Situated metaphor in scientific discourse
An English-Spanish contrastive study*

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Cognitive linguists have finally agreed that metaphorical thought is the result of neither nature nor nurture, but a combination of both. Despite the acknowledgment of this dual grounding (Sinha, 1999), cross-linguistic studies addressing the significance of cultural factors to form specialised concepts through metaphor are still rare. Research is even scarcer when it comes to terminological resemblance metaphor. To fill this gap, this paper examines a set of resemblance metaphor term pairs in English and Spanish, which had been retrieved from a corpus of marine biology texts extracted from academic journals. Based on the analysis of these terms, we propose a typology of metaphors which classifies them according to their level of socio-cognitive situatedness. This typology shows that: (i) sensorimotor perception and sociocultural factors merge into a physical-social experience that shapes scientific knowledge through metaphor, and (ii) sociocognitive patterns involved in terminological metaphor formation give rise to inter-linguistic variation and commonalities.

Keywords: sociocultural situatedness, resemblance metaphor, marine biology, English/Spanish

1. Introduction

The relationship between embodiment and sociocultural aspects has always been a subject of debate in Cognitive Linguistics. Embodiment or embodied cognition entails that human concepts are not just reflections of an external reality, but that they are crucially shaped by our sensorimotor system, that is, the morphology and physiology of our bodies as well as the functioning of our brains (Lakoff and Johnson, 1999: 22). As a result of this debate, one body of research in Cognitive Linguistics approaches metaphor from a purely neurophysiological and neurocomputational viewpoint, which involves an emphasis on our biophysical
structure. A case in point is Lakoff and co-workers’ Neural Theory of Language,\(^1\) which is being developed in a range of parallel research works (cf. Dodge and Lakoff, 2005; Gallese and Lakoff, 2005; Feldman, 2006). This strand downplays sociocultural factors involved in (metaphor-induced) embodied conceptualization, and focuses on the analysis of metaphor and other cognitive phenomena in terms of neural models, neural circuits, axonal firings and parietal-hippocampal networks (Rohrer, 2006: 121).

This biophysical reductionism is currently losing ground in favour of the second body of research, which highlights the embodied and situated nature of metaphor (cf. Gibbs, 1999; Kövecses, 2005, 2006; Yu, 2008). The situated approach to cognition claims that the shared biology and fundamental bodily experiences that give rise to (metaphorical) thought are essentially determined by embedding social, cultural and contextual factors. This second body of research is also advocated by metaphor analysts in neighbouring disciplines, such as cognitive and psychological anthropology (cf. Quinn, 1991; Palmer, 1996; Kimmel, 2008).\(^2\) In fact, there are studies jointly conducted by cognitive linguists and anthropologists (e.g. Kövecses et al., 2002). The point is that many scholars opt for a metaphor description model that integrates both bodily and cultural experiences.

For instance, Quinn (1991: 60) contends that metaphors, far from constituting understanding, are ordinarily selected to fit a preexisting and culturally shared model. She comes to this conclusion after analysing eight metaphorical categories associated with the concept of marriage, which are sharedness, lastingness, mutual benefit, compatibility, difficulty, effort, success/failure and risk. For Quinn, these categories, instead of being related to marriage, are rather inherent to this concept, and reflect cultural values and beliefs about it.

Based on a contrastive study of languages such as English, Hungarian, and Spanish, Kövecses (2005) provides evidence of the existence of non-universal metaphors. These are motivated by sociocultural factors (including environmental, historical, and communicational aspects) and cognitive preferences and styles, including processes such as elaboration, focusing, and conventionalisation. Kövecses (2005: 231) concludes that the two types of parameters cannot be separated from each other, but rather work jointly.

In his English-Chinese account, Yu (2008) suggests that metaphor, body, and culture form a circular triangle relationship (the “Triangle Model”). While conceptual metaphors are usually grounded in bodily experiences, cultural practices filter bodily experiences for specific target domains of conceptual metaphors. Thus, cultural models themselves are very often structured by metaphorical thought. This is an interesting proposal that closely links bodily experience and cultural situatedness.

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2. Metaphor, science and culture

The body-culture mergence has also found its way into science. It is now argued that the concrete sociocultural situatedness of individual language agents inevitably leads them to employ interpretive conceptualizations that are partial, i.e. not shared by all of the members of the “expert” scientific community in question (Frank, 2008: 218). Sociocognitive Terminology Theory (Temmerman, 2000; 2008) pioneered research into the way metaphor models life science knowledge as a consequence of the ongoing social, cognitive, and technological advances in Western civilisation.

However, studies focusing on the interplay of physiological and cultural patterns have typically shown a preference for non-resemblance metaphors, in other words, metaphors that emerge from rich and abstract structures not involving physical or behavioural patterns (Lakoff and Turner, 1989: 91). As a consequence, resemblance metaphors, which arise because of comparison in physical appearance (typically shape, colour and size) or behaviour, were left more or less out in the cold. For example, Larson (2008) elaborates on the biological, cultural, and linguistic origin of the war on invasive species within the domain of invasion biology, a subdiscipline of conservation biology concerned with strategies to maintain biodiversity. Based on three major metaphorical elements, fears of invasion, an emphasis on competition, and prevalent militarism, Larson identifies the macro-metaphors NATURAL LANDSCAPES ARE PERSONS, INVASION SPECIES ARE A DISEASE, INVASION SPECIES ARE HUMAN INVADERS, and examines their historical and cultural bases.

The main reason for this preference is that resemblance metaphor was regarded by Lakoff and others as a fleeting kind of metaphor with an impoverished inner structure (Lakoff, 1987; 1993; Lakoff and Turner, 1989). Grady (1999: 91) also highlights the lack of entrenchment of resemblance metaphors: “resemblance is not the basis for the sorts of entrenched mappings which prompted the development of conceptual metaphor theory”. Consequently, Conceptual Metaphor Theory has traditionally limited the treatment of resemblance metaphors to literature and poetry within Cognitive Poetics (e.g. Lakoff and Turner, 1989; Lakoff, 1993; Stockwell, 2002; Gavins and Steen, 2003).

Fortunately, in recent years there has been a renewed interest in resemblance metaphor. Corpus-based research both in general language (Deignan, 2007) and specialized discourse (Caballero, 2006 in architecture; Ureña and Faber, 2010 in marine biology) shows that resemblance metaphors are well-established, conventional metaphors that arise from enduring and productive patterns of figurative thought, and that they are not only subscribed to literature, but also to general and specialized language.
Nevertheless, research offering a systematic approach to the body-culture conflation in terminological resemblance metaphor from a cross-linguistic perspective is long overdue. The translation-oriented work by Alexiev (2005) opens the door to this line of investigation. He carries out a corpus-based contrastive analysis of resemblance metaphor terms in Bulgarian, English, and Spanish in the fields of mining, geology, civil engineering, and architecture. Alexiev (2005:36) points out that the choice of a target language conceptualisation strategy and a subsequent translation technique are determined not only by cognitive, but also by language- and culture-specific factors. On this basis, Alexiev (ibid.:108–115) establishes a set of culture-experiential parameters which determine the choice of the designation, and thereby, the general concept to be exploited in the terminological metaphorisation process.

3. Method

3.1 Justification

This paper sheds light onto the relationship between the physical and the sociocultural underpinnings of terminological resemblance metaphor, an aspect that has hardly been researched. For this purpose, this study revises Alexiev’s (2005) proposal, and suggests a typology of culture-induced marine biology metaphors arranged according to four criteria: culture-specificity, culture-typicality, the angles of referent perception, and degree of specificity. We provide empirical evidence showing that: (i) body, perception, interaction, and cultural patterns merge into a physical-social experience that shapes scientific knowledge through metaphor, and (ii) this physical-social experience can give rise to inter-linguistic variation and similarities in specialized language.

3.2 Materials and procedure

The framework is a contrastive study between English and Spanish resemblance metaphor terms extracted from a bilingual corpus of marine biology academic journals. The nature of this corpus ensures the analysis of authentic, naturally occurring data. According to Charteris-Black (2004:19), corpus evidence helps the user to detect cases of inactive conventional metaphors and compensate for the arbitrariness of dictionaries.

This corpus is made up of 4,550,190 tokens (2,240,347 tokens in English and 2,309,863 tokens in Spanish). It is composed of research articles from a wide range of academic journals on marine biology, which guarantees representativeness of
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the field in the analysis of empirical data. The corpus was already used in a previous research study (Ureña and Faber, 2011), where we present an innovative methodology for the semi-automatic retrieval of resemblance metaphor term pairs in English and Spanish. Moreover, the results provided in this article were then revised and refined in Ureña’s (2011) Ph.D. dissertation. Importantly, the terms analysed here were retrieved by means of the strategies applied in such previous studies. Our methodology is innovative because it analyses terminological metaphor in a naturally-occurring corpus of texts from a cross-linguistic perspective, and applies a systematic and time-efficient method of identifying metaphorical terms in corpora. Earlier corpus-based studies of terminological metaphor (e.g., Alexiev, 2005; Caballero, 2006) do not propose a method that integrates all of these aspects, and some of them do not even analyse metaphorical terms in discourse, but rather isolated instances extracted from specialized dictionaries and glossaries (e.g., Alexiev, 2005).

In the first phase of the methodology, the corpus was searched for target domain keywords in English and Spanish, such as ‘fish’/pez, ‘sea’/de mar, and ‘crab’/cangrejo. The great potential of this strategy has been documented by various researchers (cf. Tissari, 2003; Stefanowitsch, 2006), but never applied to scientific texts. Secondly, a search was made for a set of lexical markers that are typical of scientific discourse. These markers include phrases such as ‘known as’ and conocido/a como, and importantly, taxonomic designations, which are standard Latin names written in italics (e.g. Portunus pelagicus) and used by all scientists around the world. Taxonomic designations were important for resemblance metaphor detection and interlinguistic term pairs because they turned out to co-occur with their corresponding (metaphorical) common names. Besides being quicker and more effective than manual searching, the combination of both these search strategies was found to successfully retrieve metaphors, also providing interlinguistic information regarding terminological metaphor. A manual tagging system was also applied that further exploited such lexical markers, and helped to identify other metaphorical terms (cf. Ureña, 2011 for specific details about this system). The tagging system was effective since it provided a quantitative account of metaphor in English and Spanish.

The set of interlinguistic terminological metaphor pairs retrieved from the corpus was analysed from an intercultural perspective following a bottom-up procedure. We contrasted the data and established situatedness criteria by drawing on assumptions from social psychology, cognitive anthropology and cognitive semantics. The tagging procedure allowed us to obtain the numerical distribution of the analysed terms across the metaphor categories derived from the situatedness criteria.
In sum, the methodology presented by Ureña (2011) and Ureña and Faber (2011) to efficiently identify English-Spanish metaphor term pairs from a corpus was devised with a view to improving Ureña and Faber (2010), which is an introspective study of the bodily basis of marine biology conceptual metaphor carried out from a monolingual (English) perspective. This aim has been achieved by the present work because the strategies proposed by Ureña (2011) and Ureña and Faber (2011) allowed us to gain further insights into the theoretical implications of terminological metaphor from an interlinguistic perspective. As the present study shows, these insights concern the way socio-cultural factors crucially constrain the conceptualisation of sea creatures through metaphor in English and Spanish.

4. Results and discussion

The results show that socio-cultural factors more often than not lead English and Spanish to conceptualise and designate marine organisms in different ways through metaphor (interlinguistic variation). Interestingly, the results also show that socio-cultural factors can also bring English and Spanish together.

The strategies used to identify interlinguistic resemblance metaphor term pairs in the marine biology corpus yielded a total of 104 pairs, out of which 42 were relevant to our research because of their socio-cultural basis. Some of these pairs are given as examples and described in Subsections 4.1 and 4.2.

4.1 Situated metaphor and inter-linguistic variation

In Social Psychology, and more specifically, in Social Identity Theory, social identity is defined as “that part of an individual’s self-concept which derives from his knowledge of his membership of a social group (or groups) together with the value and emotional significance attached to that membership” (Tajfel, 1978:63). The possibility of membership in more than one group sanctions the assumption of a layered sociocultural structure, which presupposes generic and ingroup patterns. The notion of ingroup membership is envisaged in the definition of human cognition as a joint product of many people working over many years, combining and accumulating skills and knowledge (Tomasello, 2000:357). On this basis, scientific perception and conception are contingent on the divergent groups of experts who industriously work to obtain sound knowledge about the entities and phenomena under examination. For this reason, scientific knowledge can be regarded as situated. Accordingly, while English-language and Spanish-language marine biologists share a broad social cognition model — i.e. they belong to the same sphere of civilisation (Kövecses, 2005:68) — they constitute separate communities of scien-
tists, who have their own self-group schemas impinging on universal sensorimotor experiences.

The next subsections provide an analysis of English-Spanish term pairs showing that metaphorical thought plays a major role in this impingement. One of the few scholars addressing this issue is Alexiev (2005), who suggests a set of culture-experiential parameters in the field of architecture and civil engineering. We review his proposal, and suggest a typology of resemblance metaphors according to their level of socio-cognitive situatedness. This typology distinguishes between culture-specificity, culture-typicality, unconstrained angles of referent perception, and degree of specificity.

4.1.1 First level of situatedness: Culture-specificity

The incidence of culture in the conceptualisation of specialized referents can give rise to evident cross-linguistic differences. Alexiev (2005: 91, 109) speaks of degree of cultural typicality, making a distinction between culture-specific and culture-experiential parameters that prompt such cross-linguistic differences. He states that a culture-specific metaphor results from a culture-specific (unique/realia) concept mapping, whereas a culture-experiential metaphor entails a concept-onto-concept mapping in one language which cannot be proved to affect the other one.

We agree with this distinction, but, in our view, the representative examples proposed by Alexiev to flesh out such distinction need revising. For instance, in his corpus, Alexiev (2005: 114) finds the English-Bulgarian mining equivalents 'bootleg' /гърне, which refer to the portion of shothole after a blast has been fired. Regarding the English term, Alexiev explains that the original sense of the word 'bootleg', “upper part of a boot”, can only be found in some American English dictionaries and not in major British ones, which only define the noun 'bootleg' as “something hidden, especially smuggled liquor”. For this reason, 'bootleg' should be regarded as culture-specific (Alexiev, 2005: 114). In the first place, Alexiev does not clarify the metaphorical relationship between the boot-part sense and the mining domain sense. When we looked into the issue, we discovered that the term 'bootleg' designates “a hole, shaped somewhat like the leg of a boot, caused by a blast that has failed to shatter the rock properly” (McGraw-Hill Dictionary of Scientific and Technical Terms). Thus, this is an evident case of resemblance in shape.

Secondly, in this case, Alexiev considered the concept of cultural specificity from an intralinguistic perspective. One sense of a word, which is the one giving rise to the terminological metaphor, is only recognised in American English, not in British English. This is thus a case of intralingual variation. Evidently, this variation is not the reason why English-language experts use a different metaphor from those used by Spanish and Bulgarian experts to designate a shothole after a blast. Indeed, boots, the source domain of the English metaphor, are not unique
to American culture, but also exist in Spanish-language countries, in Bulgaria, and in most of the world. In other words, the comparison between the shape of a boot and that of a hole after a blast could very well have been made by Spanish and Bulgarian mining specialists as well. In our opinion, the bootleg metaphor is an instance of metaphor based on the angle from which the expert perceives the domain-specific referent (see Subsection 4.1.3).

This research study targets culture-specific metaphors that arise from an inter-linguistic, (rather than an intralinguistic) analysis. In this regard, a culture-specific metaphor can belong to one of three categories:

- A metaphor emerges because it has both a culturally unique source domain and a culturally unique target domain. This is the least common category. A good example is given by Kövecses (2005: 86), who explains that it was common for the slaves escaping from the South to the North in the United States in the first half of the 19th century to think of this escape as a secret train ride. The target domain, which is the secret escape, is unique to the United States in the first half of the 19th century. The source domain, which is the train ride from South to North, is also unique because it entails a novel blend of railroad rides and underground activities;

- A metaphor arises because the source-domain concept is solely found in the expert community where such concept occurs. For instance, the Spanish term *ochavo* refers to a fish that is compared to an ochavo, a coin (source-domain concept) that was exclusively used in Spain during a specific time span. This example is explained in detail further below in this subsection;

- A metaphor arises because the source-domain concept, which is exclusive of one broader expert community, is only used by a cultural subgroup of such community. An example is ‘devil ray’, which is used by English-language experts, but not by Spanish-language experts. This example is explained in detail further below in this subsection.

The existence of boots across different languages and cultures is what makes *bootleg* unsuitable for the first and second types, and obviously, for the third type too.

Concerning the Bulgarian term *гърне*, Alexiev affirms that this is an example of metaphor with a high degree of cultural typicality. Literally, *гърне* refers to the traditional cooking pot for the national Bulgarian bean stew dish (Alexiev, 2005: 114). There is thus a comparison in shape between the hole in the ground and the Bulgarian pot. In our view, this is not a case of metaphor based on cultural typicality, but rather a case of culture-specific metaphor since the source-domain concept exclusively belongs to Bulgarian gastronomic culture. Therefore, the term *гърне* fits the profile of the second type of our subtypology of culture-specific metaphors.
We found no empirical evidence of culture-specific resemblance metaphors belonging to the first type in the marine biology corpus. In what follows in this subsection we will discuss resemblance metaphors belonging to the second and third types.

Let us first focus on metaphors arising because the source-domain concept is unique to an expert community. It should be highlighted that only three metaphors out of the 42 pairs (84 terms) retrieved from the corpus belong to this category. One of these metaphors is the Spanish term *ochavo* (*Capros aper*). It designates a fish with a roundish shape (see picture in Appendix). This shape prompts the comparison between the fish and an ochavo (no literal translation into English), the coin used from the reign of the Spanish king Philip III until the 19th century (*Diccionario de la Real Academia Española*). ‘Boarfish’, the English equivalent, is not culturally marked. The fish receives this name because of its projecting snout and bright red/orange colouring. Both languages rely on the same sensory mode (visual perception), and the same motivation for metaphorical transfer (shape). However, restrictive sociocultural factors bias the conceptualisation of the specialized referent in Spanish. Moreover, the Spanish term lacks the metaphorical motivation of colour, which does operate in the English unit. This is a clear example of how interaction with entities (in this case, objects, but also dwellings, people, fauna, and flora) exclusive of a physical environment during a specific historical period critically constrains visual perception, a physiological capacity common to human beings.

Another example is the term *cangrejo moro* [literally, “Moorish crab”], which designates the crab species, *Grapsus grapsus*. A Moor is “one of the Muslims who invaded Spain in the 8th century and established a civilisation in Andalusia that lasted until the late 15th century” (*The American Heritage® Dictionary of the English Language* and *Diccionario de la Real Academia Española*). Thus, this concept is specifically associated with Spanish culture and history. The dark skin of the Moors is compared with the black colour of the shell of young crabs of the *Grapsus grapsus* species (see picture in Appendix). In contrast, the English equivalent, ‘sally lightfoot crab’, is not culturally motivated. It refers to this crab’s extraordinary speed along vertical rock walls and its uncanny ability to hide away in crevices to escape predation by rapacious birds, and pursue any smaller animals in the immediate vicinity.

From a psycholinguistic perspective, the question of whether marine biologists really process figurative domain-specific terms metaphorically ties in with Shafarian’s (2008: 118) claim that cultural conceptualizations are heterogeneously distributed across the minds in a cultural group, and consequently, there are concepts that are not equally imprinted on the mind of each member at a given point in time. There is thus evidence of intra-group diversity in cultural knowledge (cf.
Borofsky, 1994 for a detailed account of such diversity). In marine biology, *ochavo* is a very specific concept that is no longer used in everyday communication. If most laymen do not know the meaning of the word *ochavo*, there is no way that they can process the marine biology concept metaphorically. As far as specialists are concerned, they may fail to recognise that their technical terms have a metaphorical basis because their basic meanings are never used anymore, or at least not within that register (Steen, 2007: 94). Nevertheless, experts tend to find out about the metaphorical motivation of an organism’s common name because it presumably has the effect of facilitating the retrieval of the animal’s mental image more quickly than the Latin taxonomic designation. In this case, we can speak of situated yet distributed cognition in the marine biology domain.

Let us now focus on the third type of culture-specific metaphor, that is, metaphors that are exclusive of a cultural subgroup within a broader expert community. Only two cases were identified in the marine biology corpus. As previously stated, a sociocultural context is a layered structure which includes different subcontexts. Accordingly, although English-language and Spanish-language marine biologists belong to different subcultural backgrounds, they all form part of a broader social frame, which entails the sharing of a particular set of values, habits, and cognitive standpoints. The combination of such sharing and the common structural and functional basics of the human brain — what Lakoff (1987: 267) calls “collective biological capacities” — results in an extensive body of English-Spanish term pairs whose constituents have the same metaphorical motivation. An example is the pair ‘manta ray’/*mantarraya*, which will be explained further below in this subsection (cf. Ureña, 2011 for more interlinguistic pairs of this nature).

Nevertheless, on some occasions, a concept characteristic of such a broad social group of specialists is exclusively used by one cultural subgroup to metaphorically designate a specialized concept (third type of culture-specific metaphors in our classification). A representative example extracted from our corpus is the pair ‘blue manna crab’/*jaiba azul* [“blue jaiba” (an untranslatable word into English)] (*Portunus pelagicus*). The metaphor ‘blue manna crab’ is grounded in colour and shape. The white spots on the blue shell of males of the species are compared to manna, snowflake-like food which, according to the Bible, was eaten by the Israelites in the wilderness during their flight from Egypt (see picture in Appendix). The source domain concept, manna, is one of the religious beliefs of Christianity. As a matter of fact, this species is abundant off the coasts of East Asian countries (Potter *et al.*, 1983), where it is known as ‘flower crab’ because the concept of ‘manna’ does not exist there. Unlike English-language experts, Spanish-language experts, who largely share traditions and sociocultural values with English-language experts in Western civilisation, do not use the manna metaphor, but simply call this crab *jaiba azul*, which is a non-figurative name.
The other example is the English term ‘devil ray’. This term designates all of
the members of the genus *Mobula*. They are called ‘devil rays’ because of the shape
of their cephalic fins, which protrude from their heads as if they were horns, thus
giving these rays a diabolical appearance (see picture in Appendix). Another met-
aphorical motivation is their intimidating size. The feeling that their abnormal
bodies generates in humans is compared to the fear caused by the image of the
devil. Although the devil is a salient concept in Christian religion, and thus, shared
by English and Spanish subcultures, Spanish-language biologists do not use it to
refer to the individuals of the genus *Mobula*. They simply use the taxonomic des-
ignation or, if they wish to be more specific, they use the (metaphorical) common
names associated with each of the ray species of *Mobula*.

For instance, they call the species *Mobula hypostoma mantaraya* (or *mantar-
raya*). The English equivalent is ‘manta ray’, which means that both interlinguistic
terms are based on the same two metaphors. Firstly, the word ‘manta’ literally re-
fers to “a rough-textured cotton fabric or blanket made and used in Spanish Amer-
ica and the southwest United States” (*The American Heritage*® *Dictionary of the
English Language*). The metaphorical motivation is shape because of the extensive
flattened body of the fish designated. This metaphor clearly shows the strong so-
cial cognitive bonds between English and Spanish, particularly in contexts where
both languages are in contact because of geographical proximity. Secondly, the
metaphorical motivation of *raya*, which literally translates as “line” or “stripe” into
English, is transparent in Spanish because the fish is flat and long in shape. The
metaphorical motivation of *ray* depends on the etymology of this term, which
stems from Latin *raia*, which means “line”.

By adding up all cases of culture-specific metaphors found in the corpus, we
obtained a total number of five metaphors (two in English and three in Spanish)
which belong to this category.

4.1.2 Second level of situatedness: Culture-typicality
As previously explained, Alexiev (2005: 109) argues for the degree of cultural typi-
cality of the general concept giving rise to the metaphorical concept. We agree
with him that the more prototypical a referent is in a linguistic community, or the
more frequently it is experienced, the more likely it will be for such a referent to
take part in metaphorisation processes.

We retrieved resemblance metaphor terms from the corpus that feature con-
cepts typical, though not exclusive, of their corresponding community of speakers.
Specifically, nine terms (four in English and five in Spanish) fit in this category.
One of them is the English term ‘cookie-cutter shark’ (*Isistius brasiliensis*), a meta-
phor arising from the comparison between the cookie-shaped plugs of flesh ex-
tracted by the shark from its prey and the actual shape rendered by a cookie-cutter
on cookie dough. Cookie-cutters are particularly prominent utensils in the English world, but not in the Spanish one. Evidence of this is that Spanish-language experts refer to this shark as *tiburón cigarro* (“cigarette shark”) because of its thin, elongated shape and the dark, collar-like mark around the base of its head, which resembles the tip of the cigarette (see picture in Appendix). The interaction with, or in this case, the manipulation of an artifact typical of a particular community is the main factor causing the interlinguistic variation.

The corpus also provided Spanish terms arising from culture-typical patterns, which give rise to interlinguistic differences. The metaphor *torito* [“little bull”] emerges because of the comparison between the big head and mouth as well as the bulging eyes of the fish designated by it and those of a bull (see picture in Appendix). Curiously enough, its scientific name, *Bovichtus*, does not refer to a bull but to a cow since this name derives from Greek *bous* (“cow”) and *ichtys* (“fish”). This may be considered to be irrelevant because the heads of bulls and cows are morphologically alike (except for bulls’ horns). However, the influential symbolic status of bulls in Spanish culture biased the designation. In contrast, English-language experts use the neutral metaphor ‘thornfish’ because of the thin, elongated body of the fish. Again, both languages rely on visual perception to focus on physical appearance. However, sociocultural factors operating on one of the languages result in the interlinguistic difference.

The Spanish term *castañeta* (*Chromis crusma*) is a borderline case. This fish receives its name because of its roundish shape resembling a castanet, which is a common Spanish musical instrument (see picture in Appendix). Castanets were invented and spread along the Mediterranean coast by the Phoenicians. They are especially popular in Spain, and have even become a national instrument. For this reason, while castanets are typical though non-exclusive of Spain, the metaphor *castañeta* is very close to being culture-specific. The English term for *castañeta* is “damselﬁsh”, whose bright colours are compared with the beauty and charm of a damsel (in fact, the taxonomic name *Chromis* stems from the Greek *chroma*, meaning “colour”). Although both languages draw on passive perception to metaphorically conceptualize the referent, they have different motivations.

Finally, it may also occur that an element typical of a cultural group becomes particularly salient to outsiders, whereas the members of the in-group view such element as so common to their cultural cognition that its relevance passes unnoticed (Shafarian, 2008: 118). Curiously enough, those who come from outside the cultural group are drawn to this element, and use it for complex conceptualization strategies. In the marine biology corpus, we found the interlinguistic pair ‘olive ridley turtle’/*tortuga golfina*. The English name refers to the olive green shell of this turtle (see picture in Appendix). Although olives are obviously cultivated in other places, they are native to the Mediterranean region, and of major agricultural
importance as the source of olive oil, especially in Spain. The taxonomic designation of this animal, *Lepidochelys olivacea*, also clearly shows its metaphorical motivation. Paradoxically, and despite the taxonomic reference, Spanish-language experts do not use the olive metaphor to refer to the turtle. As a matter of fact, they do not even use a metaphor. They simply call it *tortuga golfina*, literally “gulf turtle”.

4.1.3 Third level of situatedness: Unconstrained angles of referent perception

Alexiev (2005: 108) states that the selection of a domain-specific referent designation is determined by the angle of referent perception, and that this angle is contingent on the experience of the metaphor designator in the particular culture. As a result, scientists, researchers and technologists belonging to different linguistic communities often select different domain-specific referent designations associated with different metaphors. Although this is doubtless true, the experience of the particular culture as well as the angle of special referent perception (Alexiev, *ibid.*) are too general notions, and thus, need greater specification.

Empirical evidence provided in this study shows that the incidence of culture on specialized concept formation is gradable. We propose a scale of situatedness with the following levels:

- Metaphors motivated by exclusively cultural factors;
- Metaphors emerging from typically cultural factors;
- Metaphors determined by factors that, though neutral or equally familiar to experts from different communities, were used by the designator to coin the metaphor.

As with the first two types of situated metaphors, the locus of the metaphorical conceptualization in the third type is first individual. It then spreads among the group members through the dynamics of group interactions, and as a result, the metaphor is no longer reduced to individual representations (Shafarian, 2008: 119). In the third type of situated metaphor, however, the initially individual conceptualization is not determined by exclusive or typically salient sociocultural patterns, but simply by an expert’s choice based on his/her unconstrained angle of perception of the domain-specific referent. The created term is eventually assumed by the scientific community that the expert belongs to because of peer pressure and group membership (Kristiansen, 2008: 412). Since the entrenchment of the metaphor only takes place in a particular community, we can speak of situated metaphor, thus giving rise to cross-cultural and cross-linguistic variation.

Experts from different linguistic communities can use either the same or different angles of domain-specific referent perception. When marine biology experts from different language communities examine the same organism from different angles, such an organism is not perceived and named in the same way.
This cross-linguistic difference in perception constrains the (metaphorical) conceptualization of the organism. This claim is substantiated by 16 interlinguistic pairs extracted from our corpus. A clear example is the pair ‘pilot whale’/calderón común [“common cauldron whale”] (Globicephala melas). The angle of perception of English-language experts points to the behaviour of this dolphin (confusingly called ‘whale’) species. The individuals of this species are noted for their gregarious behaviour, forming big schools led by the largest male, which acts as the pilot or guide. In contrast, Spanish-language experts look at the shape of this animal’s head, whose melon (odontocetes’ ovaloid structure used for echolocation) is overdeveloped. This overdeveloped part of its body provides the animal’s forehead with a conspicuous roundish shape, thus resembling a cauldron (see picture in Appendix). Neither pilots nor cauldrons are exclusive or particularly typical elements of English and Spanish cultures.

Another example of this type of unconstrained angle of referent perception is the pair ‘ocean sunfish’/pez luna (Mola). The English term, which is not metaphorical, refers to this fish’s habit of basking on its side at the sea surface, as though having a sunbath. Again, English-language experts focus on the animal’s behaviour. This angle of referent perception differs from the angle taken by Spanish-language marine biologists, who metaphorically refer to this animal as “moonfish” because of its rounded shape5 (see picture in Appendix).

Contemporary metaphors and metonymies are the result of social, historic crystallization, that is, the result of the synergic cognitive activity of the community (Bernárdez, 2008:152). However, it has been shown that metaphorical conceptualization may change over time in domain-specific language (cf. Zinken et al., 2008 for fields such as archaeology, anthropology, and robotics, and Temmerman, 2008 for genetics). The term ‘ocean sunfish’ is also interesting because it is an example of such change. This fish was originally classified in the pufferfish genus, as Tetraodon mola. Further scientific research replaced it in its own genus, Mola, with two species, Mola mola and Mola ramsayi (Parenti, 2003). Pufferfish receive their name because they inflate with air or water to scare their predators away. Presumably, the roundish shape of the ocean sunfish misled scientists into classifying it as a type of pufferfish. In short, the subculture of science provides interesting examples of how metaphor-induced knowledge changes over time.

When marine biology experts from different language communities examine the same organism from the same angle — i.e. they focus on the same specific feature to conceptualize the domain-specific referent —, the conceptualization process may result in different conceptual metaphors for each language or in the same metaphor. We detected nine pairs belonging to the first subcategory. A good example is the pair ‘weever fish’/pez araña [“spider fish”] (Echiichthys vipera). The term ‘weever’ stems from Old Northern French wivre, and ultimately from Latin
vipera, which means “serpent” — in fact, it is hardly a coincidence that the taxonomic name of this fish includes the word vipera. English-language experts compare this fish with a serpent because it uses poisonous spines on the gill cover and first dorsal fin to hurt potential predators and scare them away. This is thus a case of resemblance in behaviour. The metaphorical motivation of its Spanish equivalent, pez araña, is also behaviour since spiders also use venom for survival. Therefore, both expert communities look at the domain-specific referent from the same angle, which is used as a tertium comparationis in the metaphorical conceptualization. However, English-language experts rely on a different metaphor from that used by their Spanish-language colleagues. Importantly, both snakes and spiders occur widely across the globe, and consequently, cannot be associated with any particular community.

The pair ‘weever fish’/pez araña is based on what Kimmel (2008: 99) calls “retrojection” or the “cultural nature of the preconceptual”:

[R]etrojection describes situations in which cultural metaphors are picked up in discourse and then mapped back onto the body. Retrojection is a process whereby discursively objectified body images or other symbolic associations resonate with proprioceptive body awareness and thus come to be felt inside the body.

Supported by the work of other phenomenological anthropologists, such as Kirmayer (1993) and Csordas (1999), Kimmel (2008: 93–94) argues that preconceptual structure, including the perception of our aching, craving or sick bodies, is a cultural mode of being in the world.

Accordingly, when we are confronted with the metaphors ‘weever fish’ and pez araña, both metaphors are mapped back onto our bodies with proprioceptive awareness, and thus, the painful experience comes to be felt inside us. However, as Kimmel writes, we are dealing with cultural metaphors. On this basis, while drawing on the same feeling of pain (inoculation of venom under our skin), English- and Spanish-language biologists interpret such preconceptual experience in different ways, which results in two different metaphors to conceptualize and designate the same sea organism. It can be concluded that “proprioception is not only a universal substrate, but also the locus of culture-specific ways of monitoring one’s own body” (Kimmel, 2008: 92).

Another interesting case is the pair ‘rose shrimp’/gamba blanca [“white shrimp”] (Parapenaeus longirostris). It clearly epitomises what is known as “social categorization” (Kristiansen, 2008: 417), which is a cognitive process involving the accentuation of intragroup similarities and accentuation of intergroup differences on relevant continuous dimension. Pink and white are two colour categories sharing a transitional zone where it is not possible to distinguish between both categories. The colour of the shrimp Parapenaeus longirostris stays on such
an undefined zone of the continuous dimension, which can be defined as light pink or pinkish white (see picture in Appendix). To designate the shrimp, English-language experts use the word ‘rose’, which is metaphorical. Since one of the commonest colours of rose flowers is pink, the entire source domain, ROSE FLOWER, is mapped onto the target domain, PINK. Thus, apart from a metaphor, there is also a whole-for-the-part metonymy. Roses are not exclusive or representative flowers of English culture. Moreover, using ‘rose’ for ‘pink’ in Spanish is a well-entrenched metaphor in everyday communication (in the same way as the colour orange receives its name from the orange fruit). This means that Spanish-language specialists could very well have resorted to the rose metaphor as well to designate the shrimp. Nevertheless, Spanish-language experts stay on the other side of the continuum, that is, the colour white.

This inter-linguistic difference shows that the universality of experiential basis — in this case, the perception of colour — does not necessarily lead to universally equivalent conceptualization (Kövecses, 2005:247). It also shows how the collective form of cognition (Shafarian, 2008) critically biases the individual’s categorisation schemas, bringing out a significant decrease in his/her cognitive effort (Bernárdez, 2005). In other words, sociocultural patterns underlying the linguistic realization of concepts guide the individual into perceiving reality in a specific way. As Tajfel (1969:82–83) explains, stereotypes help us cope with fuzzy differences, which are transmuted into clear ones, and new differences are created where none exist. Accordingly, English-language and Spanish-language individuals once transmuted the previously mentioned fuzzy colour zone into separate watertight categories, which then became stereotypes in the conceptualization of Parapenaeus longirostris in their corresponding scientific circles.

We now turn our attention to the second subcategory, which involves the conceptualization process resulting in the same metaphor in English and Spanish. Alexiev accounts for the incidence of cultural patterns in terminology metaphor from the perspective of translation studies. Alexiev (2005:115) underlines the level of specificity of special referent perception as one of the translation strategies used in the field of mining and architecture. His corpus data show that most non-metaphorical target language translation equivalents of source language metaphorical terms are superordinates. In other words, the target language culture usually perceives the same domain-specific referent at a higher level of generality than the source language culture.

In our study, we use the notion of degree of specificity to pin down differences between English and Spanish term pairs whose constituents are all metaphorical in nature. Specifically, the constituents of each of the interlinguistic pairs are both grounded in the same conceptual metaphor. There is a degree of specificity because one of the pair terms focuses on a more or less specific-generic aspect of
José Manuel Ureña and Maribel Tercedor

the source conceptual domain than the other term. This phenomenon has been analysed in general language non-resemblance metaphors. For instance, Kövecses (2005: 154) considers it a type of differential cognitive preference involving a hierarchy of things or events. However, it had still to be attested in specialized language, and concretely, in resemblance metaphors.

With this new criterion, we thus go further up the scale of metaphor situatedness to establish a fourth level. However, we consider degree of specificity to actually be a subtype of the expert’s unconstrained angle of domain-specific referent perception since the source domain concepts are not exclusive or typical of the two language communities at work. English- and Spanish-language scientists view the domain-specific referent from the same angle of perception, i.e. they use the same aspect of the referent as the target domain concept to take part in the metaphorical process. Nevertheless, depending on the language, this aspect is compared to a more or less specific aspect of the source domain.

Two cases featuring degree of specificity were retrieved from the corpus. A good example of this phenomenon is the pair ‘triggerfish/pez ballesta’ [“crossbow fish”] (Balistidae). This fish erects the first two dorsal spines to scare potential predators away (see picture in Appendix). This behaviour is compared with the functioning of a crossbow, whose trigger is pulled to keep enemies away. The English term focuses on the specific concept ‘trigger’, whereas the Spanish term designates the generic concept ‘crossbow’, which eventually constitutes the whole source domain. Thus, both expert communities rely on the same aspect of the target domain (same angle of perception), which is the dorsal spines of the fish. However, conceptualization of this sea organism through metaphor shows a clear difference in degree of specificity from an interlinguistic perspective.

The other example is the pair ‘croaker/corvina’ [“raven-like”] (Sciaenidae). ‘Croaker’ is a generic concept that refers to the land animals that produce a specific sound (ravens and other animals, such as frogs), and this aspect is mapped onto the target conceptual domain fish. In contrast, corvina straightforwardly refers to the particular type of bird that produces that sound, which is a raven. This aspect is likewise mapped onto the target domain fish. Both ‘croaker’ and corvina belong to the source conceptual domain land animals that produce a croaking sound, but there is a clear differentiation in specification. Croaker is a generic concept, whereas corvina specifically refers to ravens. Ravens are geographically distributed across the whole northern hemisphere, and thus cannot be linked to any specific culture.

After adding up all of the corpus pairs belonging to the third level of situatedness, a total number of 27 pairs was obtained.
4.2 Culture-specificity brings English and Spanish together

Evidence has been given so far of the crucial influence of different types of situatedness and sociocultural factors on scientific knowledge to prompt English-Spanish differences through metaphor. We are now presenting a new scenario, in which cultural elements that are exclusive of one expert community shape the metaphorical conceptualization of a sea organism in this community and in others. In our case, this means that one culture critically influences the other so that both use the same conceptual metaphor, which is moreover subject to no degree of specificity from an interlinguistic perpective. In other words, there is total coincidence of both cultures at the conceptual and the linguistic levels.

The only example found in the corpus is the Spanish metaphorical common name *bailarina española*, which designates a species of nudibranch (*scientific name Hexabranchus sanguineus*). English-language marine biologists have adapted this name into the literal equivalent “Spanish dancer”, and use it in their academic journal articles. The dynamic mental image that this metaphor evokes integrates three closely interrelated metaphorical motivations. First of all, the intense red colour of this nudibranch is similar to the colour of a typical flamenco dancer’s dress (see picture in the Appendix). Secondly, the spirals of the nudibranch look like the frills and flounces on the skirt of the dress. Thirdly, the nudibranch behaves like a flamenco dancer insofar as the nudibranch moves its spirals in a fluttering manner to advance through the water, much like the flamenco dancer moves the flounces on her skirt while performing. Thus, this metaphor combines physical appearance and behavioural patterns.

Importantly, it emerges from very specific Spanish cultural patterns, which are so appealing to outgroup specialists — in this case, English-language experts — that they adopted it to designate the same marine organism. Therefore, in this case, English-language experts have assumed Spaniards’ socio-cognitive patterns to make and communicate science.

5. Conclusions

The analysis of English-Spanish metaphorical term pairs extracted from academic journal articles on marine biology reveals that metaphorical conceptualization and categorization of domain-specific referents are traceable not only to sensory-motor inferences, but also to cultural factors, which critically constrain the former. This fact challenges the feed-forward logic claim of experiential realism (Lakoff and Johnson, 1999) that it is the body that necessarily comes first.
The interlinguistic term pairs analysed offer empirical evidence that English and Spanish have conceptual differences that are culturally grounded. As Yu (2008: 393) argues, cultural models set up specific perspectives from which certain parts of the body and certain aspects of bodily experience are viewed as especially salient and meaningful. Terminological metaphor analysis is thus an effective way of ascertaining and improving our understanding of inter- and cross-linguistic variation.

This English-Spanish contrastive study draws on a set of strategies used by Ureña (2011) and Ureña and Faber (2011) to semi-automatically retrieve interlinguistic resemblance metaphor term pairs from a marine biology corpus. Based on such strategies, which yielded numerical data, this paper proposes a typology of terminological metaphors which classifies them according to their level of socio-cognitive situatedness. This typology distinguishes between four levels, which are culture-specificity, culture-typicality, unconstrained angles of referent perception, and degree of specificity.

According to the numerical data, up to 42 English-Spanish resemblance metaphor term pairs with a socio-cultural basis were retrieved from the corpus. The most numerous category was that including metaphors featuring unconstrained angles of referent perception (a total of 27 pairs), which subsumes the degree of specificity subcategory (2 pairs), followed by culture-typical metaphors (9 pairs), and culture-specific metaphors (3 pairs).

The interlinguistic pair that is left is ‘Spanish dancer’/bailarina española, which is interesting because it shows that very specific sociocultural patterns exclusive of a particular linguistic community — in this case, the Spanish one — can be adopted by another community to conceptualize and lexicalise the same referent through metaphor (‘Spanish dancer’). This fact supports the claim that although cultural practices more often than not establish cross-linguistic differences, they can occasionally bring them together as well.

Notes

* We are grateful to Professor Pamela Faber, from the Department of Translation and Interpreting at the University of Granada, for revising the language and style of the article and for her wise advice.


2. Insofar as the analysis of conceptual phenomena as a whole, situated embodiment theory has given rise to what is known as social cognitive neuroscience, which carries out empirical studies of the neural mechanisms underlying social cognitive processes (cf. Blackmore et al., 2004).
3. Social Identity Theory was developed in Bristol in the 1970s by Tajfel, Turner and their associates. As this study shows, research on social cognition can be of great help to Cognitive Semantics.

4. This crab is also called the ‘blue swimming crab’ by English-language specialists. Synonymy in specialised language is not as uncommon a phenomenon as it was traditionally thought (cf. Ureña, 2011 for further cases of marine biology synonyms).

5. This metaphor also exists in Dutch, Portuguese, French, Catalan, Spanish, Italian, Russian, and German, which use the common names maanvis, peixe lua, poisson lune, peix lluna, pez luna, pesce luna, рыба-луна, and Mondfisch, respectively.

References


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## Appendix — Classification and pictures of the marine organisms described in the article

<table>
<thead>
<tr>
<th>Level of situatedness</th>
<th>English term</th>
<th>Spanish term</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culture-specificity (source-domain concept unique to one expert community)</td>
<td>boarfish (metaphorical but not culture-specific)</td>
<td>ochavo (metaphorical and culture-specific)</td>
<td><img src="image1" alt="Boarfish" /></td>
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<tr>
<td></td>
<td>sally lightfoot crab (metaphorical but not culture-specific)</td>
<td>cangrejo moro (metaphorical and culture-specific)</td>
<td><img src="image2" alt="Sally Lightfoot Crab" /></td>
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<tr>
<td>Culture-specificity (source-domain concept exclusive of a broader community used only by one cultural subgroup)</td>
<td>blue manna crab (metaphorical and culture-specific)</td>
<td>jaiba azul (neither metaphorical nor culture-specific)</td>
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<tr>
<td></td>
<td>devil ray (metaphorical and culture-specific)</td>
<td>raya (genus Mobula) (metaphorical but not culture-specific)</td>
<td><img src="image4" alt="Devil Ray" /></td>
</tr>
<tr>
<td>Borderline case</td>
<td>damselfish (metaphorical but neither culture-specific nor culture-typical)</td>
<td>castañeta (metaphorical and culture-specific/culture-typical)</td>
<td><img src="image5" alt="Damsel Fish" /></td>
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<td>Culture-typicality</td>
<td>cookie-cutter (metaphorical and culture-typical)</td>
<td>tiburón cigarro (metaphorical but not culture-typical)</td>
<td><img src="image6" alt="Cookie-Cutter Shark" /></td>
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<td></td>
<td>thornfish (metaphorical but not culture-typical)</td>
<td>torito (metaphorical and culture-typical)</td>
<td><img src="image7" alt=" Thornfish" /></td>
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<tr>
<td>Level of situatedness</td>
<td>English term</td>
<td>Spanish term</td>
<td>Picture</td>
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<tr>
<td>Situated metaphor in scientific discourse</td>
<td>olive ridley turtle (metaphorical and based on an aspect typical from Spanish culture)</td>
<td>tortuga golfina (neither metaphorical nor culture-typical)</td>
<td><img src="image" alt="Olive Ridley Turtle" /></td>
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<tr>
<td>Different unconstrained angles of domain-specific referent perception</td>
<td>pilot whale (metaphorical: based on behaviour)</td>
<td>calderón común (metaphorical: based on shape)</td>
<td><img src="image" alt="Pilot Whale" /></td>
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<tr>
<td></td>
<td>ocean sunfish (not metaphorical)</td>
<td>pez luna (metaphorical: based on shape)</td>
<td><img src="image" alt="Ocean Sunfish" /></td>
</tr>
<tr>
<td>Same unconstrained angle of domain-specific referent perception (different conceptual metaphors)</td>
<td>weever fish (metaphorical: based on behaviour)</td>
<td>pez araña (metaphorical: based on behaviour)</td>
<td><img src="image" alt="Weever Fish" /></td>
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<tr>
<td></td>
<td>rose shrimp (metaphorical: based on colour)</td>
<td>gamba blanca (not metaphorical: based on colour)</td>
<td><img src="image" alt="Rose Shrimp" /></td>
</tr>
<tr>
<td>Degree of specificity (same unconstrained angle of domain-specific referent perception: same conceptual metaphor)</td>
<td>triggerfish (metaphorical: based on behaviour)</td>
<td>pez ballesta (metaphorical: based on behaviour)</td>
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<td></td>
<td>croacker (metaphorical: based on behaviour)</td>
<td>corvina (metaphorical: based on behaviour)</td>
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</tr>
<tr>
<td>Culture-specificity bringing English and Spanish together</td>
<td>Spanish dancer (metaphorical: based on shape, colour, and behaviour)</td>
<td>bailarina española (metaphorical: based on shape, colour, and behaviour)</td>
<td><img src="image" alt="Spanish Dancer" /></td>
</tr>
</tbody>
</table>
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