Sensory language across lexical categories

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Abstract

Being able to talk about what humans perceive with their senses is one of the fundamental capacities of language. But how do languages encode perceptual information? In this paper, we analyze how experiences from different senses (sight, sound, touch, taste, and smell) are encoded differentially across lexical categories (nouns, verbs, adjectives) in the English language. Three independently collected lists of perception-related words show that sound concepts are more prone to being expressed as verbs. Additional data show that nouns rated to strongly relate to motion are also rated to strongly relate to sound, more so than is the case for color-related nouns. We argue that the association of sound with verbs is due to sound concepts being inherently more dynamic, motion-related and event-based, in contrast to other sensory perceptions which are phenomenologically less strongly associated with motion and change. Overall, our results are the first to show differential encoding of perception-related concepts across different lexical categories. Our analyses of lexical patterns furthermore provide empirical evidence for the interconnection between semantics and grammar.
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1. Introduction

Humans perceive the world through their senses and then share their perceptions with others, chiefly through language. Talking about sensory perceptions, such as whether a curry tastes too spicy or a fish smells rotten, forms a frequent focus of communicative activity. How people talk about sensory perceptions has been studied for a long time in linguistics (Ullmann, 1959 [1957]; Williams, 1976; Viberg, 1983; San Roque et al., 2015), anthropology (Classen, 1993; Howes, 2003), and the cognitive sciences (Miller and Johnson-Laird, 1976; Majid and Burenhult, 2014; Olofsson and Gottfried, 2015; Majid, 2015). A core question in this area of research is how perceptual meaning is encoded in the lexicon of human languages (Levinson and Majid, 2014). What words are available to speakers from various languages to talk about what they see, hear, feel, taste and smell?

Research that looks at how perceptual experience is expressed in language is theoretically and methodologically heterogeneous, but it is possible to observe that it has been conducted from two main perspectives. The first perspective takes a specific lexical category as the starting point. The second one takes sensory modalities as a starting point.

In the lexical category perspective, studies focus on a given lexical category—often either verbs or adjectives—and observe the interplay between sensory modalities within that lexical category. For instance, typological research on verbs of perception has shown that most languages have more verbs for vision and/or for hearing than for the other modalities;

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moreover, verbs of vision and/or hearing may undergo a semantic extension toward the other modalities, while the reverse happens less frequently (Viberg, 1983, 2001; Evans and Wilkins, 2000; Maslova, 2004; Vanhove, 2008). As for perceptual adjectives, research has focused on semantic extensions, particularly highlighting the fact that certain sensory modalities are more likely than others to be combined together in adjective-noun pairs. For instance, touch-related adjectives are often used to modify hearing-related nouns (e.g., *rough*: *rough voice*, *rough sound*), but it rarely happens that hearing-related adjectives are used to describe tactile perceptions (Ullmann, 1959 [1957]; Williams, 1976; Shen, 1997; Ronga et al., 2012; Strik Lievers, 2015; Winter, 2016b; Ronga, 2016). The studies of perception verbs and "synesthetic" adjectives mentioned here are examples of research that primarily focuses on a particular lexical category or combinations of particular lexical categories (as in adjective-noun pairs).

The sensory modality perspective focuses on one (or more) sensory modality, investigating the characteristic way the sensory modality/modalities are encoded in the vocabularies of human languages. Many such studies concern, for instance, the fact that different sensory modalities seem to be linguistically encodable to different degrees (Levinson and Majid, 2014; Majid and Burenhult, 2014; Olofsson and Gottfried, 2015), both within a single language and across languages/cultures. In English and other Indo-European languages the expression of visual perceptions can rely on a particularly rich vocabulary compared to that available for the other senses (Buck, 1949). On the contrary, smell has a very small number of dedicated lexemes: it is presumed to be the most "ineffable" sense (cf. Levinson and Majid, 2014). While visual language appears to be dominant not only in Indo-European languages, but also in all the other languages that have been analyzed so far in the literature, the ranking of the other senses is more variable cross-linguistically and cross-culturally (Majid and Burenhult, 2014; San Roque et al., 2015; O'Meara and Majid, 2016).

Both the lexical category and the sensory modality perspectives have been widely studied. In this paper we explore a third perspective, which has so far received less attention, and which can be seen as a combination of the other two. We address the following research question: are there differences among lexical categories in the expression of concepts pertaining to the various senses? To put it another way: how many words of a given lexical category are there for a given sensory modality, such as sight, sound, touch, taste, or smell? That is, do the different sensory modalities differ in which *kinds of words* are preferentially used to describe them? For instance, Strik Lievers (2015:86–88) observed that, in her English and Italian datasets of sensory lexemes, adjectives are numerous for touch and scarce for hearing, while nouns are numerous for hearing and scarce for touch. Knowing about this distributional fact of the sensory lexicon may explain, in part, why adjective-to-noun mappings are more commonly touch-to-sound rather than sound-to-touch, as has been previously described by researchers working on synesthetic metaphors. In other words, the directionality observed in metaphorical mappings between sensory concepts may be related to an already existing asymmetry in the lexicon (for a similar idea, see already Ullmann, 1959 [1957]:283; see also Winter, 2016b: Ch. 8).

This paper investigates the distribution of sensory lexemes across lexical categories systematically, by comparing different datasets of sensory lexemes that have been built for English in previously published studies. A quantitative analysis shows that the senses indeed differ with respect to how many nouns, verbs, and adjectives they have. We argue that this asymmetric distribution can be related to the different properties of prototypical representatives of the various lexical categories on the one hand, and to phenomenological and perceptual differences between the senses on the other. That is, we identify differences between the senses that can be related to semantic differences between lexical categories.

Reasoning about the motivations that may explain the distribution of sensory lexemes across lexical categories will hopefully shed new light on the connections between the characteristics of actual human perception and the linguistic means used to express it. Moreover, gaining an understanding about what the baseline frequency of sensory words is with respect to particular lexical categories is important for investigating synesthetic meaning extensions of sensory words. Finally, in light of the fact that semantic criteria differentiating nouns, verbs, and adjectives are often not deemed as important compared to morphological and distributional criteria (see discussion in Baker and Croft, 2017), our empirical results are important because they quantitatively demonstrate that different semantic domains may be expressed differentially in terms of lexical categories. In addition to our descriptive and theoretical contributions to the study of language and perception, and to the study of lexical categories more generally, we also make a methodological contribution by showing how existing databases—in particular norm datasets with ratings collected by humans—can be used for linguistic theorizing in this domain. Many claims that have been made without quantitative substantiation in the previous literature on perceptual language can now be addressed using already published databases (see also Winter, 2016a, 2016b).

2. Background on lexical categories and the senses

2.1. Lexical categories

One of the core properties of language that has received much discussion in formal linguistics, functional and cognitive linguistics, as well as in typology, is that words in the lexicon may be grouped into what are often called "parts-of-speech"