DIMENSIONS IN THE SEMANTICS OF COMPARATIVES:
SIMILARITY, SCALARITY, & IDENTITY

INTRODUCTION This paper investigates the interpretation of comparative constructions in English, with a particular focus on those headed by the adjectives *same* and *different*, as in (1).

(1) a. Barry is different than I am.
b. Barry is the same as I am.

(2) a. The plant is taller than the door is.
b. Mary is as tall as John is.

Whereas (1a) asserts the presence of some dissimilarity between Barry and the speaker, (1b) asserts that the two individuals are similar in all relevant respects. I provide a semantic analysis for such "similarity comparatives" that is guided by the following goals. First, it provides some insight into why similarity comparatives are in fact comparative constructions, by integrating their semantics with the semantics of ordinary "scalar comparatives" headed by *more*/*–er* (or *less*) and *as*, as in (2). Second, the analysis provides some insight into how the quintessential identity predicates *same* and *different* come to express similarity in (1); ultimately, this alternation is seen as a case of polysemy.

SIMILARITY VS. SCALARITY Central to the integrated analysis developed here is the notion of a dimension of comparison. Informally, a dimension of comparison represents the range of values for some potentially distinctive attribute, such as height or color. Such dimensions are familiar from degree-based approaches to the semantics of scalar comparatives, as in Cresswell 1976, von Stechow 1984, and Kennedy 1999. According to these analyses, the semantic function of a gradable predicate is to locate an individual along some dimension of measurement. A dimension of measurement is formalized as a scale, a linearly ordered sortal subclass of D_d (the domain of "degrees"). A gradable predicate (e.g., *tall*) then relates an individual to a particular location, or measure, along its associated dimension (e.g., spatial extent). With Kennedy (1999:Ch. 4), Schwarzschild (2005), and Heim (2006), I take such measures to be scalar intervals of type *dt*, so that *tall* denotes a relation of type <*dt*,*et*>.

(3) $\textbf{tall} = \lambda I_{dt}.\lambda x_e.\ \{d \in SPAT\_EXT\text{: } HEIGHT(x) \geq d\} = I$ (where $SPAT\_EXT \subset D_d$)

Scalar comparatives are concerned with the relative locations of individuals along the dimension contributed by the gradable predicate: *more*/*–er* (and *less*) requires that there be some difference amongst these locations, while *as* (under its 'exactly'-construal) requires there to be no difference.

(4) a. $\textbf{more} = \lambda I_{dt}.\lambda J_{dt}.\ J–I \neq \varnothing$ b. $\textbf{less} = \lambda I_{dt}.\lambda J_{dt}.\ I–J \neq \varnothing$ c. $\textbf{as} = \lambda I_{dt}.\lambda J_{dt}.\ J–I \cup I–J = \varnothing$

(2a,b) then receive the logical representations in (5) and the truth conditions in (6).

(5) a. $\textbf{more}(\iota I[\textbf{tall}(I)(d)])(\iota I[\textbf{tall}(I)(p)])$
b. $\textbf{as}(\iota I[\textbf{tall}(I)(j)])(\iota I[\textbf{tall}(I)(m)])$

(6) a. $\iota I[\textbf{tall}(I)(p)]–\iota I[\textbf{tall}(I)(d)] \neq \varnothing$
b. $\iota I[\textbf{tall}(I)(m)]–\iota I[\textbf{tall}(I)(j)] \cup \iota I[\textbf{tall}(I)(j)]–\iota I[\textbf{tall}(I)(m)] = \varnothing$

Similarity comparatives pattern with scalar comparatives in numerous respects: apart from the complementation parallels seen above, one finds the same sorts of modifiers in both constructions (*almost as tall*/*the same as* and *much taller*/*different than*; see Huddleston & Pullum 2002). Clausal complements to both also uniformly display negative island effects (**as tall*/*the same as I never was*) and Russellian ambiguities (*John thinks that Mary sounded happier*/*different than she did*; see Postal 1974). I claim that these grammatical affinities reflect a deeper semantic one: like scalar comparatives, similarity comparatives are also concerned with the relative locations of individuals along various dimensions of comparison. However, whereas scalar comparisons are restricted to occur within a single, quantitative dimension of measurement (the one introduced by the gradable predicate), a typical similarity comparison will encompass numerous dimensions, both quantitative and qualitative (e.g., color or shape). To account for these differences, I assume that similarity comparatives are interpreted with respect to a fixed relation *R* of type <*dt*, *et*>. The relation *R* serves to introduce the dimensions of comparison for similarity comparatives, just as *tall* introduces the spatial extent dimension in (2). Unlike *tall*, *R* is sortally nonspecific, and so relates individuals to "multidimensional" locations, i.e., ones that represent an individual's location along every applicable dimension at once. Furthermore, some of these dimensions are purely qualitative, corresponding to unordered sortal subclasses of D_d. Similarity comparatives are then interested in the differences amongst such multidimensional locations: *different* requires that there be some difference, i.e., that the compared individuals differ along at least one dimension, while *same* requires that there be none.

(7) a. $\textbf{different} = \lambda P_{<<dt,et>,dt>}.\lambda Q_{<<dt,et>,dt>}.\ P(R)–Q(R) \cup Q(R)–P(R) \neq \varnothing$
b. $\textbf{same} = \lambda P_{<<dt,et>,dt>}.\lambda Q_{<<dt,et>,dt>}.\ P(R)–Q(R) \cup Q(R)–P(R) = \varnothing$

(1a,b) then receive the logical representations in (8) and the truth conditions in (9).

(8) a. ***different***$(\lambda G_{<dt,et>}.\iota I_{dt}[G(I)(x_{sp})])(\lambda G_{<dt,et>}.\iota I_{dt}[G(I)(b)])$
b. ***same***$(\lambda G_{<dt,et>}.\iota I_{dt}[G(I)(x_{sp})])(\lambda G_{<dt,et>}.\iota I_{dt}[G(I)(b)])$

(9) a. $\iota I[R(I)(x_{sp})]-\iota I[R(I)(b)] \cup \iota I[R(I)(b)]-\iota I[R(I)(x_{sp})] \neq \emptyset$
b. $\iota I[R(I)(x_{sp})]-\iota I[R(I)(b)] \cup \iota I[R(I)(b)]-\iota I[R(I)(x_{sp})] = \emptyset$

Seen in this light, similarity comparatives emerge as the more general, or basic form of comparison. Scalar comparatives in turn constitute a specialized form of comparison, one which is restricted to occur within a single, quantitative dimension of measurement; this restriction is what underlies the bifurcation of *different* into *more*/*–er* and *less* in scalar domains. I show further how the analysis can be extended to accommodate the modifiers that occur in comparative constructions. Formally, this is achieved via the introduction of a contextually-determined measure function in (7), which returns a measure of overall (dis)similarity on the basis of the set differences $P(R)–Q(R)$ and $Q(R)–P(R)$; modifiers such as *almost* and *much* then operate over this measure. Depending on the utterance context, the measure function may assign greater significance to differences along certain dimensions, and may entirely ignore differences along other dimensions, thus also allowing us to capture the contextual variability of similarity comparisons (see Tversky 1977).

SIMILARITY VS. IDENTITY A welcome result of the above analysis is that it straightforwardly extends to "identity comparatives" headed by *same* and *different*.

(10)a. The medicines used to treat malaria today are different than they were fifty years ago.
b. The medicines used to treat malaria today are the same as they were fifty years ago.

Although the examples in (10) can be read as similarity comparatives, their most salient readings concern (non-)identity amongst pluralities, e.g., (10a) asserts that the set consisting of current malaria medicines differs in its membership from the set consisting of malaria medicines from fifty years ago. The analysis of identity comparatives developed here takes individual identity to itself constitute an attribute with respect to which individuals will differ, so that the dimension of comparison in identity comparatives is simply that of individual identity. Formally, this is reflected in the relation R, which here relates an individual y (atomic or plural) to the set X consisting of y's atomic parts (see Heim 1985 for a related proposal).

(11)a. ***different***$_{\text{ID}}$ $= \lambda P_{<<et,et>,et>}.\lambda Q_{<<et,et>,et>}.\ P(R)-Q(R) \cup Q(R)-P(R) \neq \emptyset$
b. ***same***$_{\text{ID}}$ $= \lambda P_{<<et,et>,et>}.\lambda Q_{<<et,et>,et>}.\ P(R)-Q(R) \cup Q(R)-P(R) = \emptyset$
where $R = \lambda X_{et}.\lambda y_e.\forall z[(z \leq y \ \&\ \forall x[x \leq z \rightarrow x = z]) \leftrightarrow z \in X]$

The resulting truth conditions for (10a) require that there be some difference in membership amongst the relevant sets of medicines. For (10b), what is required is that there be no such difference.

The denotations in (11) for *same* and *different* as identity comparative heads are distinct from, but closely related to their denotations as similarity comparative heads in (7). The variation across these denotations is localized to the dimension-introducing relation R that *same* and *different* incorporate as part of their meanings. The semantic operations performed by *same* and *different*, as well as the gross logical structure of the comparative constructions that they head, remain constant across their two guises. The relationship between the two interpretations for *same* and *different* can thus be viewed as a case of polysemy. More generally, this analysis of identity comparatives situates such constructions within a larger understanding of "the comparative", one that encompasses similarity comparatives headed by *same* and *different* as well as scalar comparatives headed by *more*/*–er* and *as*. The overall characterization that emerges, namely that comparatives are concerned with the relative locations of individuals along various dimensions of comparison, may thus serve as a starting point for further explorations of the semantic properties underlying this notional grammatical category.

SELECTED REFERENCES **[1]** Cresswell, M. 1976. The semantics of degree. In *Montague Grammar*. **[2]** Heim, I. 2006. *Little*. In *SALT XVI Proceedings*. **[3]** Kennedy, C. 1999. *Projecting the Adjective.* **[4]** Schwarzschild, R. 2005. Measure phrases as modifiers of adjectives. *Recherches Linguistiques de Vincennes*. **[5]** Tversky, A. 1977. Features of similarity. *Psychological Review*. **[6]** von Stechow, A. 1984. Comparing semantic theories of comparison. *Journal of Semantics.*