Aslin, R. N., & Newport, E. L. (1996). Statistical learning by 8-month-old infants. *Science*, 274, 1926-1928.
- Saffran, J. R., Johnson, E. K., Aslin, R. N., & Newport, E. L. (1999). Statistical learning of tone sequences by human infants and adults. *Cognition*, 70, 27-52.
- Schelling, T. (1971). Dynamic models of segregation. *Journal of Mathematical Sociology*, 1, 143-186.
- Sweetser, E. (1998). Regular metaphoricity in gesture: bodily-based models of speech interaction. In Actes du 16e Congrès International des Linguistes, Elsevier.

Tversky, B. (2011). Visualizing thought. *Topics in Cognitive Science*, 3(3), 499-535.

- Walker, E., & Cooperrider, K. (2015). The Continuity of Metaphor: Evidence From Temporal Gestures. *Cognitive Science*, 40, 481-495.
- Waterworth, J.A., Lund, A., & Modjeska, D. (2003). Experiential Design of Shared Information Spaces. In Munro, A., Höök, K., & Benyon, D. (Eds.), *Designing Information Spaces: The Social Navigation Approach* (pp. 125-150). London: Springer.
- Wertheimer, M. (1938). Laws of organization in perceptual forms. In W. D. Ellis (Ed.), *A source book of Gestalt psychology* (pp. 71-88). New York: Harcourt, Brace.
- Williams, L. E., & Bargh, J. A. (2008). Keeping one's distance: The influence of spatial distance cues on affect and evaluation. *Psychological Science*, 19, 302-308.
- Winter, B. (2014). Horror movies and the cognitive ecology of primary metaphors. *Metaphor & Symbol*, 29, 151-170.
- Winter, B. & Matlock, T. (2013). More is up... and right: Random number generation along two axes. In M. Knauff, M. Pauen, N. Sebanz, & I. Wachsmuth (Eds.), *Proceedings of the 35th Annual Conference of the Cognitive Science Society* (pp. 3789-3974). Austin, TX: Cognitive Science Society.
- Winter, B., Perlman, M., & Matlock, T. (2014). Using space to talk and gesture about numbers: Evidence from the TV News Archive. *Gesture*, 13, 377-408.
- Winter, B., Matlock, T., Shaki, S., & Fischer, M. (2015). Mental number space in three dimensions. *Neuroscience and Biobehavioral Reviews*, 57, 209-219.
- Wiseman, R. (2014). Social distance in hunter-gather settlement sites: A conceptual metaphor in material culture. *Metaphor & Symbol*, 29, 129-143.

Notes and acknowledgements

- ¹ We thank Daniel Casasanto and Beate Hampe for extensive review and feedback on an earlier version of this paper.
- ² The TV News Archive is a vast online repository of American TV News casts that can be freely accessed online (https://archive.org/details/tv). The database is searchable so that one can look for specific metaphorical expressions such as "we drifted apart." Over 400,000 news shows are already online, representing over five years of American television (2009-2015). On specific uses of the archive for gesture research, see Winter et al. (2013).
- ³ The video is archived at:

https://archive.org/details/CSPAN_20090821_100000_Today_in_Washington?q=disturbingly+high+n umber+of+contractors+in+core+support#start/2178/end/2238

(still images taken on June 2, 2016)

⁴ The video is archived at:

https://archive.org/details/HLN_20090716_160000_HLN_News#start/660/end/720

(still image taken on June 2, 2016)

- ⁵ This characterization is adapted from Scott Page's *Model Thinking* (cf. discussion in Miller & Page 2007: 143-146).
- ⁶ The video is archived at

https://archive.org/details/CSPAN_20111210_233000_The_Communicators?q=increasingly+becomin g+more+similar+but+different#start/978/end/1038

(image taken June 2, 2016).

⁸ For other insightful discussions of metaphors in horror movies, see Eggertsson and Forceville (2009), Ortiz (2011). For discussions of darkness-related primary metaphors in films, see Coëgnarts and Kravanja (2012); Forceville and Renckens (2013); Forceville, *this volume*.