

What happens to the basic level in language?

Some theoretical considerations with crosslinguistic examples

Gábor Győri
University of Pécs (Hungary)

It is a common assumption that basic level categories are cognitive units that share perceptual and linguistic characteristics at the same time. They are taken to be perceptual and functional gestalts designated by words that have a special status with regard to lexical development in children and frequency of occurrence and usefulness in everyday communication. Despite this connectedness of the two aspects of the basic level they do not go hand in hand. The perceptual side of basic level categorization is primary to language and exists independently of it. Basic level categories emerge naturally in the human perceptual-cognitive system as a result of our biological make-up in order to facilitate a proper functioning and orientation in our environment. The linguistic side relies on perception but is at the same time determined by several other factors. Basic level designations do not directly represent perceptual information because they contain additional conceptual knowledge reflecting cultural conceptualizations. This dissociation between the two sides can be seen on the one hand in the inconsistencies between perceptual qualities of entities and the way in which these entities are grouped together in linguistic basic level categories. On the other hand it is revealed through crosslinguistic discrepancies in category boundaries as delineated by words that are considered basic level terms and seemingly correspond in their semantics. An explanation of these phenomena requires that we do not handle the basic level as one phenomenon in which the perceptual and linguistic aspects merge but keep the two sides of the basic level apart while paying attention to their specific connections and influences on each other.

Keywords: categorization, perception, basic level categories, cognitive function of language, linguistic relativity

1. Introduction

Categorization is the most basic biological cognitive capacity, which has the function in an organism to guide the recognition of phenomena as being the same or different for purposes of adaptive interaction with the environment. It is based on the organism's knowledge of things in the world as belonging together in various ways (Harnad 2005: 41). This internally stored information can be coded in the genes or it can be knowledge acquired through experience with the help of a nervous system. But in neither case is it a simple reflection of some objective state of affairs in the world. Recognition is based on sensory information, and the incoming stimuli are filtered by the organism's species specific perceptual mechanism, which "excludes nonsalient aspects and gives emphasis to features that have been of enduring importance in survival" for members of the species (Goodson 2003: 116).

In accordance with this, Eleanor Rosch (1978: 28–29) formulated the principles of categorization, cognitive economy and perceived world structure, which are responsible for the function of a category system to provide as much information about the environment – structured according to the organism's species specific needs – as possible with as little cognitive effort as possible. Rosch's work on human categorization also established that in a taxonomy of categories there is a level which has a special status (Rosch 1978; Rosch et al. 1976). The basic level, as Rosch called it, is special due to the way it is processed in the mind. It is the most inclusive level at which categorization proceeds on the basis of information about physical attributes of phenomena picked up by the sense organs and processed by the perceptual system. As Rosch (1978: 31) put it, the "basic cuts in categorization are made" at this level because categories are developed on the basis of "information-rich bundles of perceptual and functional attributes [...] that form natural discontinuities."

This way of processing the incoming sensory information in the perceptual system is the most efficient for regulating our behaviour so as to interact with the environment in the most adaptive and functional way. Therefore the basic level is also characterized by the fact that these discontinuities are the largest between adjacent categories in a taxonomy while being "the most inclusive level at which there are attributes common to all or most members of the category" (Rosch 1978: 31). For example, if we take a closer look at the category *CAT*, it is obvious that members of its superordinate category *MAMMAL* have far fewer attributes in common than its own members. At the same time, different members of its subordinate category *SIAMESECAT* do not share significantly more saliently perceptual attributes than members of the category *CAT*, which is at a more inclusive level in this hierarchy.

This seeming middle status of the basic level is only theoretical. Practically it can occur anywhere in a taxonomy where Rosch's above explanations are valid,

but of course in one lineage there can be only one basic level by definition. In a study involving biological taxonomies Rosch (1978: 33) noticed that “the basic level [...] did not occur at the level of the folk generic but appeared at the level [...] originally expected to be superordinate (e.g., *tree* rather than *oak*).” Obviously, the category TREE is more inclusive than that of OAK while the number of common attributes for the different types of oak is not significantly higher. This prominence of TREE as the basic level category in this lineage derives from further criteria Rosch established for this level. In addition to being the most inclusive level with the highest number of attributes in common across category members, it is also the level at which “objects [...] have motor sequences in common” with respect to human interaction while also “an averaged shape of an object can be recognized” and “an image could be reasonably representative” of all the members of the category (Rosch 1978: 33–34).

Evidence for the strong perceptual basis of basic level categorization as opposed to factual knowledge about the world can also be witnessed in the case of the biological taxonomy of vertebrates. For instance the category BIRD provides a prominent example for the perceptual characteristics of the basic level interfering with scientific classification. Even though birds are at the same level with mammals (*class*) in the biological classification, in terms of human categorization BIRD is basic level in the taxonomic lineage BIRD – SPARROW – HOUSESPARROW because it is the most inclusive category in the lineage which can be represented by a common image (characteristic of most members of the category), while in the taxonomic lineage MAMMAL – DOG – POODLE it is clearly DOG that is at the basic level for the same reason.

Rosch (1978: 30) also points out that “[c]ategories are generally designated by names (e.g., *dog*, *animal*)” and that the basic level of categorization also has relevant implications for language. Compared to words denoting categories at other levels of a taxonomy, names of basic level categories appear earlier in the lexicon of children and occur with a significantly higher frequency in the everyday speech of adults. In addition, “[o]n a more speculative level, in the evolution of languages, one would expect names to evolve first for basic level objects,” and designations for categories at other levels should emerge only later (Rosch 1978: 35). In fact, Rosch et al. (1976) merged the two sides of the basic level in the following way:

Basic objects are shown to be the most inclusive categories for which a concrete image of the category as a whole can be formed, to be the first categorizations made during perception of the environment, to be the earliest categories sorted and earliest named by children, and to be the categories most codable, most coded, and most necessary in language. (p. 382)

These implications of the basic level for language are most relevant for human categorization because the categories which are named in language, for which we have words, endow upon us the knowledge necessary for understanding the world and interacting with it in our sociocultural environment. Consequently it is common to think of the basic level of categorization in terms of language and at the same time to assume that “words for basic-level categories tend to be recognisable via gestalt perception” (Gallese & Lakoff 2005: 446). However, the basic level cannot be simultaneously perceptual and linguistic because the categories emerging separately via these two modes of categorization do not overlap with regard to the range of entities they cover. For this reason the perceptual and the linguistic basic level of categorization must be kept apart and the role of perception in the emergence of the linguistic basic level must be explained on this basis.

The category *NUT* provides a good example to demonstrate the importance of making a clear distinction between the linguistic basic level and the perceptual one. From a linguistic point of view the term *nut* is definitely basic level as it is acquired earlier by children than its subordinates *walnut*, *chestnut*, and *hazelnut*, it is used more often by adults in everyday conversation, and it obviously appeared earlier in the history of English than its subordinates. However, it is controversial whether the category *NUT* conforms also perceptually to the definition of basic level, i.e., whether its members can be represented by an averaged shape and can be recognized through a common image. On the other hand, its subordinate categories *WALNUT*, *CHESTNUT*, and *HAZELNUT* appear to be basic level on the basis of distinct perceptually criteria.

The main reason for such a discrepancy between the two aspects of basic level is that word meanings are culturally conventionalized conceptualizations, and this is true also in the case of basic level terms, which can therefore not be simple labels of perceptual basic level categories. The linguistic basic level is not equal to and does not exactly reflect crosslinguistic basic level categorization, which emerges in the biologically determined human perceptual system during physical interaction with the environment (see Tomasello 1999: 9, 58).

2. Cognition and categorization with and without language

Language functions as an instrument of social cognition on which we depend for “review of social information and the exploitation and management of social relationships” (Quiatt & Reynolds 1993: 141). Thus, human categorization relies largely on language because our social existence requires that an enormous part of human knowledge be processed, stored and made use of in the form of linguistic categories, which can be shared with others (Harnad 2005: 37). It is “the categories

found in a culture and coded by the language of that culture at a particular point in time” (Rosch 1978: 28) that really count in our everyday social interactions. This kind of coding or designating a category does not mean the synchronic activity of speakers of using a word for expressing their thoughts but the historical process of the emergence of the meaning of a word in which a certain cultural conceptualization of some aspects of the world is categorially represented (Győri 1996, 2002).

Humans – just like all other organisms – possess the biological cognitive capacity to categorize their environment purely on perceptual grounds in their own species specific ways based on their biological make-up (e.g., Zayan & Vaclair 1998; Harnad 2005). Without the implicitly acquired knowledge about co-varying and contingent features of phenomena of the environment no organism could engage in functional and adaptive behavior and interaction. Therefore the major determinants of the basic level of categorization – perceptual criteria – work in the human brain essentially independently of language and serve as grounding for the emergence of linguistic categories (see Cangelosi & Harnad 2001). The cognitive function of language only enhances the human biological cognitive capacities it is grounded in by making it possible to operate an abstract cognitive model of the world with the help of symbols (Győri 2001; Lupyan 2016; Tomasello 1999: 9). Our cognizing of reality via the human perceptual system as determined by our biology is complemented by a special human interpretation and understanding of the world with the help of words representing cultural categories. Word meanings comprise shared and conventionalized conceptualizations – in line with the social cognitive function of language – for representing perspectives and attitudes a community collectively takes on their environment (Tomasello 1999: 116).

The human understanding of the world includes among others an abstract reality of phenomena as being super- and subordinated to each other. Our sociocultural reality requires the mental ordering of phenomena into a taxonomy because super- and subordination is more useful and functional and cognitively even more economical in many cases of interaction with our sociocultural environment. For instance answering the question *What kind of store is this?* with *One that sells furniture* is a lot more useful, functional, and economical than starting to list the types of furniture that can be bought there. But in spite of this, before knowing what the word *furniture* means, what the conceptual category FURNITURE comprises, one must know what the “[m]ovable articles, whether useful or ornamental, in a dwelling-house, place of business, or public building” (OED Online) individually are. Furthermore, the knowledge of the cultural convention of what articles are in fact included in the category is indispensable because not all objects for which the definition is valid necessarily qualify as furniture (e.g., a poster on the wall). However, in order to know what for instance a table, a chair, a wardrobe, etc. are

in themselves, the knowledge of the category FURNITURE is not necessary, and one can have the knowledge of any one of them without knowing what the others are.

Thus, the superordinate category FURNITURE can exist only by virtue of the shared cultural knowledge in the speakers' minds about certain types of objects belonging together by virtue of some common function based on sociocultural convention rather than a function deriving from common structural attributes through affordance. The existence of the subordinate category KITCHEN CHAIR also depends on shared cultural knowledge since perceptual clues do not necessarily differentiate an instance of it unanimously from dining room chairs for example. The basic level of categorization, the level of the category CHAIR in this case, contains the least amount of conventionalized, sociocultural knowledge due to the fact that its function is to provide the most basic and useful information necessary for direct interaction with the environment. It is the most effective level of categorization in this interaction because the recognition of instances of these categories is closely linked to the perception of gestalts and the identification of structural attributes, which lead to the detection of affordances, in the above example the possibility of 'sitting on.'

When we use basic level categories coded in language, it is essential to take into account the fact that "[t]he *perspectival nature of linguistic meaning* implies that the world is not objectively reflected in language" (Geeraerts 1997: 8). This is no problem in itself because – as Rosch (1978: 29) emphasized – "we are talking about a perceived world and not a metaphysical world without a knower" and the "kinds of attributes [that] *can* be perceived are [...] species-specific." After all, it is a human species specific trait – due to our biological predisposition for language with its social cognitive function – that human categorization is first and foremost experienced and carried out through language. Words denote categories for us on the basis of conceptual similarity, their conceptual relations provide us with a taxonomy of phenomena of the world, and the degree of conceptual similarity designates a level in a taxonomy as a basic one in terms of usefulness of a word and frequency of its use (Storms et al. 2015).

Thus, on the theoretical side it may not make a difference that the meaning of a basic level term includes cultural and conventionalized conceptual knowledge in addition to the perceptual information about the category. But if basic level terms comprise cultural conceptualizations that have become conventionalized in a speech community, then Rosch's (1978: 31) "operational definitions of the basic level of abstraction: attributes in common, motor movements in common, objective similarity in shape, and identifiability of averaged shapes," will mostly be inconsistent with what is generally taken to be basic level in the case of linguistic categorization. As already illustrated by the category NUT above, words do not exactly 'designate' the categories processed by our perceptual system and which they

are supposed to be the names of on the basis of the definition since “[v]erbal labels change (modulate) ‘nonlinguistic’ representations” (Lupyan 2012a: 256).

The inconsistency mentioned above can be witnessed in the following linguistic phenomena (discussed in more detail in Section 4). The linguistic basic level is not always in line with perceptually salient attributes while in other cases linguistic taxonomies deviate from expert or scientific or even encyclopedic knowledge due to contradicting perceptual salience of attributes. Also, taxonomies may often appear to be random. In addition, there is also the problem that in reality ‘language as such’ does not exist, there are only particular languages. As these categorize phenomena of the world in many different ways, in most of the cases even basic level terms in different languages do not correspond to each other in the range of entities they denote. However, making a clear distinction between nonlinguistic basic level categories and their linguistic counterparts, the conceptual structures underlying the meanings of basic level terms, will help us better understand the status and functioning of the basic level in language and also provide answers to the question why such discrepancies occur. Of course, in spite of these differences all languages fulfill their cognitive function perfectly by representing through their linguistic categories the adaptive and functional perspectives of their speakers for facilitating a proper interaction with their environment, though based on their own idiosyncratic structural and system characteristics (Regier et al. 2015: 237; Tomasello 1999: 9).

These discrepancies also point to a theoretical problem concerning the assumption that basic level categories are designated by names in language (Rosch 1978: 30). In reality they are designated by different terms in different languages, and due to the nature of linguistic meaning these different terms cannot be names of the same nonlinguistic categories. They are words in particular languages with only partially corresponding and overlapping meanings, i.e., they identify different conceptual categories (Lupyan 2012a: 256). Because of this not only their positions in taxonomies may deviate from each other but will often also denote different ranges of objects, which questions the direct correspondence between linguistic basic level categories and basic level categories based on perceptual attributes.

Thus, the definition of the basic level based on perceptual criteria may not be merged with a definition of the basic level in language, which is based on linguistic criteria connected to lexical development and frequency of use. Combining the two obscures the real nature of the grounding of symbols (the materializations of linguistic categories) in physical bodily experience, which is manifest in non-linguistic perceptual categorical representations deriving from “learned and innate feature detectors that pick out the invariant features of object and event categories from their sensory projections” (Harnad 1990: 335). Grounding does not mean that the conceptual mechanisms and processes operating in the emergence

of basic level linguistic categories completely rely on perception and that a basic level term actually stands for a basic level category. Linguistic categorization is only influenced by perception even at the basic level.

3. Language and the basic level of categorization

The emergence of linguistic categories is largely affected by various types of socially shared knowledge (Glushko et al. 2008: 131). This knowledge consists of cultural conceptualizations which get conventionalized for symbolic purposes (Langacker 1987: 98). The coding of basic level categories in language is no exception from this process and perceptual information relating to structure, shape, and other similar clues picked up by the sense organs is only one – though important – factor in determining the conceptual content of basic level linguistic categories, i.e., the meanings of basic level terms.

Rosch's operational definition for the basic level corresponds to categorization in human pre-linguistic knowledge and thought, i.e., before children learn the symbols representing such categories, because at a very early age the infant cannot be aware about the linguistic conventions of adults, and the child's cognitive system automatically categorizes the environment on the basis of perceptual clues in the pre-linguistic stage (Tomasello 1999: 58; Westermann & Mareschal 2014). Obviously, overextension in word learning in early stages of language acquisition can be explained on the basis of an enduring dependence on perception in categorization at this age. This is the reason why overextension happens at the basic level, for which the child will first learn words anyway (Golinkoff et al. 1995). Children acquire the names of basic objects prior to names for categories above and below that level because the recognition of these is heavily backed up by perceptual clues (e.g., Diesendruck 2003: 777; Waxman & Lidz 2006: 311).

From this perspective erroneous word learning and usage in the child is not a true categorization error. It is a categorization error only in the semantic sense due to not having mastered linguistic-conceptual conventions. Perceptually it is the consequence of the function of the cognitive system to govern our natural biological interaction with the environment. For instance, in extending the word *ball* to piggy banks of a round shape the fact that children's prototype categories contain fewer attributes as compared to those of adults certainly plays an important role (Rogers & McClelland 2004: 25). However, the sphere shape – i.e., the perceptual basic level category SPHERE – must be a more important factor because perceptual salience tends to dominate word learning in infants (Pruden et al. 2006). The perception of similarity in shape must be the primary cause also because shape perception is one of the most fundamental processes in object recognition and visual

categorization (Mohan & Arun 2012). The meaning of the word *ball* is a culturally conventionalized linguistic-conceptual category in which gestalt perception plays only a partial role. The overwhelming force of conceptualization in linguistic categorization is also demonstrated by Ronald W. Langacker's (1987: 113) example for autonomous processing, the "cube shaped golf ball." While it is impossible for the perceptual system to process the image of a cubic sphere as such, the conceptual category of such an object is – though paradoxical – not impossible and can be relatively easily created with the help of language.

The priority of names for basic level objects during lexical development in language acquisition is also attributable to the fact that such names appear to be the most useful and frequently used ones – compared to terms referring to higher or lower taxonomical levels – in the case of adults (see Malt 2015: 328). Evidently, basic level terms are generally more effective in communicative interactions for an appropriate functioning in and dealing with our environment. The degree of usefulness of an expression can be measured by the effectiveness of the information about the environment it carries. Thus, the utterance *Watch out, a lion is approaching* is without doubt more useful in the given circumstance than the utterance *Watch out, a mammal is approaching*, for which even finding a realistic context would be difficult. Although in some sense the category MAMMAL carries more information than LION as it implies a larger amount of knowledge of biology, its usefulness in everyday communication connected to ordinary interaction with the environment is definitely less.

Actually it is not the basic level term that is useful in itself in the first place. As Rosch's (1978) principles state, it is the species specific perspective contained in a category that is useful by providing functional knowledge for an adaptive interaction with one's environment. Such perspectives are primarily represented in perceptual basic level categories through which we recognize phenomena for a proper orientation and functioning in our physical surroundings. The linguistic basic level categories, the meanings of basic level terms, contain perspectives and conceptualizations that are functional in the particular human sociocultural environment. Thus, the usefulness of basic level terms derives from the fact that in a taxonomy of categories they are at the level which incorporates perceptual information to the largest degree but at the same time also semantic knowledge made up of socioculturally expedient conventionalized conceptualizations and shared perspectives.

As adults our perspectives on the environment are fundamentally influenced by our linguistic-conceptual categories. For example, a chair and a stool differ perceptually to some extent even though in terms of the Gibsonian notion of affordance they are rather similar. They both afford human type of sitting and have also been designed and are manufactured with that function in mind. In the interaction

with our human surroundings it also makes a difference if one can or cannot lean back and thus sit in different postures more or less comfortably. Due to the cultural conventions that have emerged in the course of time in this interaction and the conceptualizations connected to them with regard to these objects two different linguistic categories have surfaced and CHAIR and STOOL are designated by different basic level terms.

Chairs and stools are also perceptually different enough to belong to two different linguistic-conceptual basic level categories: a stool is “a seat (for one person) without arms or a back” while a chair is “a seat for one person [...]; [...] movable four-legged seat with a rest for the back” (OED Online). However, if one were to say ‘chair’ for a barstool, would that mean that the person was mixing up two perceptual categories? Actually the person would only be using an English word incorrectly and mixing up two conceptual categories relative to the “*conceptualizations* [that have been] shaped for symbolic purposes according to the dictates of linguistic convention” in the history of English (Langacker 1987: 98). The person might be a speaker of another language in which certain instances of these two particular kinds of “objects [...] are considered equivalent” for purposes of categorization (Rosch 1978: 30), like for instance in German, where conceptualizations different from those manifest in English have become conventionalized, probably also due to the relativity of perception and cognition manifest in Rosch’s (1978: 29) principle of perceived world structure. Thus, English *barstool* is not a hyponym of *chair*, but they are both hyponyms of *furniture*. In contrast, German *Barstuhl* ‘barstool’ is a hyponym of *Stuhl* ‘chair’, and so *Stuhl* is a basic level term and *Barstuhl* is its subordinate.

These examples show that categorization at the basic level in the form of linguistic-conceptual categories does not directly correspond to perceptual or even perceptually salient attributes of objects. The perceptual basic level and the linguistic-conceptual basic level diverge as they are results of cognitively different mechanisms yielding not exactly similar representations of reality. Crosslinguistic differences in basic level categorization obviously do not mean that the human perceptual system works in different ways from language to language or culture to culture. The linguistic relativity effect – which doubtlessly exists – only means that linguistic-conceptual cognitive processes may affect our focus of attention and therefore different features of phenomena may *appear* to be perceptually salient. Consequently, the basic level in language is an idiosyncratic reflection of the perceptual basic level, which is the result of varying conceptualizations manifest in the linguistic-conceptual categories of the particular languages.

4. Basic level categories vs. basic level terms

It follows from the previous explication that designating basic level categories in language is not a simple labeling process. When they become coded in language, they only serve as a basis for the conceptualizations that lead to the emergence of linguistic-conceptual categories. Because of this, discrepancies between the perceptual basic level and the linguistic one do not only occur crosslinguistically. It occurs also within one language that linguistic-conceptual categorization is inconsistent with the perceptual representations of entities, or conversely, that perceptual similarities or differences outweigh conceptual knowledge and lead to logical inconsistencies in linguistic categorization. Such issues can be better understood and explained by making an explicit distinction between the two cognitive modes (the perceptual and the linguistic) of basic level categorization.

For instance, Barbara C. Malt (2015: 329) ponders in connection with the linguistic routine of adults with regard to word choice, why it is more common to use the subordinate term *penguin* instead of *bird* when talking about penguins, although *bird* is the basic level. She suggests that due to being an atypical member in its category the subordinate level term is used and therefore heard most often for this member, which influences word choice. However, while this factor certainly plays an important role, the fact that in the scientific biological taxonomy of vertebrates penguins are subordinate to birds does not affect what we recognize as basic and subordinate levels. If this were so, mammals should also be recognized as basic level on the basis of purely scientific knowledge. It is the perception of the phenotypic appearance of other life forms resulting from their evolutionary adaptation to – and reflecting – different ways of life and habitats (rather than the knowledge of their evolutionary connections as represented in the taxonomy) that is relevant for us in categorization when interacting with our natural environment.

Thus, categorization at the basic level depends first of all on perceptual processing and only subsequently on how this perceptual information is integrated along with other types of information into a linguistic-conceptual category that underlies the meaning of a basic level term. The explanation for the above state of affairs is apparently the fact that – based on the common image and representative shape criteria – the category PENGUIN is processed as basic level since perceptually it is not that obvious that a penguin belongs to the same group of ‘things’ as several other ‘things’ in the world that are mostly called birds. This nonlinguistic cognitive status of the category is inherited by its linguistic representation reflected in the status of the term, i.e., its relatively early appearance in lexical development and high frequency of use. Thus, *penguin* appears to be a basic level term even if penguins are indeed subordinate to birds in a biological taxonomy. The knowledge that penguins are (subordinate to) birds is expert knowledge that has become

encyclopedic but is not reflected in linguistic taxonomy due to the strong influence of perceptual information, which results in a logical inconsistency in linguistic categorization.

The already mentioned category *NUT* provides a prime example for the discrepancy between the linguistic and the perceptual basic levels. This inconsistency can be further illustrated by the classic example of the category *CHAIR*. In spite of the fact that the resemblance in shape between a kitchen chair and a heavily upholstered armchair is rather relative – they hardly conform to a common gestalt – they are both subordinate to the same basic level linguistic category as entailed by their shared designation as *chair*. Furthermore, if we take the categories *CHAIR* and *STOOL*, we face the problem that a stool resembles a chair a lot more than a chair resembles a heavily upholstered armchair and the two are also a lot closer in function (e.g., a kitchen chair and a barstool). Nevertheless, *STOOL* is not subordinate to *CHAIR*. To take another example, a common image and an averaged shape may appear more realistic for the basic level categories *TABLE* and *DESK* – compared to *CHAIR* and *ARMCHAIR* – as several desks differ from tables mostly by virtue of their function and not so much by their shape. However, their designations suggest that they are basic level terms, subtypes of furniture in linguistic categorization.

Such incongruities are due to the fact that Rosch's perceptual criteria for the definition of basic level categories (common image, averaged shape, same motor movements) and the implications of this definition for language (acquired first, used most often, emerging first in the history of languages) converge only in theory. In practice these implications are relative to the way the perceptual characteristics of the basic level are overwritten by the mechanisms of linguistic-conceptual categorization. Due to the influence of the conventionalized linguistic conceptualization inherent in the meaning of the basic level term, the scope of the perceptual category may not completely overlap with the referential scope of the term. In other words, the usage of the basic level term as a referring expression will not be in line with what is to be expected on the basis of the perceptual definition of the category.

In addition, a significant degree of cultural variation has also been observed in the level that can be considered basic in a folk taxonomy of flora and fauna (e.g., Lakoff 1987: 37; Kövecses 2006: 46). Thus, for instance for “indigenous people or people who live close to nature [...] categories, such as *OAK*, *MAPLE*, and so on” are basic level when it comes to naming objects in their natural environment, whereas “city dwellers [...] tend not to make finer distinctions in the overall shape of different kinds of trees” (Kövecses 2006: 46). This type of naming behavior very clearly shows the functional relevance and essence of linguistic-conceptual categorization for the interaction with the environment in a particular sociocultural setting. The same can be seen in the above example with the category *NUT* except for the fact

that the basic level has been raised with respect to perceptual appearance, whereas in the case of OAK and MAPLE it has been lowered.

This kind of cultural variation in categorization derives from the different semantic organization of lexical structure in the different languages. We see the world through these categories and the cultural knowledge contained in the meanings of words will also influence our perceptual categorization (e.g., Davidoff 2001). Gary Lupyan (2012b) has shown that variations in naming practices may have a major effect on perception and cognition. It has also been suggested that perception does not consist of culturally universal processes because the focus of perceptual attention is influenced by cultural patterns (Nisbett & Miyamoto 2005: 468). This is not surprising at all as this is exactly the function of such categories in accordance with the cognitive function of language. The conceptual categories embodied in the words of a language represent perspectives that prove and have proven useful and adaptive in the given cultural context. These cultural conceptualizations have emerged in the history of a social group in order to provide culturally adaptive and functional perspectives on the natural and sociocultural environment of the people inhabiting it and interacting with it. They have become fixed in language in the process of lexical-semantic change in order to provide efficient means for communication and thinking in and about that context and environment (Györi 2000, 2004; Regier et al. 2015).

Malt et al. (2011) have also shown that words in different languages with theoretically similar meanings do not identify any universally shared basic concepts. The function of linguistic symbols is precisely that they “are based not on the recording of direct sensory or motor experiences, as are the cognitive representations of other animal species and human infants” (Tomasello 1999: 9) but lend us the possibility of having various cognitive perspectives on our environment. But explaining and investigating the influence of language on perception is only one side of the coin. It is equally important to explain the influence of perception on language, i.e., what role our biologically determined nonlinguistic perceptual categorizing capacity plays in the fact that languages divide up reality in different ways. After all, perceiving what the human perceptual system makes us universally perceive is prior to the cultural knowledge and conventions that affects our perception of the world in a nonuniversal way through linguistic categories (Tomasello 1999: 9, 167). Therefore, nonlinguistic cognitive processing of basic level categories based on sensory information structured and processed by the human perceptual system does not vary across cultures. Both the crosslinguistic differences and the incongruities within one language with regard to the basic level can be better understood and more precisely explained on this basis.

Thus, for instance, the basic level status of the term for TREE vs. terms for OAK, MAPLE, etc. in the taxonomy of a particular language depends on the naming

behavior of adult speakers – affecting also lexical development in children – which ultimately depends on culturally conventional interactions with the environment. However, independently of this linguistic status, in nonlinguistic perceptual processing TREE is still the most inclusive level for which we can form an image and an averaged shape is “representative of the class as a whole” (Rosch 1978: 34). Members of a category processed in this manner will be seen in the same way and also motor movements connected to them will be carried out in the same way. Therefore the category will be basic level perceptually independently of its status in a linguistic taxonomy. To take an example of real physical interaction with the environment, if a tiger is chasing one, it is a tree that one can climb up in irrespective of whether it is an oak, a maple or any other kind of tree. Furthermore, even if one is an expert on tigers, it is most probably the capacity of one’s perceptual system to recognize the category TIGER by its common overall shape and not one’s knowledge of the perceptual differences between a Bengal tiger and a Siberian tiger that is going to save one’s life. In such circumstances it is especially important that the identification of a basic level category requires less effort because here the visual processing of the general shape is enough, while in the case of the recognition of subordinates the visual system must extract additional finer details (Collin & McMullen 2005: 354). This bias for general shape perception as an identifier of the basic level is also strengthened by the fact that details of visual sensory information – that could identify a subordinate level instance – may get lost under certain viewing conditions, e.g., larger viewing distance (Archambault et al. 2000: 589).

In the following I will turn to a brief empirical investigation of some crosslinguistic examples in connection with the relationship between basic level categories and basic level terms. In spite of the close connection of the meanings of basic level terms with perception, words representing basic level categories may also differ considerably in their semantics in a crosslinguistic comparison. Even these words have the function of not simply serving as recall labels for otherwise nonlinguistic representations of perceptual categories but of providing us with a functional and adaptive sociocultural perspective – contained in the conceptualizations underlying word meanings – of our particular environment. The crosslinguistic variations resulting from this state of affairs can be better understood by recognizing the difference between the nonlinguistic perceptual cognitive representations of basic level categories and the basic level conceptual categories in language. Just as in the case of the inconsistencies within one language, investigating the interactions between the two sides of the basic level can help us come closer to an explanation of the cognitive basis of these variations.

I will compare some basic level noun categories from different languages with regard to their categorial scope, by which I mean the range of members included

in the category. In linguistic categorization the semantics of the designating word, i.e., the inherent conventionalized conceptualization, has a large influence on the scope of the category. The examples below do not concern the nonuniversality of the basic level in the sense that crosslinguistically it may occupy different hierarchical positions in comparable taxonomies in the languages of different cultures as in the above example of TREE vs. OAK and MAPLE. The variations illustrated by these latter examples depend on culturally differing routines and practices in the everyday interaction with the environment, which is adaptively reflected in the individual languages in order to function as efficient communicative tools in these routines and practices.

When investigating object categories it is useful and expedient to make a distinction between categories of natural kinds and of artifacts because “living things differ in terms of distinctive perceptual features, whereas artifacts differ in terms of distinctive perceptual and functional information” (Tyler et al. 2000: 210). Superordinates of artifacts may even be totally devoid of perceptual features and “specify a *kind of function*” only without any reference to structural attributes (Wierzbicka 1984: 317). The category FURNITURE groups objects together purely on the basis of their culturally conventionalized functions, whereas members of the category MAMMAL have no function at all.

This kind of difference is present at the basic level as well and affects the scopes of categories. Especially in the case of artifacts there is considerably more room for conceptual fuzziness compared to natural kinds. With natural kinds the perceived structure of the world does not allow for too much cultural deviation at the basic level (Kövecses 2006: 44). The relevance of studying folk taxonomies of natural kinds relates to how they reflect cultural knowledge or belief systems about the natural world, which can then be compared with other cultural systems on the one hand and scientific knowledge on the other (e.g., Atran et al. 1997). Taxonomies of artifacts do not reflect belief systems of this kind. They are based on cultural conventions reflecting a kind of conceptual categorization which is cultural only in the sense that it differs from that of other cultures as represented in the particular language and therefore often even appears to be random.

In the case of natural kinds categorial scopes do not seem to differ even if there are crosslinguistic differences in the taxonomic levels to which objects are assigned. This is probably due to the aforementioned influence of perception rather than sociocultural function on categorization and to the lack of variation in the appearance of these entities. Although the categories are mostly overlapping crosslinguistically as a result of this perceptual invariance, the linguistic basic level may occur in different places in the taxonomy, as in the case of TREE vs. OAK and MAPLE. These differences are a consequence of the perceptual categories being overwritten by cultural conceptualization but only regarding the distribution of

levels in taxonomies. To take the already mentioned example, English *nut* does not have a corresponding basic level term in Hungarian. Hungarian only has terms corresponding to its subordinates, *walnut*, *chestnut*, and *hazelnut*, i.e., Hungarian *dió*, *gesztenye*, and *mogyoró*. They are basic level not only perceptually as are their English equivalents (see above), but they are basic level also linguistically. This is also implied by the monomorphemic structure of these words, a relatively common characteristic of basic level terms as compared to subordinates (see Geeraerts 2010: 201).

Another example from these two languages represents a reverse case. The English words *crab*, *lobster*, and *shrimp* are clearly basic level terms, and the claim that they are also basic level perceptually appears to be justified. In Hungarian, however, the corresponding terms *tengeri rák*, *homár*, and *garnéla rák* are subordinates of *rák* (approximately ‘crustacean’), which is the basic level term, as also implied by the morphological structure of the expressions. The meaning of *rák* also represents a more common concept, which is responsible for its earlier appearance in lexical development and higher frequency of usage. Interestingly, in view of the basic level status of English *crab*, *lobster*, and *shrimp*, it seems to be controversial whether a common image appears to be realistic for *rák*. However, the perceptual basic level status of *rák* must be very similar to the situation with the basic level status of the term *bird*, which designates a category that is basic level also perceptually in spite of the fact that it does not cover all entities in the world that are biologically birds. Thus, whereas in some cases cultural knowledge overrides perceptual effects, in these cases the linguistic basic level of categorization does not depend on our knowledge of facts about the world but on how our perceptual system processes sensory information about it and that the boundaries of basic level categories may be strongly influenced by perceptual prototype effects. These examples again demonstrate the independence of the perceptual and the linguistic basic levels of each other.

In the case of artifact categories, contrary to natural kinds, effects of perception are more likely to be modified by knowledge of cultural convention and function. An analysis of artifact terms shows that even if semantically comparable words are at the same level crosslinguistically, the basic level, they do not always designate the same categories. The categories have different categorial scopes due to which the terms have different referential scopes. Such crosslinguistic differences stem from the different conceptualizations of elements of external reality, which cause their linguistic representations to be organized into lexical fields in different ways (see Crespo 2013: 69). These conceptualizations are strongly influenced by culturally salient functional considerations as they are at least as relevant as perceptual ones in our interaction with the environment and these conceptualizations will be manifest in the linguistic categories operating in the cognitive processes governing

this interaction. It is important to note that in the case of basic level artifact terms cultural salience does most of the time not necessarily mean a direct connection to culture in the sense of traditions, belief systems or ways of life. For instance the conceptual categorizations differentiating between CHAIR and STOOL appear to be the result of accidental historical linguistic development, since the borrowing of *chair* from Old French must have had an effect on the subsequent development of the meaning of the word *stool*, which is of Germanic descent. This event excluded the possibility of any kind of parallel semantic development of *stool* with its German cognate *Stuhl* 'chair.' Thus different cultural conventions emerged as to what types of objects to include in these linguistic categories.

The basic level terms in various languages that are in theory semantically equivalent to the English basic level term *chair* provide good examples to illustrate the differences in cultural conventions of designating basic level artifact categories. The deviating scopes of the categories in the examples demonstrate the importance of differentiating between linguistic basic level categories and perceptual ones and show that *gestalts* do not identify basic level terms. Thus, the English term *chair* is used to refer to both of the schematic images (representative of two types of objects) in Figure 1, image A and image B. In other languages the terms theoretically meaning 'chair' have a narrower referential scope and can refer to objects represented by image A only, e.g., Chinese 椅子 (*yǐzi*), German *Stuhl*, Hungarian *szék*, Russian *стул* (*stul*), Spanish *silla*, Turkish *sandalye*. These languages all have different expressions for objects represented by image B. Obviously, the scopes of the linguistic basic level categories underlying the meanings of the basic level terms in these languages differ from that of the English term, which has a different referential scope and therefore does not designate the same category.

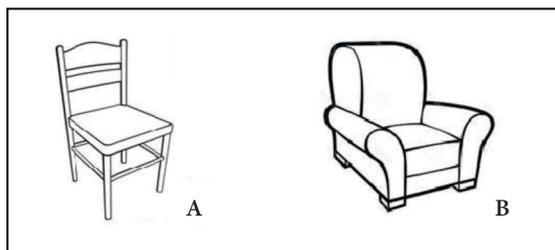


Figure 1. Images of chair

From these languages Chinese, Spanish and Turkish are especially interesting with respect to designating members of the object category represented by image B. Chinese 单人沙发 (*dānrén shāfā*) is a compound and literally means 'single sofa,' which points to the cultural conceptualization of these types of objects as being a subordinate category of SOFA, whereas they form a subordinate of CHAIR in the

case of English. Actually the same is true for Turkish with the difference that the linguistic expression is not a compound but a syntactic phrase, *tek kişilik koltuk*, which literally means ‘sofa for one person.’ On the other hand, Spanish *sillón* is a derivative of *silla* with the augmentative suffix *-ón*, thus meaning approximately ‘big chair,’ but constituting a conceptual category of its own.

Paradoxically this linguistic bias does not disappear when we use the conventional notation of full capitals for theoretically language independent labels of categories (in order to distinguish them from words in a given language). If we take English *chair* and German *Stuhl* (theoretically ‘chair’) and convert them into category labels, which are in theory uninfluenced by their meanings as words in the respective languages, will it be true that the scope of the category is the same in both cases, i.e., that they label the same category? How are we to decide for instance whether the category in question includes *SESSEL*, which as a German word means ‘a type of furniture with a back and arms heavily upholstered for comfortable sitting,’ or not? This type of furniture is not included in the meaning of *Stuhl* as a word but is included in the meaning of *chair*. Why would *STUHL* suddenly include *SESSEL* too on the basis that it is not a German word anymore but a language independent category, or why would *CHAIR* suddenly exclude (heavily upholstered) *ARMCHAIR*? Who is to decide and on what grounds and by what logic whether *STUHL* should include *SESSEL* or *CHAIR* should not include (heavily upholstered) *ARMCHAIR* when they are not supposed to function as words in particular languages but as notational labels of categories independent of any language? At best we can apply to common sense and assume that only perceptually prototypical members are included, which is, however, also relative to a great extent.

The category *CUP* is also a frequent example in studies on categorization. Theoretically its German counterpart would be *TASSE*, but not surprisingly these are not the same basic level categories in terms of *gestalts*. The category *CUP*, because of its English designation *cup*, includes not only drinking vessels with a handle but also objects resembling a glass rather than a cup with a handle but not made of glass. However, the categorial scope of *TASSE*, due to its corresponding German word *Tasse*, extends only to drinking vessels with a handle. Drinking vessels without a handle and not made of glass belong to the category *BECHER* when designated in German. These categories compared to their Hungarian ‘equivalents’ look again different. Hungarian *csésze* means ‘drinking vessel with a handle’ and therefore the category *CSÉSZE* should include only such objects. Hungarian does not have a separate basic level term for drinking vessels without a handle not made of glass. Hungarian *pohár* means ‘drinking vessel without a handle made of any material,’ because of which the scope of the basic level category *POHÁR* extends both to cups without handles and glasses, i.e., to objects designated in German as *Becher* and *Glass* respectively. Obviously, the linguistic difference is not directly

due to perceiving the world differently but to semantic blocking as a result of the fact that the designating term contains the name for 'glass' as a material. It is another issue that the difference in the semantics of these terms predestines linguistic relativity effects in the form of perceiving different attributes and appearances as salient in the case of these objects.

Many examples for this kind of discrepancy can be found in crosslinguistic comparisons. The various types of objects mentioned above can all be recognized as perceptually different in the same universal way because visually the individual types can be identified by common schematic images and represented by averaged shapes. This means that in visual perception they form their separate basic level categories which are independent of language. As the examples show, linguistic categorization does not reflect this perceptual information in a true and precise manner because it is a different mode of representation that contains additional conceptual information to the perceptual one.

When the perceptual information about the world becomes coded in the form of word meanings in the history of the particular languages, the additional conceptualization supplements this information with a culturally relevant cognitive perspective that is useful in interacting with the given natural and sociocultural environment. This is where linguistic relativity steps in. It is not a side effect of linguistic categorization but the direct manifestation of the cognitive function of language. This function is to provide an adaptive social perspective on the speakers' environment, which includes also the expedient guiding and structuring of our perception as required for proper interaction. The usefulness of basic level terms as reflected in early acquisition and frequency of use derives from this function.

5. Conclusion

My aim in this paper was to show that the common view that basic level object categories correspond to words whose meanings can be identified through perceptual gestalts leads to problems in accounting for certain linguistic phenomena. These phenomena are most conspicuously the two facts that basic level terms denoting objects do not always conform to a common gestalt (but instead terms at other levels do) and that crosslinguistically semantically similar and thus seemingly corresponding basic level terms designate categories with different scopes and therefore conform to different gestalts.

Thus, an approach to basic level categorization merging perceptual and linguistic criteria with equal weight cannot be correct. What are commonly called basic level categories in language are distinct from basic level categories that emerge in our perceptual system based on its biologically determined functioning. The

linguistic status of a term as basic level is not a direct outcome of basic levelness in terms of perception. Basic level categories are processed primarily in the perceptual system based on sensory information independently of language while linguistic basic level categories, corresponding to the meanings of basic level terms, are based on the conventionalized cultural conceptualizations of these perceptual experiences. Furthermore, the emergence of basic level meanings in the history of a language is also affected by linguistic mechanisms and the characteristics of linguistic structure.

Of course, the perceptual characteristics of basic level categories exert a major influence – often a decisive one – when such categories are coded linguistically. Designating them in language plays a crucial role in human individual and social cognition. This relevance derives from the cognitive and communicative usefulness of basic level designations because they reflect our physical reality most closely and thereby directly facilitate everyday interaction with the environment. But since this is always interaction with the particular natural and sociocultural environment in a given culture, the meanings of the arising basic level terms are affected by cultural conceptualizations and also by the structure of the particular language in question. The cognitive function of the linguistic relativity effect is to tune our originally nonlinguistic mode of perception to sensory inputs that are culturally salient and expedient in the given environment.

References

- Archambault, A., Gosselin, F., & Schyns, P. G. (2000). A natural bias for the basic level?. In L. R. Gleitman & A. K. Joshi (Eds.), *Proceedings of the twenty-second annual conference of the Cognitive Science Society* (pp. 585–590). Mahwah, NJ: Lawrence Erlbaum.
- Atran, S., Estin, P., Coley, J., & Medin, D. (1997). Generic species and basic levels: Essence and appearance in folk biology. *Journal of Ethnobiology*, 17(1), 17–43.
- Cangelosi, A., & Harnad, S. (2001). The adaptive advantage of symbolic theft over sensorimotor toil: Grounding language in perceptual categories. *Evolution of Communication*, 4, 117–142. doi:10.1075/eoc.4.1.07can
- Collin, C. A., & McMullen, P. A. (2005). Subordinate-level categorization relies on high spatial frequencies to a greater degree than basic-level categorization. *Perception & Psychophysics*, 67(2), 354–364. doi:10.3758/BF03206498
- Crespo, B. (2013). *Change in life, change in language. A semantic approach to the history of English*. Frankfurt am Main: Peter Lang. doi:10.3726/978-3-653-02894-2
- Davidoff, J. (2001). Language and perceptual categorization. *TRENDS in Cognitive Sciences*, 5(9), 382–387. doi:10.1016/S1364-6613(00)01726-5
- Diesendruck, G. (2003). Categories for names or names for categories? The interplay between domain-specific conceptual structure and language. *Language and Cognitive Processes*, 18, 759–787. doi:10.1080/01690960344000116

- Geeraerts, D. (1997). *Diachronic prototype semantics. A contribution to historical lexicology*. Oxford: Clarendon Press.
- Geeraerts, D. (2010). *Theories of lexical semantics*. Oxford: Oxford University Press.
- Gallese, V., & Lakoff, G. (2005). The Brain's concepts: the role of the Sensorymotor system in conceptual knowledge. *Cognitive Neuropsychology*, 22(3–4), 455–479.
doi: 10.1080/02643290442000310
- Glushko, R. J., Maglio, P. P., Matlock, T., & Barsalou, L. W. (2008). Categorization in the wild. *TRENDS in Cognitive Sciences*, 12(4), 129–135. doi: 10.1016/j.tics.2008.01.007
- Golinkoff, R. M., Shuff-Bailey, M., Olguin, R., & Ruan, W. (1995). Young children extend novel words at the basic level: Evidence for the principle of categorical scope. *Developmental Psychology*, 31(3), 494–507. doi: 10.1037/0012-1649.31.3.494
- Goodson, F. E. (2003). *The evolution and function of cognition*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Györi, G. (1996). Historical aspects of categorization. In E. H. Casad (Ed.), *Cognitive linguistics in the Redwoods. The expansion of a new paradigm in linguistics* (pp. 175–206). Berlin and New York: Mouton de Gruyter. doi: 10.1515/9783110811421.175
- Györi, G. (2000). Semantic change as linguistic interpretation of the world. In S. Niemeier & R. Dirven (Eds.), *Evidence for linguistic relativity* (pp. 71–89). Amsterdam & Philadelphia: John Benjamins. doi: 10.1075/cilt.198.07gyo
- Györi, G. (2001). Symbolic cognition: its evolution and adaptive impact. In G. Györi (Ed.), *Language evolution: Biological, linguistic and philosophical perspectives* (pp. 113–129). Frankfurt am Main: Peter Lang Verlag.
- Györi, G. (2002). Semantic change and cognition. *Cognitive Linguistics*, 13(2), 123–166.
doi: 10.1515/cogl.2002.012
- Györi, G. (2004). Semantic-lexical change at the crossroads between universals and linguistic relativity. A perspective from cognition and evolution. In W. Mihatsch & R. Steinberg (Eds.), *Lexikalische Daten und Universalien des semantischen Wandels / Lexical data and universals of semantic change* (pp. 19–37). Tübingen: Stauffenburg.
- Harnad, S. (1990). The symbol grounding problem. *Physica D* 42, 335–346.
doi: 10.1016/0167-2789(90)90087-6
- Harnad, S. (2005). To cognize is to categorize. Cognition is categorization. In H. Cohen & C. Lefebvre (Eds.), *Handbook of categorization in cognitive science* (pp. 20–43). Amsterdam: Elsevier. doi: 10.1016/B978-008044612-7/50056-1
- Kövecses, 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. doi: 10.7208/chicago/9780226471013.001.0001
- Langacker, R. W. (1987). *Foundations of cognitive grammar. Volume 1: Theoretical prerequisites*. Stanford, CA: Stanford University Press.
- Lupyan, G. (2012a). What do words do? Toward a theory of language-augmented thought. In B. H. Ross (Ed.), *The psychology of learning and motivation*, Vol. 57: (pp. 255–297). Amsterdam: Elsevier. doi: 10.1016/B978-0-12-394293-7.00007-8
- Lupyan, G. (2012b). Linguistically modulated perception and cognition: The label-feedback hypothesis. *Frontiers in Psychology*, 3, Article 54. doi: 10.3389/fpsyg.2012.00054
- Lupyan, G. (2016). The centrality of language in human cognition. *Language Learning*, 66(3), 516–553. doi: 10.1111/lang.12155

- Malt, B. C. (2015). Words as names for objects, actions, relations, and properties. In J. R. Taylor (Ed.), *Handbook of the word*. Oxford: Oxford University Press (pp. 320–333).
- Malt, B. C., Ameel, E., Gennari, S., Imai, M., Saji, N., & Majid, A. (2011). Do words reveal concepts?. In L. Carlson, T. F. Shipley & C. Hoelscher (Eds.), *Proceedings of the thirty-third annual conference of the Cognitive Science Society* (pp. 519–524). Mahwah, NJ: Lawrence Erlbaum.
- Mohan, K., & Arun, S. P. (2012). Similarity relations in visual search predict rapid visual categorization. *Journal of Vision*, 12, 19. doi: 10.1167/12.11.19.
- Nisbett, R. E., & Miyamoto, Y. (2005). The influence of culture: Holistic versus analytic perception. *TRENDS in Cognitive Sciences*, 9 (10), 468–473. doi: 10.1016/j.tics.2005.08.004
- OED Online. March 2017. Oxford University Press.
- Pruden, S. M., Hirsh-Pasek, K., Golinkoff, R. M., & Hennon, E. A. (2006). The birth of words: Ten-month-olds learn words through perceptual salience. *Child Development*, 77(2), 266–280. doi: 10.1111/j.1467-8624.2006.00869.x
- Quiatt, D., & Reynolds, V. (1993). *Primate behaviour. Information, social knowledge, and the evolution of culture*. Cambridge: Cambridge University Press.
- Regier, T., Kemp, C., & Kay, P. (2015). Word meanings across languages support efficient communication. In B. MacWhinney & W. O’Grady (Eds.), *The handbook of language emergence* (pp. 237–263). Oxford: Wiley Blackwell.
- Rogers, T. T., & McClelland, J. L. (2004). *Semantic cognition: a parallel distributed processing approach*. Cambridge, MA & London, England.
- Rosch, E. H. (1978). Principles of categorization. In E. Rosch & B. B. Lloyd (Eds.), *Cognition and categorization* (pp. 27–48). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Rosch, E. H., Mervis, C. B., Gray, W. D., Johnson, D. M., & Boyes-Braem, P. (1976). Basic objects in natural categories. *Cognitive Psychology*, 8(3), 382–439. doi: 10.1016/0010-0285(76)90013-X
- Storms, S., Spelman, D., Geeraerts, D., & Storms, G. (2015). Within-concept similarities in a taxonomy: a corpus linguistic approach. *Language and Cognition*, 7(2), 194–218. doi: 10.1017/langcog.2014.22
- Tomasello, M. (1999). *The cultural origins of human cognition*. Cambridge, MA & London, England: Harvard University Press.
- Tyler, L. K., Moss, H. E., Durrant-Peatfield, M. R., & Levy, J. P. (2000). Conceptual structure and the structure of concepts: A distributed account of category-specific deficits. *Brain and Language*, 75, 195–231. doi: 10.1006/brln.2000.2353
- Waxman, S. R., & Lidz, J. L. (2006). Early word learning (pp. 299–335). In D. Kuhn & R. Siegler (Eds.), *Handbook of child psychology. Volume 2: Cognition, perception and language*. (6th edition) Hoboken, NJ: Wiley.
- Westermann, G., & Mareschal, D. (2014). From perceptual to language-mediated categorization. *Phil. Trans. R. Soc. B* 369, 20120391. doi: 10.1098/rstb.2012.0391
- Wierzbicka, A. (1984). “Apples” are not a “kind of fruit”: The semantics of human categorization. *American Ethnologist*, 11(2), 313–328. doi: 10.1525/ae.1984.11.2.02a00060
- Zayan, R., & Vauclair, J. (1998). Categories as paradigms for comparative cognition. *Behavioural Processes*, 42, 87–99. doi: 10.1016/S0376-6357(97)00064-8

Author's address

Gábor Györi
H-7624 Pécs, Ifjúság útja 6
Hungary
gyori.gabor@pte.hu