John Benjamins Publishing Company

Mereology in the flesh

Simon Devylder
Lund University

Figurative language repositories typically encompass expressions that are coded manually in formal content analyses. This chapter proposes to discuss a number of theoretical and methodological issues related to mereology – the study of parts, wholes, and their relation – that are crucial for coding part–whole figurative expressions. This contribution draws the attention to the importance of: distinguishing language and experience of part whole relations; taking into account the existence of two different kinds of whole; and finding ways to implement these distinctions in coding schemes to be used to annotate figurative expressions in electronic repositories. Finally, based on cognitive scientific evidence, this chapter formulates a hypothesis on how part–whole relations are acquired through bodily experiences and therefore could indeed said to be "in the flesh".

Keywords: mereology, metonymy, partonymy vs.meronymy, embodiment, manual coding

1. Introduction

The usefulness of figurative language databases can be measured, among other criteria, by inter-rater reliability indexes. Scoring high on these indexes implies that the various contributors to the databases disagree to a strict minimum when they make an entry and categorize a metonymy or a metaphor as being of the X, Y, or Z type. One way to keep inter-rater disagreement to a minimum is of course to provide contributors with a set of categorization criteria that are both theoretically and practically unambiguous. This chapter is a contribution to identifying a number of clear criteria for the coding of figurative expressions that are based on part–whole relations.

The Bibliography of Metaphor and Metonymy (Barcelona & Ruiz de Mendoza Ibáñez, 2015) lists 1365 papers and monographs devoted to the analysis of metonymy, for which mereology – the study of parts, wholes, and their relations – plays a central role: "spatial part–whole contiguity is at the core of the category [metonymy]" (Peirsman & Geeraerts, 2006, p. 269). Building repositories of figurative expressions in general, such as the MetaNet project (Sweetser, David, & Stickles, this volume), the MetaNet.HR – Croatian Metaphor Repository (Despot et al., this volume), the COGMOD project, and of metonymies in particular such as Córdoba Metonymy Database (Barcelona, this volume), thus call for a fine-grained definition of these relations. The present contribution proposes to add a few cobblestones to a way already paved by many contributions, to which I frequently refer throughout the chapter.

The general theoretical contribution of this chapter is to clearly distinguish the *language* and the *experience* of part–whole relations to account for the "reciprocal relation between prelinguistic-experience and linguistic meaning" (Blomberg & Zlatev, 2014, p. 397). Alternative linguistic expressions can refer to the same state of affairs in experience and alternative state of affairs in experience can be referred to by the same linguistic expression. Building conceptual explanations on the assumption that language and experience map onto each other on a one-to-one basis is the main source of the issues discussed in this chapter.

The methodological contribution of this chapter is to show how these theoretical ambiguities lead to practical shortcomings in the analysis of meaning in general, and in the coding of entries of a database in particular. Ways to adjust these theoretical ambiguities will be presented as well as supported by several examples showing how these adjustments can be operationalized in the coding scheme of repositories of figurative language.

I first propose to discuss several issues related to the conflation of conceptual and linguistic meaning of part–whole relations (Section 2). Then, I propose to clearly identify two different kinds of wholes – the *Gestalt* and *componential* wholes – which is needed to identify the semantic components of expressions structured mereologically. Each kind of whole is distinctly synthesized and thus involves a different system of conceptualization, which gives way to a number of linguistic constraints (Section 3). In cognitive linguistics it is commonly assumed that conceptualizing entities as wholes made of parts is not innate but acquired through the experience of our bodies and environment (e.g., Lakoff, 1987, pp. 273–274; Kövecses, 2006, p. 209). But what sensorimotor experience can possibly be at the origin of structuring wholes into parts? Based on a compelling contribution from cognitive science (de Vignemont et al., 2009) I formulate a hypothesis on how mereology could indeed be in the flesh (Section 4).

2.   Towards a sharper definition of the part–whole relation

This section is not intended to provide a prescriptive set of rules but rather proposals that aim at drawing attention to specific issues related to the study of part–whole relations so as to avoid potential shortcomings. The underlying issue of all the others presented in the following sub-sections is the conflation of the fundamentally distinct – yet interacting – experiential vs. linguistic phenomena of part–whole relations and the extension of this conflation to meta-explanations. Taking this distinction into account can help resolve the ambiguities that are identified in the following Sections (2.1). This distinction is crucial in general and in particular for the study of parts and wholes in language and thought because some linguistic part–whole relations can be marked in some languages but absent from others. For example, the English expression *part of* can conflate both conceptual relations of partonomy and taxonomy (e.g., *wheels are part of cars*; *birth control pills are part of the category of pills*). The conflation of linguistic and conceptual meaning becomes problematic when the affordances of a specific language (e.g., the possibility of referring to both 'part of' and 'kind of' conceptual relations with the English expression *a part of*) become extended to meta-explanations that aim at explaining cross-culturally shared pre-predicative processes. I propose to systematically show how relations that can be conflated at the linguistic level cannot be confused at the experiential level. More specifically I will discuss why partonomy is not taxonomy (2.2), possession (2.3), containment (2.4), or contiguity (2.5) at the conceptual level. I will systematically show why extending these linguistic conflations to conceptual explanations is not only problematic theoretically but also practically when one needs to operationalize these criteria in the coding scheme of a database where different contributors have to agree on categorizing the same type of entries in the same way.

2.1   Partonomy is not meronymy

To start with some terminological clarification, *mereology* is defined as the science or study of parts and wholes, and as such includes both notions of *partonomy* (experiential structures based on part–whole relations) and *meronymy* (linguistic structures based on part–whole relations).

   Partonomy is sometimes used as a synonym for *meronym*y, but both terms are here defined as clearly distinct: the former exclusively refers to experiential/pre-predicative part–whole relations, in contrast to the latter, which exclusively refers to part–whole relations as linguistic phenomena. Partonomy is here synonymous to Sonesson's (1989, 2010) term *factorality*, defined as a pre-predicative

phenomenon starting out from the perception of part–whole relations. Factorality is perhaps a less transparent term to the linguist reader, therefore we will talk about *partonomy* when we refer to part–whole relations of *the experiential lifeworld*.

The experiential lifeworld is defined as the world we directly experience in consciousness (Dermot, 2005, p. 9; Husserl, 1970, p. 49; Konderak, 2018, p. 115–116; Sonesson, 2016, p. 26). Using Gibson's (1932) example, there is no way we could perceive the movement of the Earth going round the Sun through the senses. In the experiential lifeworld, it is the Sun that rises up and sets down. It is the experiential lifeworld that is relevant to take into account when one attempts to explain the pre-predicative phenomena we cognitively process, conceptualize and eventually structure into semiotic systems such as language. Taking into account the part–whole relations of the experiential lifeworld allows avoiding the pitfalls of objectivism that we find in Seto (1999, p. 94) who claims that part–whole relations are "based on real-world constitutive relations [that] we are not free to change […] because the world is there just as it is". In phenomenological terms part–whole structures reside in the *intentional* object, correlating with the intentional act (e.g., perception, imagination) of the subject (Husserl, 1970a; Sokolowksi, 2000; Blomberg & Zlatev, 2014). The possibility of intending objects as 'wholes made of parts' allows many languages to capture and code the conceptual process with diverse strategies (e.g., Panther, Thornburg, & Barcelona, 2009), and once the distinction between language and experience is made clear, their interaction can then be explored.

In order to make the *experiential vs. linguistic distinction* explicit, and because we are here bound to use language to refer to both experiential and linguistic structures, I will use single quotes to refer to objects and relations described at the experiential level (e.g., 'part of' or 'hand') and italics for the linguistic expressions (e.g., *a part of* and *hands* in English, or *une partie de* and *mains* in French).

The human body is both a universally shared domain of experience and the most salient object we encounter on a daily basis. It is also a domain of conceptualization that is referred to with language-specific features, as for instance in the segmentation of the body into body part terms, the semantic extensions of which greatly varies across languages (e.g., Majid & Van Staden, 2015). As a domain of conceptualization, it provides a resourceful platform to explore the distinction between experientially shared part–whole relations (i.e., partonomy) and language-specific patterns of part–whole linguistic expressions (i.e., meronymy). Accordingly, the points discussed below will frequently recruit examples of experiencing the body and referring to it linguistically to illustrate the unsystematic one-to-one mappings between language and experience and present what this implies for the formulation of meta-explanations.

To illustrate why the experiential vs. linguistic meaning distinction is important to take into account, there is for example no body part term for 'upper arm' in French (Devylder, Bracks, Kozai, Shimotori, & Siahaan, *forthcoming*), no word for 'hand' in Indonesian (Majid & Van Staden, 2015), and no expression for 'a part of' in Jahai (Burenhult, 2006) or in Kuuk Thaayorre (Gaby, 2006). However, there is no evidence supporting that this linguistic absence presupposes the lack of experiencing 'upper arms' or 'hands' as body parts in French and Indonesian, or that Jahai and Kuuk Thaayorre speakers do not experience anything as parts of larger wholes (see also Sonesson, 1993). It just means that there is no word for it and as Majid and Van Staden (*ibid*, pp. 586–587) put it:

> [T]here cannot be a one-to-one mapping between lexical representations and the body structural representation. If that were true then we would be forced to the conclusion that the body structural representation is different for speakers of different languages, and therefore culturally relative. There is no evidence for this radical proposal.

The distinction between experiential partonomy and linguistic meronymy is not only necessary to solve the issues addressed in the following sub-sections but also useful to study the expression of partonomy in semiotic systems other than language, such as pictures (e.g., Sonesson, 1989, p. 35; Stampoulidis & Bolognesi, under review), or gestures (e.g., Mittelberg, 2018, p. 11).

2.2 Partonomy is not taxonomy

Winston, Chaffin, and Herrmann (1987, pp. 430–431) raise a red flag on the vagueness of the English term *part*, which can encode both a 'part-of' relation and a 'kind-of' relation, the latter consisting of the very distinct conceptual process of taxonomy.

Both 'part–whole' and 'kind-of' relations are relations of inclusion and as a result "taxonomy and partonomy, […] tend to be confused" (Radden & Kövecses, 1999, p. 34). Such confusion can be seen when Lakoff (1987, p. 287) states that "each higher-order category is a whole, with the immediately lower categories being its parts", and when Radden and Kövecses (1999, p. 34) state that they "feel justified in analyzing Category and-Member ICMs as instances of the whole-part configuration". The English language allows for the conflation of 'kind of relations' and 'part of relations' with the expression *a part of*, but it is quite a common feature of language to subsume conceptually, experientially, or logically distinct phenomena under the same expression. It is however problematic to maintain this conflation at the explanatory conceptual level because meta-explanations aim at accounting for phenomena that are not language-specific.

I propose that the 'part–whole' relation is to be strictly distinguished from the 'member-category' relation. The 'member-category' relation is the inclusion of one category in another, as in 'car' and 'vehicle', where 'car' is the more specific item (hyponym) included in the larger category 'vehicle' (hypernym). For 'part–whole' relations the crucial relation is not a relation between classes or categories of entities but "observable at the level of individual entities" (Cruse, 2002, p. 248) within the boundaries of a single entity, as for instance between 'wheels' and 'car': 'wheels' are 'parts' of the whole entity 'car'.

To operationalize this theoretical distinction as part of a protocol destined to contributors of figurative language databases, one could design semantic tests that could help determine if the conceptual relation at work in the entry is structured on a 'kind of' or on a 'part of' relation. Using linguistic expressions to account for experiential distinctions could be criticized as repeating the same kind of inaccuracies that this contribution aims to avoid. As a response, there is a point where theoretical considerations need to be operationalized, because database editors and contributors cannot just keep thinking about what they should do, but actually do it, hence compromises must be found. Moreover, several validity criteria per semantic test seems like an acceptable compromise as they can better "cancel out" the degree of inaccuracy and conflation patterns that are inherent to the language-specific meaning of terms like *type, kind*, or *part*. Taking these considerations into account and recruiting the works of Cruse (1986, p. 89; 2002, p. 248), Lyons (1977, p. 292), Miller and Johnson-Laird (1976, p. 241), and Winston et al. (1987), I propose the two following semantic tests.[1]

Taxonomy test

In a relation between two entities 'X' and 'Y', 'X' and 'Y' are connected by a taxonomic relation where 'X' is 'a conceptual kind of' Y, if and only if:

  i. *Xs are a type of Y*
 ii. *Xs are Ys*
iii. *a X is a kind of Y*
 iv. *a X is a Y*

---

1.   These tests would be invalid for languages like Kuuk Thaayorre or Jahai where there is no term for 'part–whole' relations, and for the languages where *type, kind*, or *parts* conflate different conceptual relations from what the English terms conflate. We would therefore also need to adapt each test to each language represented in the database.

Partonomy test

In a relation between two entities 'X' and 'Y', 'X' and 'Y' are connected by a partonomic relation where 'X' is 'a conceptual part of' Y, if and only if:

i. *Xs are parts of a Y*
ii. *Xs are parts of Ys*
iii. *a X is part of a Y*
iv. *a X is a part of a Y*

Consider that as contributors to a database or repository of figurative language we have to code the two following entries (1) and (2) (Davies, 2008):

(1) *We need to hire <u>an extra pair of hands</u>, but we can't pay him much.*

(2) *Remember to take <u>the pill</u> every day is just a pain in the neck.*

Both examples are extracted from the Corpus of Contemporary American English, but they also are classic examples of metonymies in the literature. Example (2) is for instance used by Radden and Kövecses (1999, p. 34), to support that taxonomies can metaphorically be understood as part–whole structures following Lakoff (1987, p. 287). However it can be argued that using language-specific meta-metaphors to identify a type of figurative expression at the conceptual level may be risky. Both examples are analyzed through the proposed semantic tests to illustrate why taxonomy cannot be confused with partonomy at the conceptual level.

1. X = hand, Y = person

   a.   Partonomy test:
      i.   *hands are parts of a person*
      ii. *hands are parts of persons*
      iii. *a hand is part of a person*
      iv. *a hand is a part of a person*

      Conclusion: X (vehicle) and Y (target) are partonomically related in the expression *an extra pair of hands* in (1).

   b.   Taxonomy test:
      i.   **hands are a type of person*
      ii. **hands are persons*
      iii. **a hand is a kind of person*
      iv. **a hand is a person*

      Conclusion: X (vehicle) and Y (target) are not taxonomically related in the expression *an extra pair of hands* in (1).

2.   X = birth control pill, Y = pill

    a.   Taxonomy test:
       i.   *birth control pills are a type of pill*
      ii.   *birth control pills are pills*
     iii.   *a birth control pill is a kind of pill*
     iv.   *a birth control pill is a pill*

    Conclusion: X (target) and Y (vehicle) are taxonomically related in the expression *take the pill* in (2).

    b.   Partonomy test:
       i.   **birth control pills are parts of a pill*
      ii.   **birth control pills are parts of pills*
     iii.   **a birth control pill is part of a pill*
     iv.   **a birth control pill is a part of a pill*

    Conclusion: X (target) and Y (vehicle) are not partonomically related in the expression *take the pill* in (2).

At the linguistic level, it would be acceptable to say that *birth control pills are part of pills* in the sense of the expression *part of* that means *part of the category of*. But this Anglo-specific affordance is not preserved at the conceptual level: partonomy and taxonomy are distinct conceptual organizations. As a result, meta-explanations that have to be valid cross-linguistically cannot maintain this conflation either.

The taxonomy vs. partonomy distinction seems to remain quite unnoticed in the metonymy literature and consequently in the coding schemes of databases, an example of which is to be found in the entry model of the Córdoba Metonymy Database who suggest classifying CATEGORY FOR MEMBER metonymies as WHOLE FOR PART metonymies (Barcelona, 2011, p. 20, 2018, p. 45):

> […] WHOLE FOR PART metonymies such as *the pill has reduced the birth rate in many countries* (PILL [CATEGORY] FOR BIRTH CONTROL PILL [MEMBER]; a member is a distinct part of a category, which is the relevant whole in this case).

Accordingly, the value of *the birth control pill* example for the generic level of field 2 of the Córdoba Metonymy Database entry model (see Barcelona, 2018) would be WHOLE FOR PART. Regarding the arguments presented above in support of a clear distinction between 'part–whole relations' and 'category-member relations' it would perhaps be preferable to add a CATEGORY FOR MEMBER value for the generic level of field 2. In fact, the taxonomy vs. partonomy distinction is already well implemented in the hierarchical structure of the coding scheme of the Córdoba Metonymy Database. Barcelona, (2018, p. 37; this volume) explains that the former 2013 model has been updated because "one of the deficiencies was the mixing

of a taxonomic ("kind of") hierarchy with a meronymic ("part of") hierarchy". It would therefore be relevant to implement this distinction for the values of the generic level of field 2 as well.

2.3 Partonomy is not possession

'Partonomy' and 'possession' can be conflated at the linguistic level in French in expressions like Det N *a* Det N in (3) and (4).

(3) *Cet homme a une grosse tête.* ('This man has a big head')

(4) *Cet homme a une voiture toute neuve* ('This man has a brand-new car')

In French then, the construction [Det N *a* Det N] is neutral with respect to 'possession' and 'part–whole relation' at the conceptual level. In other words, French speakers can use the same linguistic expression to refer to two distinct experiential phenomena (i.e., partonomy and possession). Experientially, it is quite straightforward that the experience of 'having a head', and the experience of 'having a car' is different. This experiential distinction is actually marked in about 18% of the world languages according to the World Atlas of Language Structures (Dryer and Haspelmath, 2013), and as illustrated in Paamese in (5) and (6).

(5) *Vatu-k*
    body-1SG
    'my head'

(6) *Vakili   ona-k*
    canoe   POSS-1SG
    'my canoe'

In Paamese, the forms of possessive constructions systematically correspond to the experiential distance between the possessor and the possessum via diagrammatic iconicity (Devylder, 2018). This means that the *experiential* distinction between 'having body parts' (i.e., partonomy), and 'having a vehicle' (possession) is also *formally* distinct (i.e., N-1SG vs. N POSS-1SG) in Paamese. This form-meaning mapping is what is commonly known as *(in)alienable possessions* in the literature (Chappel & McGregor, 1996) and which is actually quite a misleading term that can give way to circularity.[2]

Partonomy and possession can be conflated (e.g., in the French construction [Det N a Det N]) or distributed (e.g., in Paamese in (5–6)) at the linguistic level,

---

2. See Devylder (2018: 317–318) for a discussion on the circularity of the notion of inalienability as traditionally defined in the literature.

but they are always distinct at the experiential level. This distinction should thus be reflected in the coding scheme of databases, particularly if they mean not to exclude the languages that do mark the experiential distinction.

Consider that as a contributor to a database or repository of figurative language we have to code the two following entries (Davies, 2008):

(7)   *You really should stop applauding because you give me* <u>*a big head*</u>.

(8)   *Now he's driving a car and wondering what hit* <u>*him*</u>.

According to Langacker (2009), the profile/active-zone discrepancy of (8) would qualify this expression as a grammatical metonymy. We understand from the context of the utterance that it is the driver's car that was hit, not the driver himself. To qualify the metonymy in (8) as a part–whole type of metonymy would be problematic because the car that was hit is not experientially 'part of' the driver but 'possessed' by him. Comparatively in (7), the conceptual relation between 'head' and 'person' is partonomic, because the experience of 'having a head as a person' is based on a part–whole structure.

The MetaNet project makes a clear distinction between the part–whole frame and the possession frame, which allows defining the nature of their relation without conflating the distinct experiential phenomena. However, one specific conceptual metaphor the mapping of which is coined as WHOLES ARE POSSESSORS – in the latest version of the model (October 2014) – could be problematic. Example (9) is listed in the repository as a linguistic instantiation of the conceptual mapping where 'possession' is the source frame and 'part–whole' is the target frame.

(9)   *The eye* <u>*possesses*</u> *several parts*.

At the linguistic level, the 'eye' can indeed be expressed in English as *a possessor of several parts* as attested in (9). But at the conceptual level (i.e., at the extra-linguistic/pre-predicative level where *conceptual* metaphors dwell) do we really experience our eyes as 'possessors' of a pupil and an iris in the way that we experience a car we just bought? An eye *possessing* parts is a semantic extension of the English verb *to possess* to refer to a 'part–whole' relation at the linguistic level, similarly to the French Examples (3–4) analyzed above, but there is no possible confusion of the phenomena of 'possession' and 'partonomy' in experience. These are two distinct experiential phenomena that are not "mapped onto each other" at the conceptual level contrary to what the conceptual mapping WHOLES ARE POSSESSORS implies.

Another reason why the conceptual mapping is problematic has to do with the language specificity of the semantic extension found in the linguistic term *to possess*. The verb can conflate both meanings of 'possessions' (e.g., as in *the organization possesses real estates overseas*) and of 'partonomy' in (9), but for example

the French verb *posséder* does not allow such extension from possession to partonomy of a body part (e.g., *?l'oeil possède plusieurs parties.* 'the eye possesses several parts'). As a result, keeping a language specific conflation in a conceptual mapping that aim at explaining non language-specific phenomena cannot be valid. It should particularly be avoided in a multi-lingual repository of figurative expressions because it would probably substantially lower the inter-rater reliability index of contributors of various L1.

2.4   Partonomy is not containment

The distinction between the container-contained relation and the part–whole relation that can be conflated at the linguistic level but not at the conceptual level can be demonstrated in the same manner as in the two previous sub-sections. When an entity X is linguistically expressed as contained in an entity Y it can indeed entails that X is 'part of' Y at the conceptual level as expressed in (10), but it does not have to as in (11).

(10)   *El cerebro està en la cabeza* ('The brain is in the head')

(11)   *Guarda el brócoli en el refrigerador.* ('keep the broccoli in the fridge')

These two Spanish examples show that 'containment' and 'partonomy' can be conflated at the linguistic level. They however remain experientially distinct. Phenomenologically, we do not have any direct experience of our brain as 'contained' in our head partly due to the lack of nociceptors[3] yet we experience it as being a central 'part of us'. Comparatively, we experience the food in the fridge as 'contained in it', yet not conceptually 'part of it'. Hence the relevance of making a distinction between partonomy and containment at the conceptual level so that examples such as (12) and (13) can be unambiguously coded as two distinct types of metonymy.

(12)   <u>*El cerebro*</u> *de una violentísima banda criminal.* ('the head of a violent crime syndicate')

(13)   *Tu veux boire <u>un verre</u>?* ('do you want a drink')

Cerebro, in (12) literally 'brain' in Spanish, but metonymically referring to the leader of the violent gang would be coded as a part–whole type, whereas *un verre*, in (13) literally 'a glass' in French, but metonymically referring to the beverage 'contained' in it, would be coded as a containment type, which could not be a subtype of part–whole metonymies.

---

3.   i.e., pain receptors.

2.5   Partonomy is not contiguity

"Contiguity has always constituted the definitional core of metonymy" write Peirsman and Geeraerts (2006b, p. 278), who also assume that "the prototypical spatial contiguity relation is constituted by part–whole contiguity and that all other metonymical patterns are related to it" (*ibid*). In contrast, Sonesson (2010, p. 155) makes a clear distinction between contiguity and factorality (that we call partonomy in this chapter):

> Each time two objects are perceived together in space, there is contiguity; and each time something is seen to be a part of something else, or to be a whole made up of many parts, there is factorality (as defined in Sonesson 1989).

Peirsman and Geeraerts (*ibid*) assume Dirven's (2002, p. 88) definition of contiguity, which nuances the referential aspect of the "referential contiguity" linguistic tradition (Norrick, 1981), "stressing that the relations that lie at the basis of metonymic shifts of meaning are not just objectively given, but rely on a process of construal" (Peirsman & Geeraerts, 2006b, p. 273). Peirsman and Geeraerts (*ibid*) nonetheless admit that "[a]fter all, the concept of contiguity is no less vague than that of domain or domain matrix". Peirsman and Geeraerts' (*ibid*) prototypical model as well as Seto's (1999) classification of metonymy that define contiguity as constituted by part–whole relations are used as a starting point for the following discussion. But first, we can start with this simple and straightforward definition of experiential contiguity:

1. Contiguity is the relation between X and Y, when X and Y are either perceived spatially or temporally next to each other.
2. Being "next to each other" spatially or temporally requires X and Y to be experienced in direct contact in space or in direct succession in time.

The conceptual conflation of partonomy and contiguity proposed by Peirsman and Geeraerts (2006b, p. 278) echoes the classification of Seto (1999), who Peirsman and Geeraerts cite as an influential reference to their model. Seto makes the following claims:

1. "partonomy is based on the perception of contiguity in the real world" (Seto, 1999, p. 94)
2. "partonomy is just one of several contiguous relations" (*ibid*, p. 95).

In stark contrast to Seto's and Peirsman and Geeraerts, I propose that contiguity and partonomy are not only distinct but also two mutually exclusive experiential phenomena. First, partonomies have a hierarchical structure whereas contiguities do not. Two simple examples can be recruited to illustrate this point. For example,

'the blade of a knife' can be described as 'a part of a knife', but not contiguous to it. If we understand two spatially attached entities as 'contiguous' then the blade of a knife is not "attached to the knife", as there is no knife without a handle, hence the 'blade' would be attached to the 'handle' not to the 'knife'. A part of a whole (e.g., the blade of a knife) can be contiguous to another part of the same whole (e.g., the handle of a knife) but neither parts are contiguous to the knife as a whole. Similarly, In English, the construals of the body part terms 'forearm' and 'upper arm' are connected by a symmetrical and non-hierarchical relation of contiguity: both segments are contiguous to each other without any hierarchical configuration. In contrast, the body part terms referring to the 'forearm' and the 'arm' are connected by an asymmetrical and hierarchical relation of partonomy: the 'forearm' is part of the 'arm', but the 'arm' is not part of the 'forearm'. In sum, many objects of our immediate environment are experienced as contiguous (e.g., the piano seat is contiguous to the piano) and not part of each other. On the other hand, those who are perceived as part of each other (e.g., the keys of the piano and the piano as a whole functional music instrument) are not contiguous.

The distinction between contiguity and partonomy is important in the analysis of figurative expressions such as metaphors and metonymies. Consider the two following expressions for instance:

(14)   _The kettle is boiling_.

(15)   _My phone died_.

As Seto (1999, p. 95) rightfully points it out, the water (target domain) is not part of the kettle (vehicle) in (14). It is just perceived as spatially contiguous to it as well as contained in it. In (15), the target domain is the 'battery', which is part of the vehicle 'phone' but not contiguous to it: a phone battery is spatially contiguous to other parts of the phone like the SIM-card for instance, but it does not make sense to say that a battery is contiguous to the phone as a whole, because that whole functional phone is _composed_ of its parts (battery, SIM-card, screen, and so on).

The contiguity vs. partonomy distinction is further supported by experimental data. Devylder et al. (_forthcoming_) asked 90 speakers of French, Indonesian, and Japanese to describe a set of stimuli depicting people who were injured with cuts on various location of their bodies. French speakers never described the stimuli illustrating a cut on the 'upper arm' as a cut on the 'forearm': what affects X does not affect Y, if X and Y are contiguous. Contrastively, French speakers would alternatively describe a cut on the 'forearm' also as a cut on the 'arm': what affects X affects Y, if X and Y are connected by a part–whole relation. Moreover, French and Japanese speakers never described a cut on the 'hand', as a cut on the

'arm': the conceptualization of the segment 'hand' in French and Japanese (*main* and *te*, respectively) is contiguous to the conceptualization of the segment 'arm' (*bras* and *ude*) and as a result cannot be connected by a part–whole relation.

Moreover, it is important to note – in relation to the distinction of experiential vs. linguistic levels that has been emphasized in this section – that we human beings, who speak different languages, do not necessarily have the words corresponding to our shared bodily experience of partonomy (as evidenced by de Vignemont et al., 2009, discussed in Section 4). Even though French speakers do not have a word for 'upper arm', they still experience their 'upper arms' as a functional bundle of muscles, bones, tendons and nerves that operates within a larger whole of flesh and bones, 'the arms', of which 'the upper arms' are parts. Similarly, in the task designed by Devylder et al. (*ibid*), the descriptions of Indonesian speakers who used the same word (*tangan*[4]) to describe a cut that was located both on the 'hand' and on the 'forearm' do not necessarily indicate that Indonesians have no notion of the experiential boundary of the wrist that is linguistically marked in French and in Japanese. In fact, another study run by Devylder, Bracks, Shimotori, and Siahaan (*forthcoming*) consisting of an elaborated version of the body coloring task designed by Majid and Van Staden (2015) provides non-linguistic evidence that Indonesian speakers do perceive a boundary between 'hand' and 'wrist' even though the word *tangan* collapses both segments. In brief, the video-recordings of the coloring performances show that a vast majority of the Indonesian participants mark a pause and lift up their pen at 'the wrist' when asked to color in what the word *tangan* refers to, thus indicating the existence of an experiential discontinuity that contrasts with the linguistic continuity marked by the term *tangan*. We observed the same phenomenon for the Indonesian term *kaki* and the Japanese term *ashi* that both collapse the distinction between 'leg' and 'foot'. These finding supports the claim according to which there is no simple one-to-one mapping between the experience of body parts and their language-specific lexicons as claimed by Majid and van Staden (2015, pp. 586–587) already quoted above.

The partonomy vs. contiguity distinction is also particularly necessary to explicate the Jahai categorization of the body and provides an example of a language that only marks contiguity of distinct body parts but not part–whole hierarchy. As Burenhult (2006, p. 178) explains, the Jahai system of simplex body part terms is characterized by 'hierachy avoidance', which means for example that there is no linguistic device to express a "part of" relationship:

---

4.   In Indonesian, *tangan* collapses both 'the hand' and 'arm' segment as is the case in many languages like Croatian, Russian, Kinyarwanda, and others.

> In Jahai this may be particularly evident in the terms for wrist and ankle-joint, where a single term *krīl* is optionally made specific by means of a modifier denoting hand or foot. However, the *krīl* as such is never described or indicated as part of the hand or foot; the association seems to be entirely based on contiguity.

Burenhult (*ibid*) and most of the literature on body part representation (e.g., Majid et al., 2006) make a clear distinction between body units that are *spatially* or *partonomically* expressed in language: "for all we know, most of the complex body part terms in Jahai may have such a spatial rather than 'part of' relation between their components".

In sum, partonomy and contiguity are two distinct experiential phenomena, and regarding the above arguments, it seems quite mistaken to claim that "partonomy is just one of several contiguous relations" (Seto, 1999, p. 95), or to position partonomy at the center of a prototypical model based on contiguity (Peirsman & Geeraerts, 2006).

To summarize Section 2, I hope to have brought up to the attention of the reader the need to take into consideration a number of points in the definition of partonomy that all find their source in the distinction of language and experience. Their distinction does not entail that linguistic and experiential phenomena never intersect – they clearly do – but they do not systematically map onto each other on a one-to-one basis and should therefore not be confused at a meta-linguistic level. These proposed adjustments have practical applications for the analysis of meaning in general and specifically for the coding scheme of a database that includes figures of speech that are often structured by part–whole relations. The ambitious enterprise of building such repositories requires that its contributors agree as much as possible with each other when they enter and code a part–whole metonymy in the database. It is of course a much easier task to point out how a model or a coding scheme can be improved rather than actually designing and implementing it. The purpose of this section was to contribute in making future inter-rater reliability indexes score higher when coding a part–whole metonymy entry, nothing more. To pursue that goal a step further, I now suggest making a distinction between two different kinds of whole. This distinction is relevant notably for the grammatical part–whole metonymies found at the clause level.

3.   Two different kinds of whole

There are at least two different kinds of whole, which I suggest to call *Gestalt wholes* and *componential wholes*. The terms are directly inspired from Talmy's (1988, 2000, p. 78) own distinction between the *Gestalt level of synthesis* and *componential level of synthesis*, yet the two distinctions differ, hence the need for a slightly

different terminology. Talmy (2000, p. 78) describes the result of a componential level of synthesis as an "unsynthesized multiplexity of independent elements", but "multiplexity" suggests that the synthesizing process only applies to homeomerous[5] parts, which fits Talmy's illustrating example (i.e., "a cluster of trees"), but not all part–whole relations (e.g., parts of the body are of different kinds). The proposed distinction is also related to a number of other existing approaches in the CL literature, which I could not however employ as such in this paper, for they never exactly describe the phenomenon identified in this section. It is nonetheless important to note that the Gestalt vs. componential distinction is related to, yet distinct from, Lakoff's (1987, p. 442) *MASS vs. MULTIPLEX* schemas, Jackendoff's (1991, p. 20) *substances* vs. *aggregates*, and from Langacker's (2008, pp. 571–572) *summary* vs. *sequential scanning* to a certain extent. The distinction I propose here is for instance much closer to Ruiz di Mendoza and Peña's (2009) interpretation of Lakoff's *MASS to MULTIPLEX image schema transformation*, and also to Sonesson's (2013, p. 537) *configurations* vs. *structures* on the pre-linguistic level. The (un)boundedness of entities seems to be a crucial criterion in characterizing metonymies (e.g., Peirsman & Geeraerts, 2006; Ruiz de Mendoza & Peña, 2009), but it does not correspond to the distinction proposed below since both wholes have clear boundaries and are thus both bounded. The boundedness criterion may however be observed as a distinctive feature in their relative internal structure, particularly when each kind of whole are "destructured": the componential wholes decompose into 'parts' (i.e., clearly bounded units), whereas Gestalt wholes breaks into 'pieces' (i.e., units with arbitrary boundaries). Here are two suggested definitions for componential wholes and Gestalt wholes:

A *componential whole* is a structure constituted by its parts, which are organized in a specific way in relation to their whole, and in relation to one another within the whole.

In contrast, a *Gestalt whole* is an entity holistically conceptualized in a way that does not allow access to the elements it is made of as 'parts'.

Since these definitions refer to quite abstract concepts, the two following pictorial representations in Figure 1 may help visualizing the distinction.

---

5.   "Homeomerous parts are the same kind of thing as their wholes, for example, (*slice-pie*), while nonhomeomerous parts are different from their wholes, for example, (*tree-forest*)" (Winston et al., 1987, p. 420).

a.   Gestalt whole   b.   Componential whole
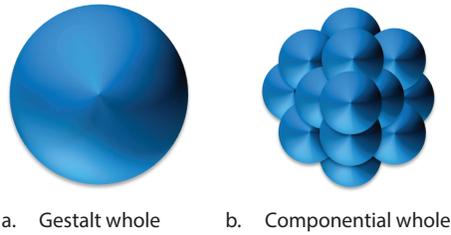
Figure 1. The Gestalt whole vs. componential whole distinction

The distinction between these two kinds of whole appears quite clearly when they undergo a separation event, as each kind of whole separates in different ways, and into different kinds of result. On the one hand, a componential whole can be – physically and experientially – separated into its different parts. For instance, a bike can be decomposed into a saddle, two wheels, handlebars, and so on. These separated units can be conceptualized as *parts* of the bike in a strict sense since they are both functional to their whole and have non-arbitrary boundaries (Cruse, 1986, p. 157; Winston et al., 1987, p. 422; Cruse, 2002, p. 248; Croft & Cruse, 2004, p. 151; Vieu & Aurnague, 2007). On the other hand, a Gestalt whole cannot be decomposed – physically or experientially – into functional and non-arbitrary bounded parts, since by the above-proposed definition, it is *holistically* (vs. *componentially*) "synthesized" (Talmy, 2000, p. 78). In the scope of a Gestalt whole it is not even relevant to refer to its non-accessible parts, since a Gestalt whole excludes the notion of 'part' by the definition proposed above. It does not mean that a Gestalt whole cannot undergo separation events, but that the results of a separation event affecting a Gestalt whole are 'pieces', not 'parts'.

Typical separation events of an object conceptualized as a Gestalt whole are breaking events. As Cruse (2002, p. 248) explains: "not all portions of an object qualify as parts: a glass jug dropped on a stone floor does not break up into parts, but into pieces." Two different kinds of synthesis (at the conceptual level) are sometimes constrained by the verbal semantics of specific verbs like *cut* or *break* (at the linguistic level) (Devylder, 2017). The verbal semantics of *break* can only code for a conceptualization of the affected figure as a *Gestalt whole*, while the verbal semantics of *cut* allow both conceptualizations (*Gestalt* or *componential*). English precisely captures this distinction as evidenced by the (un)availability for certain argument structure alternations (16–17).

(16) a.   *I cut my finger*
      b.   *I cut <u>myself</u>*

(17) a.   *I broke my finger*
      b.   **I broke <u>myself</u>*

It is because the semantics of certain verbs like *break* constrains the conceptualizer to construe the affected figure as a Gestalt whole that (17b) cannot refer to any conceivable situations. Indeed a "broken Gestalt whole" – whether it is a finger or a jug – is affected in its *integrity* in contrast to a 'cut componential whole'. Cutting events like the one referred to in (16) do not constrain the conceptualizer to construe the figure to be affected in its integrity: we naturally make sense out of the *discrepancy* (Langacker, 2009, p. 50) between the profile (Self as a whole) and the active-zone (finger as a part) in (16b) because (16a) codes for a componential level of synthesis, i.e., the human body structured as a whole composed of body parts. From there, it is then possible to conceptualize that what affects the part (i.e., 'my finger') affects the whole (i.e., 'myself'), which in other words is a *synecdochic process*, if we assume synecdoches to be the metonymy sub-types characterized by a mereological semantic transfer. The synecdochic process is blocked in expressions like (17) because synecdoches involve the construal of parts, and there is no such configuration to begin with within the Gestalt holistic conceptualization of an object. This is the case for *a broken finger*, where the break verb imposes to conceptualize the affected figure as a Gestalt whole. In other words, the breaking event described in (17) affects the figure (the finger) in its integrity, and as a whole in itself: the fact that a finger is a body part is irrelevant in the conceptualization imposed by the constraints of a breaking expression like (17).

It is important to note that these two different kinds of whole correspond to two different ways of experiencing an entity as a whole, but not necessarily to two different kinds of entity. In other words, the same entity (e.g., a salad, a coffee cup, a finger) can alternatively be experienced and linguistically referred to as a Gestalt whole and as a componential whole. Think for example of a salad made of tomatoes and lettuce. When one says, *I ate half the salad*, the speaker does not prototypically mean they only ate 'the lettuce', leaving the 'tomatoes' on the side. The rather uncontroversial interpretation of this sentence indicates that the entity referred to here is conceptualized as an undifferentiated Gestalt whole. However, the exact same salad may also be conceptualized as made of the components 'tomatoes' and 'lettuce' (in the context of a recipe for instance) and would thus be constituted as a componential whole. Both componential wholes and Gestalt wholes are wholes; they are just synthesized in distinct ways. As mentioned above, when these two kinds of wholes undergo a separation, the results of this separation are at least of two different kinds: 'pieces' for Gestalt wholes, and 'parts' for componential wholes.

4.   The embodied origin of part–whole relations

For the past thirty years cognitive linguistics has evolved in different ways, which may challenge the integrity of the discipline (Divjak, Levshina, & Klavan, 2016).

What still seems to hold the temple together however, is the credo that language is not an autonomous cognitive faculty, and that language and cognition are embodied. The understanding of metonymy and the part–whole relation from a CL perspective therefore also assumes these principles (Lakoff & Johnson, 1980, p. 39; Kövecses, 2006, p. 209; Barcelona, 2011, p. 8; Brdar-Szabó & Brdar, 2012, p. 728; Zhang, 2016). Indeed Lakoff (1987, pp. 273–274) argues that the part–whole schema is embodied because:

> We are whole beings with parts that we can manipulate. Our entire lives are spent with an *awareness* of both our wholeness and our parts. We *experience* our bodies as WHOLES with PARTS [my emphasis].

Kövecses (2006, p. 209) gives a substantially similar account of the origin of the part–whole relation:

> The most obvious bodily *experience* that led to the existence of this [part–whole] schema is that we *experience* ourselves as wholes with parts. We conceive of our body as parts of the larger whole that we are [my emphasis].

The – unnamed – phenomenological approach of Lakoff and Kövecses who both turn to the *experience* of the body to explain the origin of part–whole relation at the conceptual level is intuitively convincing. I suggest to detail and support this phenomenological analysis with the complementary perspective and methods of cognitive science as presented in a study by de Vignemont, Majid, Jola, and Haggard (2009).

The authors address the question of body mereology, that is, the segmentation of the body into parts from the perspective of primary sensorimotor mechanisms of the body. What in the experience of our body prompts us to experience it as a whole made of parts, and what sets the boundaries of these parts? De Vignemont et al. (2009, p. 502) make three assumptions, which are thoroughly tested with four experiments:

> the segmentation of the body into parts may partly derive from the organization of the somatosensory system, the organization of the motor systems, or from extrinsic perceptual factors such as visual discontinuities.

In other words, body mereology come from the way we *sense* our bodies through our complex tactile system, which captures information from the sense of *touch*. Segmenting our bodies into parts also come from our motor experience. That is, the experience of our body when it is in motion. De Vignemont et al. (2009, p. 503) therefore respectively test two systems, which potentially shape the experience of our body as a whole made of parts: *somatosensory mereology* and *motor mereology*.

Somatosensory mereology consists of the information captured by our somatosensory system (i.e., the sense of *touch*), which is then mereologically processed. According to de Vignemont et al. (2009, p. 502): "tactile sensation arises

from receptors in the skin, which form a continuous sensory sheet covering the entire body and is considered a single sense organ". The continuous tactile field of the skin would therefore suggest that we sense our body as a continuous and undifferentiated whole, as opposed to a whole segmented into parts. However, the authors show that *joints* are anatomical landmarks, which structure this continuous field. De Vignemont et al. (2009, pp. 510–511) reach that conclusion when they observe that the same distance between two tactile stimuli is sensed as being greater when the two stimuli are on distinct body parts (i.e., separated by a joint, for instance *the wrist*) than when located on the same body part (e.g., the forearm): "in distance judgment, the joint delineates body parts leading to a 'category boundary effect'". Moreover, the results of the study show that this sensorial segmentation is intrinsically *tactile* and not cross-modal (i.e., *tactile information* completed *by visual information*) as it was first hypothesized.

On the other hand, motor mereology refers to the information being captured by our motor system and then mereologically processed. In brief, it could be summarized as "our bodily experience through action". At first one would think that motor experience is what leads us to segment our bodies into clearly identified parts because muscles are discrete units with clear boundaries. Surprisingly, it is however quite the opposite because "very few actions involve a single muscle alone: muscles work in functional groups to achieve actions" (*ibid*, p. 503). De Vignemont, Majid, Jola, and Haggard (*ibid*, p. 511) therefore conclude "action produces a distributed and integrated experience of the body, linking together the body parts involved in motor synergies". Furthermore, the study demonstrates that action (i.e., the motor system) reduces the boundary effect induced by the somatosensory system.

To briefly sum up this compelling study, de Vignemont et al. (2009, p. 510–511) clearly identify two systems that shape the mereological experience of our body: the somatosensory system and the motor system. On the one hand *somatosensory mereology* […] "relies on a structured description of the body, categorically organized. The joints play the role of body landmarks. In distance judgment, the joint delineates body parts leading to a 'category boundary effect'" (*ibid*, 510–511). On the other hand, and in contrast *motor mereology* "relies on a more unified and consistent representation of the body […] action produces a distributed and integrated experience of the body, linking together the body parts involved in motor synergies" (*ibid*).

All in all, de Vignemont et al. (2009, p. 511) conclude that "the mereology of the sensing body and the mereology of the acting body appear to have the functions of differentiating and grouping parts, respectively". To refer back to the distinction between partonomy and contiguity in 2.5, this study suggests that these two cognitive processes are also distinct and interacting in the experience of our

body. Furthermore, according to the distinction and definition of the two different kinds of whole in Section 3, and following de Vignemont et al.'s (2009) findings, an interesting question could be asked. If on the one hand, the experience of our bodies, and more precisely our somatosensory and motor experience, is indeed the source of this pervasive cognitive process that makes us experience objects as wholes and parts, and if on the other hand somatosensory mereology and motor experience give way to two different kinds of mereology – respectively segmenting the whole body into parts, and unifying distinct units involved in motor synergies into functional wholes – then could not this somatosensory / motor dual experience be the embodied origin of the distinction between *componential wholes* and *Gestalt wholes*? This question is perhaps worthy of further investigation.

5.   Summary and conclusion

This chapter aimed at making a theoretical contribution to the analysis of part–whole relations in language and experience, which have crucial empirical applications in the analysis of meaning in general, and in the design of repositories of figurative language in particular. Clarifying the distinction between the experiential level and the linguistic level, going toward a sharper definition of the part–whole relation, and providing a more detailed hypothesis on its embodied origin matters very much for further research on figurative language. Similarly, to the point raised by Bouveret and Sweetser (2009, p. 57) about identifying what exact frames are being mapped in figurative cutting and breaking expressions and by Sullivan (2007) in her analysis of the LIGHT IS INTELLIGENCE overarching conceptual metaphor, this contribution supports that a fine-grained identification of the components of meaning are all the more necessary to take into account for the study of figurative language.

The theoretical adjustments, further distinctions, and detailed account of the embodied origin of the part–whole relation that I have proposed in this chapter have methodological applications in the analysis of figurative meaning in general and in the design of building repositories of figurative expressions in particular. Since partonomy, taxonomy, possession, containment, and contiguity are clearly distinct experiential phenomena, which can be conflated or distributed in linguistic expressions, they cannot be organized in dependent hierarchical relations to each other. Concretely, this proposition implies that in the design of an annotation scheme, these distinct experiential types are organized as distinct conceptual types on the same hierarchical level. So, for example, containment metonymies cannot just be marked as subtypes of part–whole metonymies, because some expressions that are build upon a 'containment' type of relation do not necessarily involve a

partonomic structure (e.g., *the kettle is boiling*). It would therefore be problematic for the contributors of databases to be limited (by the coding scheme) to annotate some entries as both structured by a part whole relation and a containment relation if that is not the case. By situating these five types of experiential phenomena on the same level of the coding scheme, database entries could then be marked as expressions combining two or more conceptual relations, but it would also leave the option of coding expressions as only structured by one of these types independently of the other. In sum, a "flat" hierarchical organization of these distinct conceptual structures would allow to account for both patterns of their conflation and distribution in figurative expressions.[6]

Of course, this "horizontal" structure should be enriched by a "vertical" and implicational structure within each type as there are for examples many different kinds of part–whole relations (e.g., component-whole, portion-whole, stuff-object, etc.) as described in Devylder (2016). The Gestalt vs componential whole distinction would then appear quite useful to implement this implicational structure within the coding scheme of a database.

The taxonomic depth and hierarchical structure of the coding scheme that are proposed in this chapter would make the annotation of figurative expressions more valid cross linguistically, and potentially reveal detailed shared patterns and variations in the structure of figurative language. More generally the theoretical and methodological propositions can contribute to a better understanding of the intricate relations at work between sensorimotor experience, cognitive processing, and figurative language.

References

Barcelona, A. (2011). Reviewing the properties and prototype structure of metonymy. In R. Benczes, A. Barcelona, & F. J. Ruiz de Mendoza Ibáñez (Eds.), *Defining metonymy in cognitive linguistics: towards a consensus view* (pp. 7–58). Amsterdam: John Benjamins Publishing Company. https://doi.org/10.1075/hcp.28.02bar

Barcelona, A. (2018). General description of the metonymy database in the Córdoba project, with particular attention to the issues of hierarchy, prototypicality, and taxonomic domains. In O. Blanco-Carrión, A. Barcelona, & R. Pannain (Éds), *Conceptual metonymy: Methodological, theoretical, and descriptive issues*, 27–54.

---

6.   It must however be noted that this chapter has only focused on the relation between partonomy and the other four experiential phenomena. It has not analyzed the relations among the other four experiential phenomena (e.g. containment and contiguity), which must be further investigated.

Barcelona, A., & Ruiz de Mendoza Ibáñez, F. J. (2015). *Bibliography of metaphor and metonymy*. Amsterdam: John Benjamins Publishing Company.

Blomberg, J., & Zlatev, J. (2014). Actual and non-actual motion: why experientialist semantics needs phenomenology (and vice versa). *Phenomenology and the Cognitive Sciences*, 13(3), 395–418. https://doi.org/10.1007/s11097-013-9299-x

Bouveret, M., & Sweetser, E. (2009). Multi-frame semantics, metaphoric extensions, and grammar. In Kwon, I., H. Pritchette, & J. Spence (Eds.), *Thirty-fifth annual meeting of the Berkeley Linguistics Society (BLS)* (pp. 49–59). Berkeley: Berkeley Linguistics Society.

Brdar-Szabó, R., & Brdar, M. (2012). The problem of data in the cognitive linguistic research on metonymy: A cross-linguistic perspective. *Language Sciences*, 34, 728–745. https://doi.org/10.1016/j.langsci.2012.04.012

Burenhult, N. (2006). Body part terms in Jahai. *Language Sciences,* 28(2–3), 162–180.

Chappell, H., & McGregor, W. (1996). *The grammar of inalienability: A typological perspective on body part terms and the part–whole relation*. Berlin: Mouton de Gruyter. https://doi.org/10.1515/9783110822137

Cruse, D. A. (1979). On the transitivity of the part–whole relation. *Journal of Linguistics*, 15, 29–38. https://doi.org/10.1017/S0022226700013086

Cruse, D. A. (1986). *Lexical semantics*. Cambridge: Cambridge University Press.

Cruse, D. A. (2002). The Lexicon. In M. Aronoff, & J. Rees-Miller (Eds.), *The handbook of linguistics*. Oxford: Blackwell.

Croft, W., & Cruse, D. A. (2004). *Cognitive linguistics*. Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9780511803864

Davies, M. (2008). The Corpus of Contemporary American English (COCA): 560 million words, 1990-present. Available online at https://corpus.byu.edu/coca/.

Dermot, M. (2005). *Edmund Husserl: founder of phenomenology*. Cambridge: Polity.

Devylder, S. (2016). The PART–WHOLE schema we live through: a cognitive linguistic analysis of part–whole expressions of the Self. Doctoral dissertation. Retrieved from theses.fr. (Accession No. s73829).

Devylder, S. (2017). Cutting and breaking the embodied self. *CogniTextes*, 15. Retrieved from http://cognitextes.revues.org.

Devylder, S. (2018). Diagrammatic iconicity explains asymmetries in Paamese possessive constructions. *Cognitive Linguistics*, 29(2), 313–348. https://doi.org/10.1515/cog-2017-0058

Devylder, S., Bracks, C., Shimotori, M., & Siahaan, P. (2019). *Carving the Body at Its Joints: Crossing Boundaries between the Language and Cognition of Body Categorization*. Manuscript submitted for publication.

Divjak, D., Levshina, N., & Klavan, J. (2016). Cognitive linguistics: Looking back, looking forward. *Cognitive Linguistics*, 27(4), 447–463. https://doi.org/10.1515/cog-2016-0095

de Vignemont, F. (2011). Embodiment, ownership and disownership. *Consciousness and Cognition*, 20(1), 82–93. https://doi.org/10.1016/j.concog.2010.09.004

de Vignemont, F., Majid, A., Jola, C., & Haggard, P. (2009). Segmenting the body into parts: evidence from biases in tactile perception. *The Quarterly Journal of Experimental Psychology*, 62(3), 500–512. https://doi.org/10.1080/17470210802000802

Dirven, R. (2002). Metonymy and metaphor: Different mental strategies of conceptualization. In Dirven, R., & R. Porings (Eds.), *Metaphor and metonymy in comparison: Metonymy as a prototypical category and contrast* (pp. 75–111). Berlin: Mouton de Gruyter. https://doi.org/10.1515/9783110219197.75

Dodge, E. K., & Lakoff, G. (2005). Image schemas: From linguistic analysis to neural grounding. In B. Hampe (Ed.), *From perception to meaning: Image schemas in cognitive linguistics* (pp. 57–92). Berlin: Mouton de Gruyter. https://doi.org/10.1515/9783110197532.1.57

Dryer, M. S., & Haspelmath, M. (Eds.). 2013. *The world atlas of language structures online*. Leipzig: Max Planck Institute for Evolutionary Anthropology. (Available online at http://wals.info, Accessed on 2017-05-10.)

Enfield, N. J., Majid, A., & Van Staden, M. (2006). Cross-linguistic categorization of the body: Introduction. *Language Sciences*, 28(2), 137–147.
https://doi.org/10.1016/j.langsci.2005.11.001

Gaby, A. R. (2006). The Thaayorre 'true man': Lexicon of the human body in an Australian language. *Language Sciences*, 28, 201–220. https://doi.org/10.1016/j.langsci.2005.11.006

Hampe, B. (2005) (Ed.). *From perception to meaning. Image Schemas in Cognitive Linguistics*. Berlin: Mouton de Gruyter. https://doi.org/10.1515/9783110197532

Husserl, E. (1970a). *The crisis of European sciences and transcendental phenomenology*. An introduction to phenomenological philosophy (D. Carr, Trans.). Evanston: Northwestern University Press (original work published 1954).

Jackendoff, R. (1991). Parts and boundaries. In B. Levin, & S. Pinker (Eds.), *Lexical and conceptual semantics* (pp. 9–45). Cambridge: Blackwell.

Kimmel, M. (2005). Culture regained: Situated and compound image schemas. In B. Hampe (Ed.), *From perception to meaning: Image schemas in cognitive linguistics* (pp. 285–312). Berlin: Mouton de Gruyter. https://doi.org/10.1515/9783110197532.4.285

Kovecses, Z. (2006). *Language, mind, and culture: A practical introduction*. Oxford: Oxford University Press.

Lakoff, G. (1987). *Women, fire and dangerous things: What categories reveal about the mind*. Chicago: The University of Chicago Press. https://doi.org/10.7208/chicago/9780226471013.001.0001

Lakoff, G., & Johnson, M. (1980). *Metaphors we live by*. Chicago: The University of Chicago Press.

Lakoff, G., & Johnson, M. (1999). *Philosophy in the flesh: The embodied mind and its challenge to western thought*. Boston: Basic books.

Langacker, R. W. (2009). Metonymic grammar. In K.-U. Panther, L. Thornburg, & A. Barcelona (Eds.) *Metonymy in grammar* (pp. 45–71). Amsterdam: John Benjamins Publishing Company. https://doi.org/10.1075/hcp.25.04lan

Lyons, J. (1977). *Semantics*. Cambridge: Cambridge University Press.

Lévy-Bruhl, L. (1914). L'expression de la possession dans les langues mélanésiennes. *Mémoire de la Société de Linguistique de Paris* 19(2), 96–104.

Majid, A. (2010). Words for parts of the body. In B. C. Malt, & P. Wolff (Eds.), *Words and the Mind: How words capture human experience* (pp. 58–71). New York: Oxford University Press. https://doi.org/10.1093/acprof:oso/9780195311129.003.0004

Majid, A., & Staden, M. (2015). Can nomenclature for the body be explained by embodiment theories? *Topics in Cognitive Science*, 7(4), 570–594. https://doi.org/10.1111/tops.12159

Majid, A., Enfield, N. J., & van Staden, M. (2006). Parts of the body: Cross-linguistic categorization. *Special issue of Language Sciences*, 28, 137–359.
https://doi.org/10.1016/j.langsci.2005.11.001

Miller, G. A., & Johnson-Laird, P. (1976). *Language and perception*. Harvard: Harvard University Press. https://doi.org/10.4159/harvard.9780674421288

Mittelberg, I. (2018). Gestures as image schemas and force gestalts: A dynamic systems approach augmented with motion-capture data analyses. *Cognitive Semiotics*, 11(1).
https://doi.org/10.1515/cogsem-2018-0002

Norrick, N. R. (1981). *Semiotic principles in semantic theory. Amsterdam studies in the theory and history of linguistic science IV* (Current Issues in Linguistic Theory 20). Amsterdam: John Benjamins Publishing Company. https://doi.org/10.1075/cilt.20

Panther, K.-U., Thornburg, L. L., & Barcelona, A. (Eds.). (2009). *Metonymy and metaphor in grammar* (Vol. 25). Amsterdam: John Benjamins Publishing Company. https://doi.org/10.1075/hcp.25

Peirsman, Y., & Geeraerts, D. (2006). Metonymy as a prototypical category. *Cognitive Linguistics*, 17(3), 269–316. https://doi.org/10.1515/COG.2006.007

Radden, G., & Kövesces, Z. (1999). Towards a theory of metonymy. In K.-U. Panther, & G.Radden (Eds.), *Metonymy in language and thoughts* (pp. 17–60). Amsterdam: John Benjamins Publishing Company. https://doi.org/10.1075/hcp.4.03rad

Rohrer, T. (2005). Image schemata in the brain. In B. Hampe (Ed.), *From Perception to Meaning: Image Schemas in Cognitive Linguistics* (pp. 165–196). Berlin: Mouton de Gruyter. https://doi.org/10.1515/9783110197532.2.165

Ruiz de Mendoza, F. J. 1998. The role of mappings and domains in understanding metonymy. In A. Barcelona (Ed.), *Metaphor and metonymy at the crossroads* (Topics in English Linguistics 4) (pp. 109–132). Berlin: Mouton de Gruyter.

Seto, K. (1999). Distinguishing metonymy from synecdoche. In K.-U. Panther, & G. Radden (Eds.), *Metonymy in language and thought* (pp. 91–120). Amsterdam: John Benjamins Publishing Company. https://doi.org/10.1075/hcp.4.06set

Sokolowski, R. (2000). *Introduction to phenomenology*. Cambridge: Cambridge University Press.

Sonesson, G. (1989). *Pictorial concepts*. Inquiries into the semiotic heritage and its relevance for the visual analysis of the visual world. Chartwell-Bratt Ltd.

Sonesson, G. (1993). The multiple bodies of man. *Project for a semiotics of the body*. Degrés, Bryssel, XXI: 74, été 1993: d1–d42.

Sonesson, G. (2010). Semiosis and the elusive final interpretant of understanding. *Semiotica*, 179(1–4), 145–258. https://doi.org/10.1515/semi.2010.023

Sonesson, G. (2013). Aspects of "physiognomic depiction" in pictures: *From macchia to microgenesis. Culture Psychology*, 19(4), 533–547.https://doi.org/10.1177/1354067X13500329

Sonesson, G. (2016). Lifeworlds: The cognitive semiotics of culture. In D. Dunér, & G. Sonesson (Eds.), *Human lifeworlds: The Cognitive semiotics of cultural evolution* (pp. 23–62). Berlin: Peter Lang Publishing Group.

Stampoulidis, G., & Bolognesi, M. (under review). Bringing metaphors back to the streets: A corpus-based study for the identification and interpretation of rhetorical figures in street art.

Sullivan, K. S. (2007). Frame-based constraints on lexical choice in metaphor. In *Proceedings of the 32nd annual meeting of the Berkeley Linguistics Society* (pp. 375–385). Berkeley, CA: Berkeley Linguistics Society.

Talmy, L. (1988). Force dynamics in language and cognition. *Cognitive Science*, 12, 49–100. https://doi.org/10.1207/s15516709cog1201_2

Talmy, L. (2000a). The fundamental system of spatial schemas in language. In B. Hampe (Ed.), *From perception to meaning: Image schemas in cognitive linguistics* (pp. 37–47). Berlin: Mouton de Gruyter.

Talmy, L. (2000b). *Toward a cognitive semantics: Concept structuring systems*. Cambridge, MA: MIT Press.

Van Staden, M., & Majid, A. (2006). Body colouring task. *Language Sciences*, 28(2), 158–161. https://doi.org/10.1016/j.langsci.2005.11.004

Vieu, L., and Aurnague, M. (2007). Part-of relations, functionality and dependence. In M. Aurnague, M. Hickmann, & L. Vieu (Eds.), *The categorization of spatial entities in language and cognition* (pp. 307–336). Amsterdam: John Benjamins Publishing Company. https://doi.org/10.1075/hcp.20.18vie

Winston, M., Chaffin, R., & Herrmann, D. (1987). A taxonomy of part–whole relations. *Cognitive Science*, 11, 417–444. https://doi.org/10.1207/s15516709cog1104_2

Zhang, W. (2016). *Variation in metonymy: Cross-linguistic, historical and lectal perspectives* (Vol. 59). Walter de Gruyter GmbH & Co KG. https://doi.org/10.1515/9783110455830

Zlatev, J. (2005). What's in a schema? Bodily mimesis and the grounding of language. In B. Hampe (Ed.), *From perception to meaning: Image schemas in cognitive linguistics* (pp. 313–342). Berlin: Mouton de Gruyter. https://doi.org/10.1515/9783110197532.4.313

Zlatev, J. (2016). Turning back to experience in Cognitive Linguistics via phenomenology. *Cognitive Linguistics*, 27(4), 559–572. https://doi.org/10.1515/cog-2016-0057