Making sense of sensory perceptions across languages and cultures

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Abstract

This article has two aims: (i) to give an overview of research on sensory perceptions in different disciplines with different aims, and on the basis of that (ii) to encourage new research based on a balanced socio-sensory-cognitive approach. It emphasizes the need to study sensory meanings in human communication, both in Language with a capital L, focusing on universal phenomena, and across different languages, and within Culture with a capital C, such as parts of the world and political regions, and across different cultures, such as markets, production areas and aesthetic activities, in order to stimulate work resulting in more sophisticated, theoretically informed analyses of language use in general, and meaning-making of sensory perceptions in particular.

Keywords: semantics, discourse, evidentiality, conceptual preference hierarchy**,** socio-sensory-cognitive triad, metaphor, metonymy, vision, sight, smell, taste, touch, texture, olfactory, gustatory.

1. Sensory perceptions in human communication

Sensory perceptions play a crucial role in our daily encounters with the world in all kinds of activities, such as when we buy clothes, stationary, toothpaste and soap, choose a restaurant or download mobile ring signals. We make those decisions based on our preferences for certain colours, smells, textures, tastes and sounds. However, in spite of their importance for human beings, research on the role of sensory perceptions for the meaningful functioning of human communication and the role of perceptions for cognition and meaning in language is limited.

For various reasons, researching the language of sensory perceptions is a challenging task. One reason is that some sensations, in particular smell, taste and touch, can only be experienced in contact with a person's body, which makes it difficult to pin-point and agree on referential meanings in communication. Another reason is that there is an alleged lack of words in many languages, particularly in the domain of smell. Yet, this allegation may very well be a symptom of insufficient semantic analyses in combination with lack of empirical socio-cultural

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research within and across languages. What makes those analyses complicated is that many of the resources that languages offer to express sensory meanings apply *across* the senses, which is often taken as a sign of there being no or few words for say smell. Now, if this is the case, this should also be true of a couple of the others as well. The mappings between language forms and the ontological sources of the profiled meanings are more often than not synaesthetic, i.e. the same words are used across the senses as in *dark colours, dark tastes, dark smells* and *dark sounds.* In addition, words and constructions pertaining to sensory perceptions are used to express emotions, suggesting a very close coupling between perceptions and emotions. For instance, we often refer to people's sensitivity as *somebody being touchy*, to people's vulnerability as *smelling their blood*, or bad experiences as *leaving a bad taste in our mouths*, *unpalatable* or *unsavoury*, and pleasant experiences as *music to our ears* or *a sight for sore eyes*.

The view of the importance of the body for human language and thinking is a basic tenet in Cognitive Linguistics. Sensory perceptions are subsumed under the notion of *embodiment*, i.e. the belief that human thinking is ultimately motivated by our bodily configuration and sensorimotor experiences. However, in spite of its basic role, perception has, to a large extent, been neglected by cognitive scholars, and cognition has been granted the lion's share in explanations for how we construe and communicate our worlds (but see the work on the role of the sensory system in meaning-making by Barsalou 2010; Classen 1993; Gärdenfors 2014; Howes 2007; Paradis 2016). This volume sets out to strike a better balance between perception and cognition in the context of language by taking a closer look at the core of the matter of embodiment, namely sensory perceptions, exploring how speakers of different languages and different cultures use language to describe visual experiences, smell, taste, texture and sound. It capitalizes on the vocabularies as such across languages and across cultures, the syntagmatic frames specific to sensory descriptions of the different modalities and the discursive functions that words related to the different sensory modalities take on. Our goal is to shed light on the importance of perceptions *for* and *in* language use and to encourage new

developments in research on the fundamental role of sensory perceptions for how we think about the world and how we express ourselves in accordance with that, and to encourage further developments of the modelling of meaning in language on a balanced socio-sensory-cognitive basis.

The procedure is as follows. Section 2 discusses the role of perception in different research disciplines, its relation to cognition and the presence or absence of a clear distinction between perception and cognition. Section 3 gives an outline of different aspects of the roles of perception and cognition for meaning in language and language use in human communication. Section 4 deals with sensory perceptions from a cultural perspective and points out some insufficiently covered areas of research. In Section 5, the contributions to this special issue are presented. Finally, Section 6 offers some thoughts about avenues for future research.

2. Perception and cognition: Two sides of the same coin

The view of the sensorium as intrinsic to thinking the world is far from new; rather, it has always been at the centre of the ontological and epistemological discussions in philosophy — from Aristotle's ideas of *sentience* and *common sense* as ultimately responsible for apprehending the world in *De Anima*, through Kant's phenomenological approach to reason in *Critique of Pure Reason* to Merleau Ponty's claims (1945/1952, 1968) that the body is the seat of knowledge, the flesh of the world. This sensual dimension of cognition is also the starting premise in disciplines such as anthropology, psychology and neuroscience (e.g. Bianchi & Savardi 2008; Binder & Desai 2011; Borghi & Cimatti 2010; Dutton 2009; Howes 2003, 2011, 2013; Howes & Classen 2014; Savardi 2009). For instance, anthropologist David Howes describes cultures as "ways of sensing the world" (Howes 2003: 16) and psychologists Borghi & Cimatti (2010: 772) see cognition as socially and bodily situated and mediated through language, relying on what they call our *sense of body*, i.e. a notion explained as "grounded first in sensation, then in action, and finally in language".

Some of the tenets thus embraced by anthropologists lie at the heart of the slow, but steady sensory shift currently observed in disciplines such as archaeology, communication studies, design and marketing.[1] As already mentioned, the basic assumption in Cognitive Linguistics is that the way we conceive of the world is the way we perceive it and *vice versa* (Langacker 1987; Paradis 2003; Talmy 2000). This intimate relationship between the mind and the body is also crucial in approaches related to Cognitive Linguistics such as research within Embodied/Situated Cognition (e.g. Barsalou 1999, 2010; Beveridge & Pickering 2013, Gee 2010; Kirshner & Whitson 1997; Lave 1988; Tomasello 1999, 2003) and Enactivism (Ellis & Newton 2005; McGann & Torrance 2005; Thompson 2007; Varela *et al.* 1991). Recent neurobiological research has shown that texture-selective somatosensory cortex is activated when textual metaphors are processed (Lacey *et al.* 2012), and brain responses indicate that conceptual representations consist of multiple levels of abstraction from sensory, motor and affective input, and that activation of these modalities is influenced by factors such as contextual demands, frequency and familiarity (Binder & Desai 2011).

Talmy (2000: 139–140) has pointed out that much psychological discussion in the cognitive realm has implicitly or explicitly treated perception as a single category of cognitive phenomena. To the extent that distinctions have been made in the literature, sensation has been treated as a subcategory of perception which, in turn, has been contrasted with conception/cognition. Talmy notes that psychologists not only disagree on where to locate the boundary between perception and cognition, but also on whether there in fact is a principled basis for a boundary between them. Therefore, he thinks it advisable to work according to the premise that there are no discrete categories or clearly located boundaries. When dealing with *fictive motion*, i.e. the dynamic predication of static entities, as in landscapes *rushing past* the

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[1] This sensual shift can also be seen in technical disciplines such as architecture, where we find architects advocating a sensual approach to build space, usually from a phenomenological perspective — from the early attempts by Bloomer & Moore (1977) and Rasmussen (1959) to more contemporary views in Pallasmaa (1996/2005, 2009) and Zumthor (2006). Consider Howes' overview at http://www.sensorystudies.org/sensorial-investigations/the-expanding-field-of-sensory-studies.

travellers in a train, Talmy (1996, 2000) argues for the usefulness of the notion of *ception* which conflates perception and conception, and which also includes aspects of the processing of sensory stimulation, mental imagery, thinking and affect.

A similar, yet more far-reaching view, encompassing not only vision but also smell, taste and touch can be found in Paradis & Eeg-Olofsson (2013) and Paradis (fc.). Exploring a range of the linguistic resources used to describe sensory experience, Paradis & Eeg-Olofsson (2013) question views of sensory perception as primed by one sense at a time and the existence of a one-to-one relationship between sensory descriptors and sensory perceptions. Rather, many descriptors such as *ruby, melon, sharp* or *soft* are supramodal, syncretic terms when they are used to describe sensations. This suggests a characterization of the conceptualization of our sensorium as a holistic rather than a discrete system. It has been proposed in brain research that the large areas of cortex that are situated between the modal-sensory cortical areas serve the function of being higher-level representational convergence zones (Binder & Desai 2011). Paradis & Eeg-Olofsson (2013) note that "we cannot taste something without smelling something, and we cannot taste something without feeling something, and over and above everything is the sight of something" (Paradis & Eeg-Olofsson 2013: 17; see also, Morrot *et al.* 2001).

3. Sensory perceptions, cognition and language use

While not very much attention has been given to sensory perceptions in treatments of language, there are a few studies that have pointed to their importance, namely work on conceptual metaphor, sensory descriptions in language use including synaesthetic mappings, and the importance of sensory perceptions for the reliability of the information, i.e. in the area of evidentiality. In most of this research, vision has been given a lot more attention than smell, taste and touch, and maybe also than hearing. For instance, the metaphor UNDERSTANDING/KNOWING/AWARENESS IS SEEING informs expressions such as "She got

married *with her eyes open* and now must *face* the implications", "He *was blind* to anything that went against his ideas" or "I *don't see* what you're getting at". These types of metaphorical expressions are observed in many languages, among them English, Spanish, and Basque (Baker 1999; Danesi 1990; Ibarretxe-Antuñano 1999, 2002) and are specific instantiations of the more general metaphors MIND AS BODY (Sweetser 1990) and THINKING IS PERCEIVING (Lakoff & Johnson 1999), both of which also cover the other — less explored — sensory perceptions. This is the case in expressions where unwillingness to understand is expressed as a hearing impairment, e.g. "La periodista *hizo oídos sordos* a las críticas de su artículo", "The journalist *turned a deaf ear to* the critics" or "Journalisten *slog dövörat till*", all of which by and large express the same message in the same way. Furthermore, being suspicious is smelling something nasty as in "La idea *me huele a chamusquina*" ('The idea *smells burnt* to me'), and understanding unpleasant or complicated things is equated to processes related to digestion as in "Lo que me has contado es *difícil de digerir*", "Vad du berättat för mig är *svårt att smälta*", or "What you told me is *difficult to digest*", all three meaning the same. At this point in time, however, we also begin to see an increase in research on how language users manage to make sense of sensory perceptions beyond traditional conceptual metaphor studies of the kind described and with more emphasis also on smell, taste and touch (e.g. Caballero 2009, 2014; Caballero & Díaz-Vera 2013; Ibarretxe-Antuñano 2013; Majid & Levinson 2011; Paradis fc.; Paradis & Hommerberg fc.; Paradis *et. al.* 2013; Plümacher & Holz 2007; Rouby *et al.* 2002; Vanhove 2008).

An important source of inspiration for a great deal of various types of sensory research comes from Ullmann's (1957) classical study of synaesthesia in poetry, where he proposes a hierarchy and a directional principle of sensory perceptions in metaphorical extensions from lower to higher sense modalities, i.e. from touch > taste > smell to sound and vision. Ullmann's model became the starting point for further research on different topics by numerous scholars (e.g. Lehrer 1978; Popova 2003, 2005; Shen 1997; Strik Liever, this issue, Sweetser 1990;

Viberg 1984; Williams 1976). Some of these scholars have expanded Ullmann's ideas, while others have contested them.

Expanding Ullmann's ideas, Shen & Gadir (2009) have formulated the *Conceptual Preference Principle* according to which the preferred direction of mappings in what they call *synaesthetic metaphorization* goes from the lower modalities of touch and taste, which require direct contact with the perceiver, to the higher modalities of vision and sound, which do not require direct contact. *Soft light* and *caressing music* involve mappings from the lower source domain of touch to the target domains of vision and sound, respectively. This directional patterning is questioned by Paradis & Eeg-Olofsson (2013), who problematize the metaphorical polysemy approach and call into question the general characterization of perceptions as motivated by synaesthesia from lower to higher modalities. They argue for a monosemy approach where synaesthetically flexible notions are described as mappings onto the same lexical concepts for the different sensory perceptions, claiming that no conceptual primacy exists in the realm of sensory perceptions. For instance, SHARP in a *sharp smell* does not primarily involve a notion of touch; rather, it spans experiences of sharpness from the sensory perceptions of vision, smell, taste and touch, suggesting that this lexical syncretism is grounded in how the conceptualization of our sensorium works. In a subsequent study focusing on the more general theoretical side of the semantics of sensory perceptions, Paradis (fc.) further develops the approach to meanings of sensory perceptions in language within the framework of *Lexical meanings as ontologies and construal* (Paradis 2005, 2016). In that study, she appeals to Gärdenfors' (2014) topological notion of *distance* and to previous treatments of the continuum from polysemy to monosemy as a reflection of distance in conceptual space (Cruse 2002). Her proposal is that monosemy across descriptors of sensory perceptions is due to the conceptual *nearness* of the sensory representations of the experiences, whereas polysemy involves *distance*. It does not appear to be the case that there is a lack of words for sensory perceptions. What might be different are the ways the lexical resources are used and the way word meanings are profiled when we talk about our sensations — not a lack of lexical resources.

In addition to the semantics of descriptions of sensory perceptions, there is also a pragmatic aspect related to the use of sensory meaning in discourse which concerns people's assessment of the reliability of evidence in general and of the degree of the reliability of sensory perceptions more specifically. Generally speaking, references to sensory experience in discourse, in combination with other clues, are important indications of reliable modes of knowing as evidence in favour of a high degree of speaker credibility (Hommerberg & Paradis fc.). In the case of the assumed ranking of the different types of sensory experience, the *Reliability Hierarchy of Evidentiality* states that in contrast to the relatively objective and stable nature of visual elements in the world, the perceptions of smell, taste and touch are highly subjective and variable across human beings (Chafe & Nichols 1986; Dubois 2007; Viberg 1984). The idea is that the reliability of the type of information evoked by words and expressions of sensory perceptions form a hierarchy from more intersubjectively reliable evidence based on vision ('I have seen this) to less intersubjectively reliable meanings in the perception modalities of smell, taste and touch.

What the semantic Conceptual Preference Principle and the pragmatic Reliability Hierarchy of Evidentiality have in common is that they are construed according to a continuum from more intersubjectively verifiable meanings to meanings which are intersubjectively non-verifiable in daily life. However, the different orientations of the two hierarchies raise the question of what is 'concrete' or 'salient' and for whom. While the Conceptual Preference Principle promotes the lower sense modalities to the more concrete and immediate representations, the Hierarchy of Evidentiality regards them as less reliable because of their status of being non-verifiable and based on inferences of the immediate speaker perceptions. The reasons for this discrepancy are related to the fact that the Conceptual Preference Principle is speaker-oriented and concerned with the semantic organization in language, while the Reliability hierarchy of Evidentiality takes the perspective of the addressees and their assessment of the reliability of knowledge.

4. Sensory perceptions in communities and cultures

A sensitive topic in sensory research is how cultural matters shape our sensing and talking about the world and, inversely, how our sensing the world shapes our culture. In spite of the importance of social and cultural matters for successful communication, they have not received the attention they deserve in the literature, sometimes to the extent that it is fair to say that they have been neglected and remain vastly underexplored. A great deal of research is marred by a view on culture as a unitary construct co-extensive with political boundaries and characterized by shared beliefs and Western world views. While most such research has started from a view of Culture with a capital C, there is a now a trend towards a more diversified take on cultures with a lower-case c. These cultures include both non-Western societies and languages (e.g. Blake & Sekuler 2005; Burenhult & Majid 2011; Classen 1993, 1997; Evans & Wilkins 2000; Rouby *et al.* 2002; among others)[2] and cultural practices within and across national, ethnic and geographical cultures, such as in the realms of food production, design and other societal activities which range from very small communities to communities on the global arena (Caballero 2006; Caballero & Díaz 2013; Holz 2005; Hommerberg 2011; Howes & Classen 2014; Wislocka Breit 2014).

Although as yet to a relatively limited extent, sensory language has been studied from the point of view language typology across geographical and cultural regions (Burenhult & Majid 2011; Classen 1993; Koptevskaja-Tamm & Rakhilina 2006; Levinson & Majid 2014; Majid & Burenhult 2014; Majid & Levinson 2011; Vanhove 2008; Viberg 1984). Due to the scarcity of such data from most cultures of the world, research is still limited to a number of languages of the Western world and to literate cultures rather than oral ones. Majid & Levinson (2011: 6–7) express their criticism as follows:

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[2] For a discussion on how culture is approached in research within the cognitive paradigm, see Caballero & Ibarretxe (2013) and Ibarretxe (2013).

On the one hand, Language with a capital L (language as a general human capacity) is part of the problem: it was obsession with language that got us into the over-concentration on text in the first place, ending up with "writing culture" writing off the senses. Moreover it was the apparent limits of Language that partly motivated the new interest in the senses: language is delivered […] only in acoustic or visual form, and it seems ill adapted to describing many of the senses that haunt our memories or excite our bodies, like taste and smell, touch and proprioception. […] It often seems that Language by virtue of its special relationship to consciousness is hooked primarily into the "higher senses" […]. For these reasons, the analysis of language may seem to lead precisely away from a proper appreciation of the senses. But, on the other hand, it is of course language (with a small "l," a particular tongue) that offers us key insights into how other peoples conceptualize the senses (as when a language talks about "hearing" what one feels with the fingers, or offers multiple primary verbs of smelling with nothing equivalent for other senses). Following these leads can yield rich insights into the differential importance of specific senses across cultures. Further, the crossmodal mappings that have played an important role in "embodiment" approaches are typically expressed in metaphor or other verbal conflations. […] Languages are windows on the senses that we can hardly afford to ignore.

Majid & Levinson (2011) stress that languages are windows into the senses, promoting the validity of language as an object of study to explore cultural differences and how such differences are revealed through languages and across cultures. While language may be ill suited to translate highly subjective sensorial experiences into comprehensible and shareable terms, it still appears to be the best — if not the only — medium human beings have for such an

endeavour.[3] It is our belief that one of the main goals of socio-sensory-cognitive linguistics should be to reduce the distance between Language and language in order to provide some insights into the various ways people feel, think and discuss their world(s). This research agenda involves paying attention to (i) the codability across languages and cultures because the differences may be greater than we think due to a paucity of research on these things in cultures other than urbanized Western cultures, and (ii) the general strategies for talking about sensory perceptions in terms of what meanings are typically coded and what the conceptual structures and construals that we use to describe sensory experience are. Insomuch as such descriptions usually involve the transfer of knowledge from people's experiences in the world into language and/or across various other modes of expression, the process is an instance of recontextualization, albeit one that goes beyond the transformation and/or rhetorical manipulation of information across texts in order to cover the ways in which knowledge arising from all sorts of human experiences is construed, (re)codified, disseminated and, eventually, legitimized through language.

Furthermore, intra-cultural phenomena are particularly conspicuous when considering professional communities — cultures within a Culture — in which the sensorium plays a central role like, for instance, for architects, perfume makers, potters, piano tuners, chocolatiers or oenologists, whose knowledge and skills require that they are tuned to various sense modalities and sensory literacies. The language used by such communities to talk about the products of their work both inside and outside their disciplinary realm is an interesting research object. The resources of these cultures are the same as the resources for more general use. For instance, architects discuss ways of avoiding *acoustical glare*, i.e. the harsh quality of sound inside a building caused by walls or surfaces that are too flat and too smooth; chocolatiers describe fine chocolates as characterized by the *satiny sheen* of their shells, i.e. the result of a process known

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[3] For instance, language is the most suited medium for describing beverages, food, perfume and the like in advertising texts (see Caballero 2009).

as *enrobing*, and the richness and *smoothness* of their centres;[4] wine experts describe optimum acidity in white wines as *lighting up*, *blazing* or *shining* through the palate; and incense sellers refer to types of incense as *forms of fragrance* and describe the etiquette of sniffing as *listening to* its fragrance.[5] Work has been done on colour naming of product types from manufacturers' and retailers' websites, namely cars, clothes, makeup and house paints (Anishchanka 2013). In that study, she explores the colour domain and the use of colour descriptors in colour swatches on the basis of the three dimensions of the domain of colour, namely lightness, hue and saturation, in relation both to basic colour terms such as blue, red and green and in relation to how they and other descriptors such as amber, mauve and turquoise are used by people in different product areas. She shows that there is a great deal of variation across product types with respect to colour naming strategies, numbers and type/token ratios of colour descriptors, and colour regions as a function of lightness, hue and saturation.

Interesting observations have been made regarding the ways the members of such communities express themselves to overcome the alleged scarcity of specific sensory terms for describing sensory experiences. In many cases they resort to figurative language of various sorts in order to facilitate the understanding and communication about such notions (e.g. research on the architectural and wine communities in Caballero 2006, 2009, 2014; Caballero & Paradis 2013; Caballero & Suarez-Toste 2010; Hommerberg 2011; Paradis & Eeg-Olofsson 2013; Paradis & Hommerberg fc.). Verbal descriptions of sensations rely upon language construed through various figurative schemas. For instance, descriptions of smell in expressions pertaining to objects of different kinds such as *a sweet nose of earth, smoke, cassis, and cherries* are profiled through construals of metonymization (construals of salience) on the basis of a WHOLE FOR PART configuration whereby the properties of 'earth, smoke cassis, and cherries' are profiled to invoke the olfactory properties of a sweet wine.[6] Many architectural descriptions rely

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[4] http://www.godiva.com/experience-godiva/HowWeMakeChocolate_RichArticle,default,pg.html
[5] http://www.nipponkodo.com/en/culture/index.html
[6] For an extended discussion of metonymization, see Paradis (2004, 2010, 2011)

on metonymizations and sensory mixtures as evidenced by architects' use of musical — auditory — terms such as *rhythm*, *orchestrate* or *choreograph*, which evoke spatial arrangements of order, sequence and patterning. Again, as previously mentioned, some descriptors such as *soft* are used to describe more than one modality, e.g. *soft colour*, *soft smell*, *soft taste*, and *soft texture*. Research on the language of such cultures reinstates the intimate relationship between sensing, thinking, and language by showing how the perceptual landscapes of professional cultures are built and disseminated in discourse.

5. The topics in this volume

Drawing upon a variety of approaches and research methods, the articles in this volume offer new ideas and methodological insights for further research. The research presented is true to the general aims and interests of usage-based approaches to language in the sense that all the contributions deal with authentic data from real communicative contexts in different languages, paying particular attention to the impact of contextual factors on the way(s) speakers of languages such as English, Russian, Italian and Swedish describe vision, smell, taste, texture and sound in discourse interaction — from highly specific contexts to everyday situations.

"Usage-related variation in the referential range of BLUE in marketing contexts" by Alena Anishchanka, Dirk Speelman and Dirk Geeraerts is a semasiological and onomasiological study of the use of different expressions of the colour blue area in marketing texts in four product areas, namely cars, clothing, makeup and house paint. The semasiological approach maps the referential range of the words for the colour blue and the spatial referential range of blue in the descriptions of the four product types, while the onomasiological approach investigates lexical semantic patterns within and across the product types for the concept blue. The study is innovative both in the way it investigates the colour domain and in its interdisciplinary methodology combining a frequency analysis of the use of different linguistic forms with the 3D modelling of their referential range in the *CIELab* colour space. The authors

show that there is substantial lexical and semantic variation both when it comes to the colour descriptors selected for the different shades of blue and the referential ranges of the different colour descriptors.

In turn, Dagmar Divjak's "Exploring the grammar of perception. A case study using data from Russian" looks into the morphological and syntactic properties of Russian verbs of vision, hearing and touch as theey occur in corpus data from the Russian National Corpus. Starting from the distributional hypothesis that the meanings of words are heavily influenced by the linguistic contexts where they occur, Divjak describes the use of perception verbs in everyday communication in order to chart similarities and differences in the verbs' syntactic and morphological usage patterns. She reports that overall verbs expressing vision, touch and hearing occur with the same types of morphological markers and participate in the same sets of syntactic constructions, but the frequency with which they occur in each one of them is different, which leaves distinct preference profiles. On the basis of this result, her tentative proposal is that this information may support sensory impaired speakers in building up representations of concepts in lieu of perceptual input. If constructional similarities between the sensory verbs are high then impaired people make use of these similarities to create pathways for supporting cross-modal analogies.

The phenomenon of synaesthesia in language use is explored across a wide range of different text types in English and Italian by Francesca Strik Lievers in "Synaesthesia: A corpus-based study of cross-modal directionality". She examines the prevalent directionality principle described in Section 3, namely the tendency of synaesthetic transfers to go from lower modalities such as touch, smell, and taste to higher ones such as sight and hearing. A semi-automatic method for the extraction of synaesthetic expressions is proposed and applied to the Wacky corpora, namely a corpus of English web data (ukWaC) and Italian ditto (itWaC). Contrasting English and Italian, Strik Lievers confirms the tendency in both English and Italian to comply with this principle. However, since her data set is much larger than previous work on cross-modal mappings and includes many different text types, she is in the position of being

able to give a more comprehensive and well-founded account showing that there are also patterns of mappings that go in the reverse direction. Accordingly, she offers a more balanced view of the directionality principle where directionality is accounted for in terms of frequency of association types as constrained by textual factors rather than in terms of universal constraints on synaesthetic transfers.

Finally, in "Sensation, perception and cognition: Swedish perception verbs in a typological-contrastive perspective", Åke Viberg discusses perception verbs in Swedish, focusing both on the more general form of perception represented by sensations and on the combination of meanings referring to perception and cognition in the Swedish verb *känna*, 'feel, know'. The study compares this highly polysemous Swedish verb with related words in other Germanic languages (Danish, Norwegian, Icelandic, German, English and Dutch), and it also brings Romance languages into the comparisons. The study shows that the polysemy of *känna* is to a large extent specific to Swedish. *Känna* may refer to internal (bodily) perception as well as extended uses that covers blended spaces that combine cognitive elements with emotional and bodily feelings (*feel remorse*, *feel convinced*). In addition to *känna*, the study also describes and compares verbs that express the visual and auditory effects of objects that *glitter, glimmer, rattle* and *creak*, and of bodily sensations and pain such as *ache* and *itch*. Viberg shows that in addition to the fine-grained description of sensory qualia, evaluation and intensity are also important aspects of the meanings of various sensations and perceptions. He emphasizes the fact that there are great differences across languages in the degree of elaboration of verbs referring to sensations.

6. Future directions

The articles of this volume offer new insights into how experiences of sight, taste, smell, touch and sound are communicated through language and what conceptual structures are evoked in the descriptions of different sensory experiences across the different senses and across different

languages. What we propose is an approach within Cognitive Linguistics where both perceptual and socio-cultural factors are given more prominence. This approach, which we refer to as a *socio-sensory-cognitive approach*, sees language, perception and cognition as communicating vessels (Paradis 2016). It embraces embodiment in the classical sense of Johnson (1997: 154), namely that "meaning and value are grounded in the nature of our bodies and brains, as they develop through ongoing interactions with various environments that have physical, social, and cultural dimensions. The nature of our embodied experiences motivates and constrains how things are meaningful to us". However, as has been pointed out, this does not automatically entail that the language of the senses in human communication receives the attention it deserves. Indeed, the embodiment literature and the conceptual metaphor theory literature have focused on universals and, by so doing, have — to a large extent — neglected the mediation of sensory experience by socially constructed cultural structures.

Fortunately, things appear to be changing, as boldly announced by Howes' (2013: 294) claim that "Linguistics is currently undergoing a kind of sensual revolution. More and more linguists are turning their attention to the sensorium." There appears to be a renewed interest in the relationship between the senses, the body and cognition, with an emphasis on variation both cross-culturally and intra-culturally. This ambitious agenda asks for additional analyses of how we make meaning of sensory perceptions in Language as well as in languages, and with a view to metaphor as not being the be-all and end-all but one among the cognitive mechanisms that are important for how we can make sense of sensory perception through language. Below are a few of the many questions awaiting treatments and answers in this regard:

- How do we describe the experiences of sight, taste, smell, touch and sound through language?
- What conceptual structures are evoked in the descriptions of different sensory experiences across the senses and across languages?
- How are sensory meanings used for communicative purposes other than descriptions?

- How do cultural and disciplinary factors influence the way we invoke sensory perceptions in symbolization?

- What are the human responses to sensory meanings in communication in the areas of aesthetics, emotions and neurophysiology?

All these aspects need treatments of a cross- and intra-linguistic and cross- and intra-cultural nature, and they require different observational techniques including textual, computational and experimental methods. They have to be analysed both in terms of lexicalization patterns, a topic which has been the main interest of language typologists and in terms of meaning-making more generally, which, in addition to an interest in specialist vocabularies, is an area that has only started to be developed by semanticists and discourse analysts in order to explain and describe conceptual domains and the construals used within communities that need detailed and distinct ways of expressing the ineffable. Clearly, the search for generality has to be complemented with perspectives attuned to linguistic usage and *vice versa*. Our perceptual system is very powerful and much more fine-tuned than our conceptual system (Bushdid *et al*. 2014). It is therefore, of particular interest to be able to examine the functioning of our brains in relations to sensory language and cognition, psychological responses to sensory communication and issues related to aesthetics and emotions, since such responses may have powerful societal effects on people's behaviour in different situations.

In order to open up new and exciting avenues of research about human language, we have to be more attentive to the socio-sensory-cognitive triad, which in turn requires more interdisciplinary research efforts in combination with a more sophisticated semantic analysis of the resources we have to talk about sensory perceptions and how sensory perceptions are employed for pragmatic uses of different kind.

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