Chapter 20

Multiple Influences on the Use of English Spatial Prepositions: The Case of “in” and “on”

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ABSTRACT

What do people know when they know a word? Previous accounts of the semantics of spatial locatives suggest that spatial meaning is based on both geometric and extra-geometric aspects of spatial scenes. However, attempts to explicitly delineate different sources of extra-geometric influences are still comparatively rare; even more rare are attempts to combine these different sources so as to examine their interactions. This chapter presents four studies examining the ways in which three classes of attributes—geometric, functional, and qualitative physical— influence speakers’ uses of the English spatial prepositions in and on. The experiments show that all three kinds of factors play roles in English speakers’ choice between these prepositions. The chapter concludes that the semantics of spatial locatives must take into account a complex set of interacting factors.

INTRODUCTION

What does one know when one knows a word? In recent years, substantial attention has been directed at answering this question with respect to spatial locatives (Coventry & Garrod, 2004; Herskovits, 1986; Landau & Jackendoff, 1993; inter alia). Spatial locatives have a paradoxical quality. On the one hand, their meanings seem simple and obvious to native speakers. For example, most native English speakers show no doubt as to which term—in or on—to use to describe the position of the located object (the Figure, in Talmy’s (1983) terms) with respect to
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Figure 1. Three spatial scenes and the English, Spanish, and Japanese spatial terms commonly used to describe them

<table>
<thead>
<tr>
<th>Over</th>
<th>on</th>
<th>in</th>
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<tbody>
<tr>
<td>sobre</td>
<td>en</td>
<td>en</td>
</tr>
<tr>
<td>ue</td>
<td>ue</td>
<td>naka</td>
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</table>

the reference object (the *Ground*), in each of the pictures in Figure 1. Yet other evidence suggests that these terms are neither simple nor obvious. For example, Dutch and English children do not achieve high production accuracy until about four years of age for the English preposition *on* and its Dutch equivalents (*op*, *aan* and *om*), despite the extremely high frequency of these prepositions (Gentner & Bowerman, 2009). Further, there is marked cross-linguistic variability in how spatial terms map onto the world (e.g., Bowerman, 1996a, 1996b; Bowerman & Choi, 2003; Bowerman & Pederson, 1992, 1996; Choi & Bowerman, 1991; Cienki, 1989; Feist, 2008, 2010; Levinson, 1996; Levinson, Meira, & The Language and Cognition Group, 2003), belying their apparent obviousness. As a case in point, the three-way English distinction presented in Figure 1 corresponds to a two-way distinction in Spanish, and to a separate two-way distinction in Japanese. Specifically, Spanish typically uses a single term (*en*) for scenes typically labeled *on* and *in* in English; while Japanese uses the term *ue* for scenes typically labeled as *over* and *on* in English.

This cross-linguistic variability hints at the astounding complexity of spatial meaning, which is confirmed by the body of research on the semantics of individual terms. However, although spatial locatives have been found to encode both geometric and extra-geometric aspects of spatial scenes, few attempts have been made to separate different sources of extra-geometric factors and test them within the same study. In this chapter, we present a series of studies aimed at assessing the influences of one geometric factor and two different extra-geometric factors – the Ground’s function and the qualitative physical interaction of the objects – on English speakers’ uses of *in* and *on*.

**Geometry**

The importance of geometry to the meanings of spatial relational terms has been noted by many researchers (Herskovits, 1986; Landau & Jackendoft, 1993; Regier, 1996; Talmy, 1983, *inter alia*). An approach to the semantics of spatial locatives based purely on geometry is appealing at first glance, given the ease with which spatial locations may be abstracted to geometric form. As a result, many researchers have proposed geometric definitions such as Herskovits’ (1986, p. 48) proposed definition of English *in*: “inclusion of a geometric construct in a one-, two-, or three-dimensional geometric construct”.

Although geometric descriptions are able to account for many uses of spatial terms, there remain uses that cannot be adequately explained...
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