The Cognitive Roots of Adjectival Meaning

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In this paper, I illustrate a way that work in cognitive psychology can fruitfully interact with truth-conditional semantics. A widely held view takes the meanings of gradable adjectives to be measure functions (e.g. Bartsch & Vennemann, 1973; Kennedy, 1997), which map objects to degrees on a scale. Scales come equipped with dimensions that fix what the degrees are. Following Bartsch and Vennemann, I observe that this allows dimensions to play the role of lexical roots, that provide the distinctive contents for each lexical entry. Following Kennedy & McNally (2005) and Fox & Hackl (2006), I assume that the grammar provides a limited range of scale structures, presumably dense linear orderings with a limited range of topological properties. The lexical root of an adjective can then be seen as a measurement system, assigning objects to points on a grammatically determined scale respecting some measured property of those objects (cf. van Rooij, 2011; Sassoon, 2010).

If these measurement systems assign each adjective its distinctive meaning, the question is how they get their contents. In the verbal domain, there is evidence suggesting roots are linked to *concepts* (e.g. Murphy, 2002; Glanzberg, 2014; Pietroski, 2010, 2012). But concepts per se are not well suited to fix the values of measurement systems. There are, however, cognitive systems that are better suited. It is well-established that humans and other animals represent a range of magnitudes including number, length, time, pitch, and perhaps brightness, warmth, weight, etc. (e.g. Cantlon et al., 2009; Feigenson, 2007; Meck & Chuch, 1983; Carey, 2009; Dehaene, 2011). These can naturally be seen as helping to fix the root values for adjectives such as *long*, *large*, *fast*, and *bright*.

However, these magnitude representation systems are approximate or analog, and do not provide precise values. They thus do not provide a full measurement system. Rather, they provide a weak constraint: if an agent discerns $x \succ y$, then $h(x) > h(y)$. This, I suggest, offers a response to the often-raised complaint that for many adjectives, precise degree values appear artificial. It is, I propose, a case of the semantics fixing structure that goes beyond what is readily available to wider cognition. This approach can be extended beyond the approximate magnitude representation systems, to other perceptually based abilities, and so provides roots for a wide range of adjectives (in languages which have large classes of adjectives).

Not all adjectives are linked to perceptual abilities. Those that are not, I propose, have their root values fixed in a radically different way. *Dense* provides a good example. Cognitively, it is likely this terms corresponds to a concept stemming from 'folk physics' (Carey, 1991, 2009; Keil & Carroll, 1980). Assuming this provides us with relational concepts, we can see the roots of these sorts of adjectives as fixed by an equivalence class construction using those relations (Bale, 2008, 2011; Cresswell, 1977). This does provide a fully specific and precise measurement system. The same approach can be applied to technical terms of mature sciences that enter common language.

I conclude that though adjectives have a uniform truth-conditional semantics, they show substantial differences in the cognitive sources of their root meanings. This shows that there are (at least) two sub-classes of adjectives, with roots fixed by different mechanisms and with different degrees of precision, and showing very different cognitive properties.

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