Chapter 7

Grounding Meaning in Visual Knowledge
A Case Study: Dimensional Adjectives

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Abstract. This paper originates from the idea that no complete account of lexical semantics can be given without a link between language and perception. It provides evidence for this claim by analysing two Italian adjectives (alto and basso - high/tall and low/short), which belong to a particular subclass of adjectives, namely those whose core meaning can be described by referring to some conceptualisation of our perceptual experience. Marr’s notion of 3D model and Jackendoff’s theory of frames of reference are used in order to represent referential properties of objects. The results of a test on the possible uses of alto (high/tall) and its antonym basso (low/short) are presented and discussed. These results, together with an analysis of the shapes of the objects tested, led to: (a) a hypothesis about the spatial conceptualisation of the objects involved; (b) a hypothesis about the way in which the procedures representing the meaning of alto and basso operate on the lexical entry of the modified noun (basically, which spatial feature they pick up); (c) a clear definition of context-dependence, as far as these adjectives are concerned, and a way to deal with it. The general hypothesis is that the meaning of these adjectives triggers a procedure which, on the basis of some characteristics of the shape of the object and the selected frame of reference, picks up a feature, the relevant vertical oriented axis (RVOA), that is present in the representation of the shape of the object, and changes the (fuzzy) values associated with it. Moreover, it enables us to derive adjectival selectional restrictions from some more basic referential property of the object involved. A computational framework to model the general hypothesis is presented and lexical entries and semantic procedures are described.

1. INTRODUCTION

This work originates from the idea that lexical semantics must be grounded in perception. During the last decade or so more and more philosophers, linguists, psychologists and computer scientists have become convinced that no complete account of our competence in the domain of word meaning can be given without a link between language and perception (Jackendoff, 1987; Landau & Jackendoff, 1993; Harnad, 1993, Marconi, 1994). Moreover, it
has been claimed that the boundary between lexical and encyclopaedic knowledge is not clear cut (or maybe completely absent): the way we use, perceive and conceptualise objects is part of a kind of knowledge that not only belongs to our lexical competence, but is precisely what allows us to know the meaning of words and to use them correctly.

This paper aims to provide evidence for this claim by analysing two Italian adjectives (alto and basso - high/tall and low/short) whose core meaning can be described by referring to some conceptualisation of our perceptual experience. Roughly speaking, the general hypothesis is that the meaning of these adjectives triggers a procedure which picks up a feature that is present in the representation of the shape of the object referred by the modified noun, and changes the (fuzzy) values associated with it (i.e., the range of the possible measurements and the default measurement). This hypothesis represents a precise interpretation of a well-known property of adjectives, which is the fact that in many cases their meaning strongly depends on the context. Moreover, an important consequence of this hypothesis is that it enables us to avoid the treatment of adjectival selectional restrictions as unanalysed primitives, and to derive them from some more basic referential property of the objects involved.

In developing this hypothesis, we would like to emphasise that we are interested in standard, or canonical, conditions. This means that at the core of our theory there are notions like prototypical representations (with default values) and typical functions of artefacts. An immediate objection can be lodged against this choice, because standard situations are not “real” situations, and so our treatment could turn out to be useless, since it simply never applies. We agree, in some respects with the premise of this criticism, but not with its conclusion. Our claim is that default conditions (or standard situations) are encoded in lexical knowledge, while “real” situations are represented by the context of use. Moreover, the interpretation of any linguistic expression requires both sources of information (lexical semantics and pragmatics), and we agree with the idea emerging in recent literature that these two types of knowledge must be integrated during the interpretation process (Lascarides & Copestake, 1995). The first source contains (or at least is linked to) both linguistic knowledge and world knowledge and represents the contribution of the semantics of the elements in the linguistic expression to the whole interpretation (it contains the lexical defaults in the sense of Lascarides & Copestake, 1995). Of course, this contribution is not enough to afford full interpretation: the pragmatic context in which the expression is used plays a fundamental role too. But we would like to stress the fact that the interpretation of a linguistic expression always relies on both factors: in the words of Copestake and Lascarides, “lexicon