The Image Schema: A Definition

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Abstract: The common belief among linguists is that the image schemas cannot be defined, except by enumeration only (e.g. Clausner and Croft, 1999). There are two reasons of that impotence: a) total disregard of the prenatal development; b) almost total neglect of the object schema. In a), what is entirely overlooked, is the simultaneous development of the nervous system and the sense of touch from the 7-8th week of g.a. It is obvious that the constant tactile interactions between two physical objects – the foetus and the mother's body – must leave some imprint on the nervous system and the mental structures. For b) physical objects are the only entities which we experience all the time through touch since the 7-8th week of gestation. Objects are also conceptually independent in contrast to conceptually dependent relations. Following Grady's 2005 condition to rule out "schemas that are too general to be associated with any particular type of perceptual experience, or too rich to count as fundamental dimensions of perceptual representation", I have taken the object schema as the basis for formulating a definition of the image schema as "a mental structure with at least one OBJECT image schema, which is a conceptually independent entity representing a physical object whose fundamental property is density experienceable by touch, with ensuing boundedness, shape, size, etc."
Keywords: the object image schema, relational schemas, the sense of touch, the prenatal formation of image schemas.

1. Introduction

Ever since they were first described by Johnson (1987), image schemas have proved difficult to define. Clausner and Croft concluded simply that "[o]ne can define image schematic domains only by enumeration" (1999, p. 21). Oakley posed a number of questions referring to the identity of image schemas: "What counts as an exhaustive image-schematic account of a familiar activity? Is there consensus on the exact number of image schemas? What are the constraints on postulating image schemas?" (2007, p. 229). Indeed, these last two questions should be reversed, since establishing constraints might bring us closer to the question of their number, which is an issue of rather lesser importance. As Johnson remarked, "[t]here is clearly nothing sacred about 253 patterns versus 53 or any other number of patterns…" (1987, p. 126).[1] Oakley's first question

[1] Also Krzeszowski has confirmed that just as it is impossible to determine the number of preconceptual schemas, it is also impossible to determine the number of preschemas (Krzeszowski, 2016, p. 188).

addresses the degree of schematicity and might also be solved if determining criteria could be established. Oakley shared his pessimism with other scholars writing that "[a]t present, I see no widespread agreement on these matters, especially regarding the exact number of image schemas or even regarding the question whether some of the items appearing on Johnson's authoritative list, such as ENABLEMENT, are bona fide image schemas" (Oakley, 2007, p. 222). Though I believe that the identification and definition of image schemas would also allow us to estimate their number, it is not immediately clear to me what purpose such knowledge could serve.

Schematicity was also discussed by Tuggy (2007) who, following Langacker (1987), wrote that schematicity is a relative matter and all concepts are schematic to some degree (2007, p. 84). So conceived schematicity he described in terms of a comparison between a standard and a target, for example, the relation RODENT (standard) → SQUIRREL (target) has a more salient schematicity than the relation THING → SQUIRREL (2007: 86). He explained schematicity as a "transitive" concept encapsulated in a simple logical formula: if A → B and B → C then this logically necessitates that A → C (2007, p. 84); the arrow stands for "is schematic for"). Unfortunately, while this establishes obvious hierarchies, it does not define the image schema as a limited set of schemas of a highly abstract character. Recent studies, for example Mandler and Canovás (2014) who describe image schemas as simple 'spatial stories' built from SPATIAL PRIMITIVES, have not brought us any closer to a solution.

The commonly discussed lists of IMAGE SCHEMAS vary and are quite clearly intuitive, with no coherent criteria except a set of the features which, it is thought, IMAGE SCHEMAS should conform to, such as having an embodied and preconceptual nature, high schematicity, an internal structure, and high flexibility (Hampe, 2005).

The most common experiential basis in those considerations has been space (e.g. Radden, 2005; Mandler and Canovás, 2014). Most linguists have overlooked the fact that space cannot be experienced by touch, sight or hearing, and that the only entities experienceable through the senses are physical objects with density as their main property. In a number of papers, I argued (2000, 2002a, 2002b, 2009, 2011, 2018) that physical objects are fundamental to human cognition,[2] other entities being abstract and dependent on objects. This division into the material and phenomenological worlds is not new. We find quite strong statements on this dichotomy in the works of, for example, Thomas Aquinas (*Summa theologica*), Kotarbiński (1929) and more recently Krzeszowski (1997, 2016).[3] If, as Langacker (1987) argued, all predications designate either conceptually independent 'things' or conceptually dependent 'relations', it is clear

[2] Miller and Johnson-Laird (1976) were quite clear about this issue when they wrote that "Languages are designed to deal with relativistic space; with space relative to the objects that occupy it" (1976, p. 380). With regard to metaphorization I argued (2000 and later works, particularly 2011) for the importance of *objectification*, i.e. metaphorization in terms of physical objects, which are the ultimate source domain. For example, LOVE as a relation can be objectified, as the 'love is blind' example shows, where 'love' is conceptualized as a human object.

[3] See section 4 for more details.

that, though Szwedek's understanding of 'things' as physical objects is different, any consideration of image schemas should be based on physical objects as independent entities.

Bearing this in mind, Grady's (2005) proposal, though vague and general, appears more promising, in that it at least suggests guidelines for a definition of the image schema which, as he wrote, should be determined by ruling out "certain schemas that are too general to be associated with any particular type of perceptual experience, or too rich to count as fundamental dimensions of perceptual representation" (Grady, 2005, p. 35).

The main task in formulating a definition is to "set boundaries" (*Online Etymology Dictionary*). In the case of image schemas, at one end, the cut-off point would be the distinction between image schematic domains and non-imagistic domains (Clausner and Croft 1999: 14), that is such that lack images (Lakoff and Turner, 1989, p. 94ff). At the other end, the task would be to determine the boundary between the most abstract image schemas and other, more concrete schemas. The first boundary seems uncontroversial and has not been really dealt with in the literature in the context of image schemas. Thus, the more difficult problem is to set a boundary between what would be called the most abstract and less abstract (more concrete) image schemas, the former in the sense in which they were introduced by Johnson (1987) and discussed, for example, by Hampe (2005). As I intend to show, such a distinction can be made on the basis of the categorization of physical objects.[4]

It is the aim of the present paper to show that a definition of image schemas must be based on categorization of conceptually independent objects, as such schemas on the one hand cannot be dissociated from some "particular type of perceptual experience", and, on the other hand, are not "too rich to count as fundamental dimensions of perceptual representation" (Grady, 2005, p. 35). I believe that such an approach will lead to establishing a criterion for the identification and definition of image schemas.

In the remainder of the paper I am going to discuss the following issues:

- Hampe's (2005) six features of image schemas, with emphasis on the origin of schemas in the prenatal period and the crucial role of the sense of touch,
- the structure of the physical world,
- the OBJECT schema and its definition,
- relational schemas and the way in which image schemas can be identified and defined,
- again Hampe's criteria in the light of these definitions,
- a few examples based on the new approach.

Conclusions and References will close the paper.

2. Hampe's Features

Taking as a starting point the monographs of Lakoff (1987) and Johnson (1987), Hampe (2005, pp. 1-2) proposed that image schemas are:

[4] As I have demonstrated (2011), all abstract entities, including relations, are metaphorizable as objects, a process referred to by Szwedek as *objectification*.

i) embodied/experiential;
ii) preconceptual;
iii) highly schematic gestalts;
iv) internally structured;
v) highly flexible;
vi) patterns acquired independently of other concepts.

These features are discussed in Szwedek (2018), whose presentation is briefly recapitulated below, with a more extensive discussion of those, which are relevant to the present paper.

2.1. Image Schemas Are Embodied/Experiential

This is the least controversial claim but most research has so far been based on visual experiences in the postnatal period. A fairly typical opinion in this regard is Johnson's view that image schemas "are not tied to any single perceptual modality, though our visual schemas seem to predominate" (1987, p. 25).[5] It is, however, worth noting that, as early as 1987, Lakoff (1987) also mentioned touch as an important sensory experience. Calling on the earlier research of scholars such as Marmor and Zaback, Carpenter and Eisenberg, Zimler and Keenan, and Kerr, he reported that "[w]hen mental imagery experiments are run with the congenitally blind using touch instead of vision, the results are virtually the same as for sighted people, except that people who can see perform the tasks faster" (1987, p. 446). This observation may be taken as yet another argument for the prenatal origin of touch and corresponding schemas.

To expose the unique character of touch in human experience, it is sufficient to mention studies by Hatwell, Streri and Gentaz (2003), Popova (2005), and Gärdenfors (2007), along with a number of others of a more neurological character (e.g. Neisser, 1976, Chamberlain, n.d.; Kornas-Biela, 2011).

2.1.1. The Role of Touch in Image Schema Formation

In a number of studies I argued for the unique and primeval character of touch in human experience (Szwedek, 2000, 2002a, 2002b, 2009, 2011, 2018), adducing the following arguments (2018):

a) Touch is the earliest sense to develop. Kornas-Biela writes that "the functional activity of the sense of touch (in the lips-nose area) is observed as early as the 5th week of pregnancy, and it is the most developed of senses at birth (Kornas-Biela, 2011: 159[6]), while "the visual focus and tracking begin around the 31st week" (Chamberlain, n.d.: 3);

[5] Cf. Neisser's assertion that biologically "a schema is a part of the nervous system" (1976, p. 54) and Dodge and Lakoff's (2005) view of image schemas as neural circuits.
[6] 7th week in Chamberlain n.d.: 1.

b) Touch, unlike the 'telecommunicative' senses (Pöppel and Edingshaus, 1994), provides the closest possible experience of the physical world (Popova, 2005);
c) Touch is the only sense capable of providing a three-dimensional perception of objects;
d) Touch, including the vital sense of taste, is the only whole-body sense reaching "full body sensitivity by the 32nd week" (Chamberlain, n.d.: 1);
e) The most vital haptic organs – the hands and mouth – have the largest neuronal representations in the brain;
f) *Encyclopædia Britannica* notes that "[t]actual sensations enable one to differentiate his own body from the surrounding environment", where "[t]he body of the individual seems to function as a perceptual frame of reference." Popova (2005: 401) confirms that "[t]ouch thus incorporates self-awareness uniquely and distinctly from the other senses", and emphasizes that "the tactile sense is a unique modality in which stimulation is *obtained* rather than imposed by the stimulus" (Popova, 2005, p. 401).
g) Finally, the fundamental character of touch translates into linguistic structures. Szwedek (2000) lists many examples from various languages illustrating the KNOWING/UNDERSTANDING IS TOUCHING metaphor.[7] Here are just a few examples.

English: *capture, catch, grasp the meaning*;
German: *fassen, begrifen* 'to understand' (from *greifen* 'to catch'), *zur Kenntnis nehmen* 'to take note';
Finnish: *käsittää* 'to understand' derives from *käsi* 'hand'; *käsite* is a 'concept', i.e. something grasped.
Polish: *pojąć* 'to understand'; '*ją*ć*'* derives from the Slavic root *jąć, imać* 'to take' (*mieć* – 'to have'), of the same etymology as German *nehmen,* OE *naman,* from PIE **neme*; cf. also *chwytać, łapać* 'to catch' (the meaning).
Hungarian: *ért* 'to understand' comes from Old Turkish *er* 'to touch', 'to reach'; 'touching', 'grasping' is related to 'understanding' in the verb *fog* 'to grasp, to hold, to seize', in several lexicalized words: *felfog* 'to comprehend'.
Tibetan: *go* 'to understand' derives from 'to be full', 'to have enough of something'; *dgongs-pa* 'to think', 'to consider' derives from 'to weigh', 'to hold', and *yid-la-'dzin* 'to think' literally means 'to mind-in-keep'.[8]

The above exposition emphasizes the unique and primeval character of touch in our experience of physical objects. In addition to the arguments above, we can summarize this claim in the following way: we can close our eyes and not see, we can plug our ears and not hear, we can hold the nose and not smell, but we cannot stop touching things – the air, the ground/floor, our clothes, etc. – and therefore we hardly notice touching because it is always part of our bodily experience.[9] It is especially important in the

[7] Bridging Sweetser's (1990) metaphors: KNOWING/UNDERSTANDING IS SEEING, and SEEING IS GRASPING.
[8] These examples have been provided by Andrew Chesterman for Finnish, Ferenc Kiefer for Hungarian, and Przemysław Żywiczyński for Tibetan.
[9] This is a paraphrase of Wittgenstein's (1953: 30) adage that we are "unable to notice something –

prenatal period when other senses have not fully developed yet, the fact that relates directly to image-schema formation. As Hampe (2005) observes, "[a]nother major theme […] pertains to image-schema formation itself" (Hampe, 2005, p. 7), but except a few occasional mentions of the idea of innateness (for example, Mandler, 2005, Dodge and Lakoff, 2005), the discussion does not go beyond the postnatal period. Notable exceptions are Szwedek (2002b) and Rohrer (2005). In my 2002b paper, I hinted at the importance of touch in the prenatal period emphasizing the fact that the sense of touch and the neural system develop simultaneously from the 7-8th week of pregnancy (Szwedek, 2002b, 2008. Rohrer held that „[a]lthough image schemas may ultimately require the consolidation of postnatal sensorimotor experience, their origins stretch back into prenatal experience." (2005, p. 176).

I wish to conclude that if the sense of touch and the nervous system develop simultaneously, it is unimaginable that the first tactile experiences of the foetus would not be recorded in the nervous system.

The question of the origin of image schemas is also mentioned by Dodge and Lakoff (2005) who, in their otherwise interesting paper, ask: "Where do universal primitive image schemas come from?" (2005, p. 71). The answer seems to emerge from what I have just stated above, following my 2018 proposal – from the tactile interaction between the foetus and the mother's body. As I observed (2018): "Naturally, we do not know what form image schemas have in our minds. We can only assume that in the prenatal period, their form is simpler (cf. Krzeszowski's 2016 "preschemas") than in the postnatal period, when they are being enriched by the other senses." (Szwedek, 2018, p. 86).

Some hope is placed in neurology for discovery of the neural structures corresponding to image schemas. But interesting as Dodge and Lakoff's (2005) findings are, they rather describe the geography and mechanisms of the brain-mind relationships in the postnatal period. It is rather surprising that they disregard the possibility that such neural circuits with corresponding schemas can be formed in the prenatal period, as I postulated in 2018. They conclude, rather generally, that "primitive image schemas are based on specific types of neural structure" (2005, p. 72) and, more specifically, establish certain correspondences between image schemas and neural circuits, which, however, brings us nowhere near the origin and formation of image schemas.

2.1.2. Some Examples of the Image Schema Formed in the Prenatal Period

To supplement the above discussion, let us, in an abbreviated form refer to my proposal of the origin of some image schemas in the prenatal period (2018, pp. 83-84).

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because it is always before [our] eyes" identical to Johnson's (1987) observation that because "force is *everywhere*, we tend to take for granted and overlook the nature of its operation" (Johnson, 1987: 42).

OBJECT	own body of the foetus; the womb;
CONTAINER	foetus– womb relation;
PROCESS/PATH	movements of the foetus;
LINK, CONTACT	umbilical cord, or direct contact (touching) with the wall;
PART/WHOLE	hand-foot experience;
BALANCE	position of the foetus (the development of the labyrinth begins about 21 days after conception, and is completed about 4 months later);
FORCE	baby's force against the wall of the womb;
BLOCKAGE	wall of the womb;
COUNTERFORCE	wall of the womb;
DIVERSION	rotations;
SCALE, MATCHING	different blockage forces in front and towards the spine;
NEAR-FAR	position in the womb, relation between extremities;
SURFACE	wall of the womb;
CYCLE	cyclical movements of the mother's walk;
MATCHING	various comparisons of different places in the womb;
UP-DOWN, FRONT-BACK	during rotations;
SELF MOTION	own body of the foetus;
CAUSED MOTION	mother's motions cause the foetus' motion? (Mandler, 1992)

As will be clear from section 4, touch is indispensible to the description of our experiences of the world of physical objects; and consequently it is also indispensible in the description of the OBJECT schema and, indirectly, of other schemas.

2.2. Image Schemas Are Preconceptual

This point is also related to the issue of when it is that image schemas are formed. Most scholars have so far discussed image schemas formation in the postnatal period (cf. for example, Mandler 2012; also, note Johnson's quote above on vision). However, as I argued (2018), to ignore tactile experience in the earliest, prenatal stages is a serious methodological mistake. I demonstrated that image schemas are even 'more preconceptual' in the sense that they are prenatal, as has also been demonstrated in the preceding section.

2.3. Image Schemas Are Highly Schematic Gestalts

This point is related to Grady's query about excessively general vs excessively rich image schemas, and raises the question of the measurability of schematicity, on which subject Grady notes that the decision may be best left to an individual "scholar's understanding" (Grady, 2005, p. 37). A good example of the confusion in this area is Langacker's (1987) rather disappointing position, based on the internal relations among schemas and their relative specificity:

> The notion of schematicity pertains to level of specificity, i.e. the fineness of detail with which something is characterized; the notion always pertains, primarily if not solely, to precision of specification along one or more parameters, hence to the degree of restriction imposed on possible values along these parameters. A schema is thus abstract relative to its nonzero elaborations in the sense of providing less information and being compatible with a broader range of options…
>
> (Langacker, 1987, p. 132)

He later continued that "[t]he difference is akin to that between representing a structure by plotting it on a fine grid (where even minor features show up) and on a coarse grid (where only gross features are preserved)" (1987, pp. 133-134).

As indicated earlier, Tuggy's (2007) similar approach did not solve the problem of the definition of the image schema as anything more than a limited set of highly abstract entities. He only articulated a simple, logical rule of inclusion within hierarchies of categories.

Whatever the approach, it is appropriate to quote Langacker's (1987) conclusion that "[o]ur cognitive ability to conceptualize situations at varying levels of schematicity is undeniable" (1987, p. 134) and that "[t]he linguistic significance of this ability is hard to overstate" (1987, p. 135).

While all this is true, what linguists are looking for are image schemas of a universal character (as is evident from Grady's remark, quoted above, on too general vs too rich image schemas (Grady, 2005: 35)). The aim of the present paper is thus to find a viable criterion for distinguishing too concrete image schemas from the most universal image schemas still tied to perceptual experience, thus excluding what Clausner and Croft (1999, p. 14) call nonimagistic domains, such as THOUGHT, DEATH and TIME, etc. (cf. also Lakoff and Turner, 1989, p. 94ff).

As will be shown in the remaining sections, this problem can be solved with reference to the schematicity (in terms of generality/universality) of objects as fundamental components of relational schemas.

2.4. Image Schemas Are Internally Structured

This feature refers to Johnson's observation that an image schema consists "of parts standing in relations and organized into unified wholes" (Johnson, 1987, p. xxix). In

a way, this coincides with the division into objects/concepts and the relations among them, the issue discussed in section 4., below.

2.5. Image Schemas Are Highly Flexible

Flexibility and transformations have been discussed extensively in Nerlich, Todd, Herman and Clarke (2004) and Dewell (1994, 2005). As will be demonstrated later in the present paper, flexibility is a direct consequence of the hierarchy of abstractness of objects with regard to relations.

2.6. Image Schemas Are Patterns Acquired Independently of Other Concepts

This is a disputable claim. Knowledge is a tightly knit and highly complex network of concepts reflecting our mind's organization of the complex world, and it is difficult to assume that image schemas would be acquired independently of other concepts.[10] Since this problem is not directly relevant to the topic of the present paper, I will only mention some studies on subsidiarity (dependency) within image schemas. Typically, image schemas have been listed and discussed in random order. However, Johnson (1987, p. 46) suggested that diversion is a variation of counterforce. Later, Pauwels and Simon-Vandenbergen (1993) observed that not all image schemas could be ranked on a par. The idea was also taken up by Peña (1999) for the PATH-FORCE relation, and Santibáñez (2002) for the OBJECT schema. Krzeszowski (2016) proposed dividing schemas into 'simple' and 'complex' categories (SOURCE–PATH–GOAL), with 'simple' schemas further subdivided into 'binary' (BALANCE–NO BALANCE) and 'bi-partite' (NEAR–FAR) types. In 2018, I argued that the only independent schema is that of OBJECT, while all other schemas are relational in nature and dependent on the OBJECT schema.

3. The Structure of the World

We live in both material and phenomenological worlds. The distinction between the material (physical) and immaterial world is not new. As early as in the 13th century, Thomas Aquinas wrote that "it is natural to man to attain to intellectual truths through sensible objects, because all our knowledge originates from sense. Hence in Holy Writ, spiritual truths are fittingly taught under the likeness of material things" (Aquinas, First Part, Question 1, Article 9).

A similar distinction between the material and phenomenological worlds was made by Krzeszowski (1997). He observed that

[10] In this regard, see studies by Pauwels and Simon-Vandenbergen (1993), Peña (1999) and Santibáñez (2002), who argue for some dependencies among image schemas.

> [not] all 'things' exist in the material world. Some, perhaps most, are only results of human conceptualization. Things such as friendship, love, mathematics, tragedy, motherhood, and hosts of others, including values themselves, do not exist outside human experience as entities independent of human conceptualization. In fact, they are results of human cognitive processes and specifically the process of *conceptualization*. Therefore, they *exist* in the same ontological domain, which is different from the domain of the material world. I shall refer to these two domains as, respectively, the phenomenological domain and the material domain. (Krzeszowski, 1997, p. 24).

A slightly different distinction was proposed by Beaugrande and Dressler (1980) who distinguish two types of components of the textual world: concepts and relations. A concept is defined as "a configuration of knowledge (cognitive content) which can be recovered or activated with more or less unity and consistency in the mind" (1980, p. 4), while "relations are the links between concepts which appear together in a textual world: each link would bear a designation of the concept it connects to" (1980, p. 4).

Langacker's (1987) position seems to be similar to that of Beaugrande and Dressler's in that he distinguished two types of predications: nominal predications designating a **'thing'** and **relational** predication designating either an 'atemporal relation' or a 'process' (1987, p. 183) (author's emphasis). However, his definition of a 'thing' is more abstract: "it makes reference **not to physical objects** but rather cognitive events. A symbolic structure whose semantic pole designates a thing is categorized as a **noun**" (1987, p. 183) (my emphasis). He then describes relations as "conceptually dependent" in the sense that "one cannot conceptualize interconnections without also conceptualizing the entities that they interconnect" (1987, p. 215). The broader treatment of a 'thing' may be justified only in the light of *objectification* (Szwedek, 2000, 2002a, and particularly 2011) whereby all concepts can be objectified, for example, THOUGHT IS AN OBJECT (which we can *have*, which may be *scattered* and *collected*, just like objects), or AN ANIMATE BEING (that can *come*, *run*, *be born*, *strike* and *breathe*) (see Szwedek, 2011 for more examples) and LIFE IS AN OBJECT (that we can *have*, *give*, *take* and *lose*).

Strangely enough, the beginnings of the division into objects and relations may be sought in Chomsky's selectional restrictions mechanism (1965, p. 114ff), in which nouns had their own characterization through semantic features[11] such as, for example, [+Common; +Count; +Animate; + Human] (Fig. 1), while verbs were characterized through the nouns and their features (Fig. 2).

[11] Chomsky's semantic features look more like ontological properties; after all, it is objects, not nouns, that can be ± animate or ± human, etc.

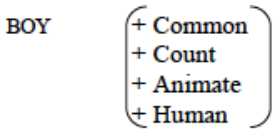

Fig. 1. Chomsky's (1965) semantic features of nouns.

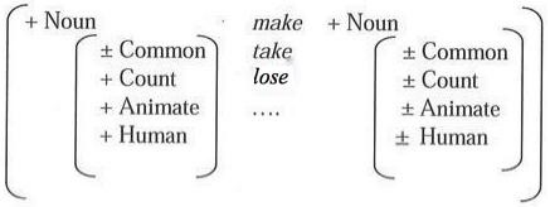

Fig. 2. Chomsky's (1965) selectional restrictions.

As the above diagrams show, such a mechanism clearly requires that nouns, representing objects are necessary components for the characterization of verbs (representing processes).

Closely related to these diagrams is Johnson's observation that "[t]he world consists of objects that have properties and stand in various relations" (Johnson, 1987, p. x). Johnson wrote this in the context of the Objectivist orientation, but if we ignore the rest of his statement, this assertion is true of any orientation. What we call the real world consists of objects and various relations obtaining between them.

In my 2000, 2002a, 2011, and 2018 papers I followed Aquinas and Krzeszowski, arguing that if embodiment is a foundation of our experience, it is clear that all our bodily senses can ever experience are physical objects. In his 2018 paper he concluded that the OBJECT schema is the only independent schema, while all other schemas, at least those commonly discussed within the standard inventory (Hampe, 2005), represent relations among objects (cf. Johnson, 1987, p. x). It has to be added that it is obvious that relations cannot be physical. If we accept touch as the most basic sensory experience (cf. point 2.1 above), it is clear that we can touch neither LINK nor CONTAINMENT, nor any other relation.

4. Objects and the OBJECT Image Schema

The Stanford Encyclopedia of Philosophy notes that "the concept of object […] is among the most general concepts (or categories) which we possess. It seems very doubtful that it can be defined in more general terms […]" (http://plato.stanford.edu/entries/object; DOA Oct. 10, 2016). I suggest that my proposal of the definition of the OBJECT schema as bounded matter is very general and exhausts Grady's essential conditions of generality and "perceptual experience" (2005, p. 35) – it is bounded matter whose density is primarily experienced by touch.

The material world is the world of physical objects with density as its fundamental property, in some bounded[12] form. Depending on the degree of density, we divide physical objects into solid, liquid and gaseous. While there is no doubt about the density of these types of objects, their degree of boundedness may be difficult to comprehend. While solid objects have clear boundaries, the boundaries of liquids and gases are the surfaces of solid objects, their containers. Thus, for example, the inner surface of a tub is at the same time the outer boundary of the water in it. From this point of view, seas, oceans, lakes, puddles and rivers are 'containers' (basins, river beds) of different shapes and sizes with the 'water-object' within. Following this line of thinking we may say that all gases are bounded by either solid or liquid objects. Thus, the air (atmosphere) is bounded internally by the earth and all objects on its surface, including liquids. For instance, the surface of a desk is at the same time the boundary of the air. The shape of the external boundary of the atmosphere is determined by the force of gravity. One might be tempted to say that this boundary is the interplanetary space, but having no density it cannot be treated as an object, though it may be metaphorically conceptualized as one.

In such a sense, without further specifications, OBJECT is the most universal and general entity. Langacker pointed out that "[CLAW HAMMER] has a fairly precise shape specification, and [HAMMER] a somewhat less precise one, [TOOL] is quite nonspecific in regard to shape." (Langacker, 1987, p. 135). Once again, from this point of view, the most unspecific concept is that of [OBJECT]. This also implies that [OBJECT] is the most abstract schema, while [TOOL], [HAMMER] and [CLAW HAMMER] are descendingly more and more concrete. It is necessary to remember that we are looking for highly schematic structures (see point 2.3.) excluding schemas that are "too rich to count as fundamental dimensions of perceptual representation" (Grady, 2005, p. 135).

Thus, we can conclude that density (and ensuing boundedness, shape, size, etc.) experienceable through the fundamental sense of touch, is the only property shared by all material objects. On that basis we can formulate a **definition of the OBJECT image schema as a mental representation of a physical object, whose fundamental property is density experienceable by touch, with ensuing boundedness, shape, size, etc.**,[13] to be distinguished from, for example, ANIMATE OBJECT schemas, which have density plus animateness, excluding all inanimate objects, and so on down the hierarchy of objects. The broken line in Fig. 3 shows the boundary between the OBJECT image schema and other, more concrete schemas.

[12] Langacker (1987) uses the term 'boundedness' in a broader sense according to which a 'thing' is a region "bounded in a primary domain" (1987, p. 189).

[13] This is a modified version of the definition proposed by Szwedek (2018) which however was logically and materially flawed. However, the redefinition does not invalidate the overall argumentation of the 2018 paper.

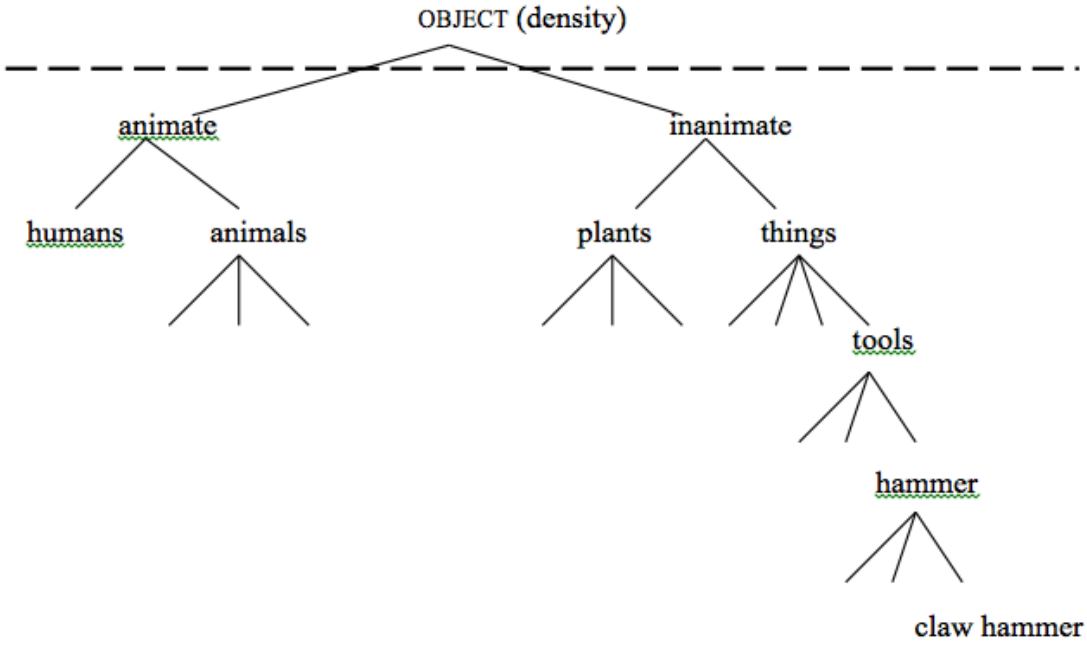

Fig. 3. The OBJECT image schema vs more concrete schemas.

5. Relations and the RELATIONAL Image Schemas

Apart from the OBJECT image schema, all other schemas are relational (Szwedek, 2018). Langacker distinguishes two types of relations: atemporal relations "corresponding to adjectives, adverbs, prepositions and similar classes"[14] (Langacker, 1987, p. 214) and processes, represented by verbs as their "symbolic expression" (1987, p. 344). It is important to add at the outset that relations are conceptually dependent (cf. Beaugrande and Dressler, 1980, p. 4; Langacker, 1987, p. 215). Since the major division of the world's entities is into objects (concepts in Beaugrande and Dressler, 1980, Langacker, 1987, and physical objects in Szwedek, 2018; possibly also in Johnson, 1987, p. x, in connection with embodiment) and relations between them, if relations are dependent, they must be dependent on objects.

Like objects, relations also display hierarchical organization. Thus, [MOTION] is more abstract than [INANIMATE MOTION] or [ANIMATE MOTION],[15] which in turn are more abstract than [WALK], [RUN] or any other activity. As in the case of the OBJECT schema,

[14] Also nouns like *part*; cf. Langacker's (1987: 218) "relational noun".
[15] The latter two are listed by Hampe (2005).

there is a difference between MOTION and WALK in that the former implies a relation with any physical object (solid, liquid and gaseous), while the latter involves only some animate objects, those with legs, via ANIMATE MOTION, which would also include flying, crawling and swimming. Each of those relations has its own image schema, but it is only MOTION that is devoid of any specification of its objects, in contrast to, for example, animate objects with wings, or fins, or no extremities.

I think it is appropriate at this point to indicate that embodiment implies universality of perception of objects and universality of various experiences as a basis for image schemas. Such a position is consonant with that of Lakoff (1987), who drew attention to the universality of image schemas: "[t]he image-schematic structuring of bodily experience is, we hypothesize, the same for all human beings. Moreover, the principles determining basic-level structure are also universally valid, though the particular concepts arrived at may differ somewhat" (1987, p. 302). And he added that "[t]here are, however, many basic experiences that one can pretty reasonably take as being universal. Among them are the basic-level perception of physical objects and what we have called 'kinaesthetic image schemas': structured experiences of vertical and horizontal dimensions, balance, inside and outside, and many others" (1987, p. 312).

As a preliminary conclusion, I would like to submit that image schemas, as proposed by Johnson (1987), Grady (2005), Clausner and Croft (2005) and others, refer to objects without any specification except density, i.e. the OBJECT schema (cf. Szwedek, 2018), and relations involving objects, as in 'X_1 relation X_2', where 'X' stands for the OBJECT schema, and 'relation', for example, for LINK, CONTACT, BALANCE, etc.[16]

In the remainder of this paper I wish to demonstrate that my assumptions meet the conditions specified by Hampe (2005), and to confront my hypothesis with the description of relational schemas most commonly discussed in literature (cf. also Szwedek, 2018).

6. Hampe's Criteria in the New Approach

It seems appropriate at this point to review Hampe's criteria in the light of the discussion of the nature of objects, the OBJECT schema and relational schemas. Thus, the OBJECT image schema is:

6.1. embodied/experiential:

In view of my claim about the sensory experiences of the physical objects, particularly the fundamental experience of touch, there can be no doubt as to the embodied character of the OBJECT image schema.

[16] See Szwedek (2018) for diagrams representing the schemas most commonly listed in the current literature. Cf. also Langacker's assertion that "the nature of a mental experience is reflected more directly in a complex image than in a complex formula" (2008, pp. 32-33).

6.2. preconceptual:

The fact that many fundamental schemas arise in the prenatal period (Szwedek, 2018) is the best evidence of their preconceptual nature.

6.3. highly schematic gestalts:

There cannot be anything more schematic than the OBJECT schema as proposed in the present paper, its schematicity extending over relations. Together they form well established gestalts in that relational schemas must have an OBJECT schema as their component.

6.4. internally structured:

Image schemas consist of parts, that is objects and relations.

6.5. highly flexible:

Being highly schematic, image schemas – in the sense proposed in the present paper – constitute grounds for an innumerable array of schemas of various degrees of abstractness (cf. Langacker's [THING] → [TOOL] → [HAMMER] → [CLAW HAMMER], or [MOTION] → [ANIMATE MOTION] → [WALK], etc.

6.6. patterns acquired independently of other concepts.

This claim remains unsubstantiated and rather controversial. As I mentioned earlier in the present paper, knowledge is a tightly knit and highly complex network of concepts reflecting our mind's organization of the complex world, and it is difficult to imagine that image schemas would be acquired independently of other concepts. For example, it is unimaginable that the LINK schema would be acquired independently of the OBJECT schema.

7. Examples

My hypothesis is that since objects are conceptually independent and fundamental components of relational image schemas, any distinction between 'image schemas' and 'more concrete image schemas' must rely on the degree of abstractness of the object expressed in the number of 'concrete' features. The most universal and fundamental feature of all physical objects is density, meeting the criteria of perceptibility and schematicity, which constitute the foundations of an OBJECT image schema. Any categories of objects with more concrete feature(s), for example, INANIMATE OBJECT, or still hierarchically lower TOOL, qualify as 'more concrete image schemas'.

Before reviewing some common image schemas, a brief note on the categorization of objects seems in order. As I mentioned above, the most fundamental property of physical object is density, with ensuing boundedness, size, shape, etc. Going down the hierarchy, the Object splits into Animate and Inanimate objects, with the

Animate objects splitting into Humans and Animals, and Inanimate objects into whatever categories we might want to find appropriate – the lower the category, the more concrete is the schema. A sample of such categorization is shown in Fig. 3 in section 4 above.

I have no intention to review all the image schemas listed by Hampe (2005) in the light of the formula I have proposed of the general form 'X_1 relation X_2', but rather to discuss briefly only a few schemas to demonstrate the formula's validity *vis-à-vis* Hampe's features.

The OBJECT schema itself is internally structured, and has parts with relations obtaining between them. Every object has PARTS, even if they are only imposed by the human mind, and these are also conceptualized as separate objects in some relation to the whole and to other parts. For example, a leg is part of a chair and numerous other objects,[17] but we can also identify parts of a solid object like the inside and outside of a piece of amber. As I mentioned above, having density entails having a surface, that is the "outside part"[18] of objects, also conceptualizable as a separate object (*A thin surface has been carried away from the whole bas-relief* (OED), *on the surface*, *under the surface*, etc.).

Containment is definitely an image schema in the sense that, given the three-dimensional character of matter, all objects are containers, for example, 'X_1 contains X_2', *X_2 is in the air*, *in water*, *in a solid object* (like an insect inside a piece of amber). Connected with the containment schema is the full-empty schema, with 'full' involving two objects and 'empty' only one object. It is not unlikely that the centre/periphery schema may be treated as a subcategory of the containment schema, with a precise indication of one object 'in the centre' and the other closer to the "the outer limits or edge of an area or **object**" (*Oxford Dictionary of English*) (my emphasis).

As will be seen below, the OBJECT schema is a necessary part of all other (relational) schemas. Among the obvious candidates for image schemas in the sense proposed here, are CONTACT/LINK schemas, both of which involve contact (direct and indirect).[19]

Fig. 4. CONTACT and LINK image schemas.

Though front-back, left-right are in essence anthropocentric, and up-down geocentric, they refer not only to human beings and the earth, respectively, but are also

[17] For example, leg of an animate object, with identifiable parts like a thigh, knee, calf and shin, ankle, foot and toes.

[18] As defined by ODE (*Oxford Dictionary of English*)

[19] This suggests that LINK could be treated as a variant of CONTACT. The diagrams are taken from Szwedek (2018).

assigned to all objects and thus would meet the condition of universality.

It seems that the above schemas have a predominantly static character (see Szwedek, 2018).

Though the other relations have nominal labels,[20] they have a dynamic character, for example MOTION and FORCE. Hampe (2005), following other linguists, proposes to also distinguish ANIMATE MOTION, INANIMATE MOTION, SELF-MOTION and a number of variants of FORCE. It is not my intention here to propose any typology (subsidiariness) of image schemas,[21] but rather to emphasize the role of the OBJECT schema in relational schemas. Nevertheless, some subsidiariness of image schemas is implied in my discussion.

While MOTION as such would qualify as an image schema in the sense proposed here, ANIMATE MOTION, SELFMOTION and CAUSED MOTION would not, in the sense that in their characterization they have animate objects. MOTION schema can be represented as 'X moves', splitting down to animate motion, selfmotion and inanimate motion, though the latter would belong to a more complex schema 'X_1 moved X_2' where X_1 stands for animate objects using force, and X_2 is an affected entity, an object set in motion. Without those objects, there would be no motion. Again, objects turn out to be fundamental components of relational image schemas, with the MOTION schema branching off to more concrete relations like animate motion, selfmotion and caused motion, with more concrete properties of objects than just density.

Still another image schema commonly discussed in the literature is FORCE and its variations. It must be pointed out at the very outset that according to Newton, FORCE has the F = m*a* formula, where 'm' stand for 'mass' and '*a*' for acceleration. Again, acceleration is a relation involving an object which has 'mass'. The most general form of FORCE can be represented as in Fig. 5 (the black circle stands for the energy source).

Fig. 5. The FORCE schema.

Here the black circle is the energy source and the arrow stands for motion (acceleration). The FORCE schema may have a number of variants depending on the number of other objects and their motions.

Newton's Third Law states that "[w]hen one body exerts a force on a second body, the second body simultaneously exerts a force equal in magnitude and opposite in

[20] Cf. Szwedek, 2002, and particularly 2011 for the *objectification* hypothesis, according to which every abstract concept, including relations, can be conceptualized as an object, naturally then in a nominal form.

[21] See Pauwels and Simon-Vandenbergen (1993), Peña (1999) and Santibáñez (2002) for attempts at establishing subsidiarities/dependencies among image schemas.

direction on the first body." (*Wikipedia*). Such a situation is known as COUNTERFORCE (Johnson, 1987, p. 46, Fig. 8), which results in some form of RESTRAINT. If, for example, 'X_2' has a mass and velocity such that it stops 'X_1', we have BLOCKAGE (entire restraint of the moving object X_1 by the object X_2). A still much greater mass and acceleration of 'X_1' would result in the REPULSION or REMOVAL of 'X_2'. If the direction of one of the objects is not aligned with the direction of movement of the other object, we would have DIVERSION and possible REMOVAL of the other object. I think that all those forces are subsidiaries to the RESTRAINT or RESISTANCE schemas. [22]

BLOCKAGE, REMOVAL and DIVERSION are, to a greater or lesser degree, dependent on the mass, acceleration of and contact angle with the other object.

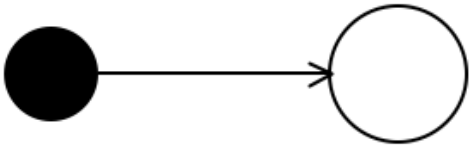

Fig. 6. BLOCKAGE schema (the size of objects represents the amount of mass).

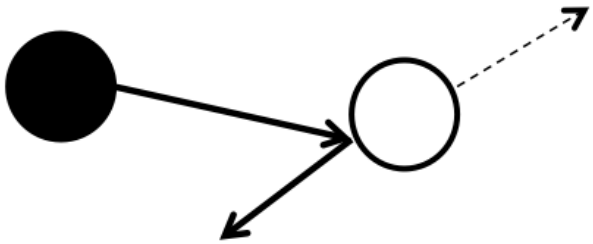

Fig. 7. DIVERSION (solid arrows), REPULSION and REMOVAL schemas (broken arrow).

It is necessary to repeat that an elaboration of a typology of schemas is not the aim here. It would require a separate, extensive study. I merely want to demonstrate the fundamental role of the OBJECT schema in the structure of RELATIONAL schemas.[23] Quite definitely, the number of relations defined by the OBJECT image schema will be limited, if the schema is conceived in this way. However, their form and number have yet to be determined through detailed analyses.

The distinction between OBJECT and its subcategories meets the criteria proposed by Grady: on the one hand, "certain schemas that are too general to be associated with any particular type of perceptual experience" and on the other hand, schemas "too rich to count as fundamental dimensions of perceptual representation" (Grady, 2005: 35). The

[22] I think that all those forces are subsidiaries to the RESTRAINT or RESISTANCE schemas. The OED defines restraint as "[t]he action or an act of restraining, checking, or stopping something" and resistance as "quality by which an inanimate body resists the action of another body".

[23] For a description of other schemas including the prenatal ones, see Szwedek (2018).

OBJECT schema, as proposed in the present paper, is associated with the fundamental tactile experience of density, while any of its subcategories should be interpreted as too rich. Naturally, such a distinction will also translate into relations which are conceptually dependent on the object.

8. Conclusions

So far linguists have questioned the possibility of defining the image schema which, on the one hand, would be anchored in perceptual experience, and, on the other, hand would not be too concrete. Following my earlier research (Szwedek, 2000, 2002a, 2002b, 2009, 2011, 2018) about the role of touch in our prenatal and postnatal perception of objects, I have proposed that the definition of the image schema, in the form conforming to the above-mentioned requirements formulated by scholars, should be based on the conceptually independent object schema. I have concluded that the minimum level of perceptibility involves the density of the OBJECT, the most general entity encompassing all physical objects in our world, and I have shown how this affects the schematicity of relational image schemas. To make it easier to visualize the indispensible role of objects in image schemas, I followed Johnson and other scholars and provided a sample of the possible diagrammatic representations. All these observations led me to formulate the following definition of the image schema.

The IMAGE SCHEMA is a mental structure with at least one OBJECT image schema, which is a conceptually independent entity representing a physical object whose fundamental property is density experienceable by touch, with ensuing boundedness, shape, size, etc.

The matter of what schemas can be identified – including their number, and their structure – remains open to question, and will require further detailed and extensive investigation.

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