Deriving the Scalar Structure
of Deverbal Adjectives

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Abstract

Focusing on the case of deverbal gradable adjectives such as *acquainted*, we show that the selective behavior of degree modifiers such as *very* and *well* provides an important prove on the semantic typology of adjectives. Specifically, we demonstrate that the distribution of degree modifiers is closely tied to the scalar structure of the adjectives they modify, and that scale structure also determines one of the core semantic properties of gradable adjectives: the nature of the «standard values» according to which sentences involving adjectival predications are judged to be true. In addition, we show that in the case of deverbal gradable adjectives, scalar structure can be inferred from the aspectual properties of the source verbs, providing a basis for predicting which degree modifiers will be acceptable with which participles.

Key words: adjectives, aspect, degree modification, participles.

Resum. *La derivació de l'estructura escalar dels adjectius deverbals*

Centrant-nos en el cas dels adjectius deverbals graduables de l'anglès, com ara *acquainted*, mostrem que el comportament selectiu de modificadors de gradació com per exemple *very* i *well* constitueix una prova important per a la tipologia semàntica dels adjectius. Concretament, demostrem que la distribució dels modificadors de grau està estretament relacionada amb l'estructura escalar dels adjectius que modifiquen i que aquesta estructura escalar també determina una de les propietats semàntiques centrals dels adjectius graduables: la naturalesa dels «valors estàndars» d'acord amb la qual les oracions que contenen predicacions adjectivals es jutgen com a veritables. A més, mostrem que, en el cas dels adjectius deverbals graduables, l'estructura escalar pot inferir-se de les propietats aspectuals dels verbs originals, la qual cosa permet de predir quins modificadors de grau seran acceptables amb quins participis.

Paraules clau: adjectius, aspecte, modificació de grau, participis.

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1. Degree Modification in Deverbal Gradable Adjectives

The starting point of this paper is two puzzles involving the acceptability of degree modification of deverbal gradable adjectives by *well* and *very*. First, why do the participles in (1) accept degree modification by *well* but not *very*?

(1) a. Martin Beck is well/$^{??}$very acquainted with the facts of the case.

b. The facts are well/$^{??}$very understood.

c. The concert was well/$^{??}$very publicized.

d. The abuse of public funds was well/$^{??}$very documented.

The acceptability judgments in (1) are mirrored by corpus data: as shown in (2), there is a clear statistical tendency for such participles to appear with *well* rather than *very*.

(2) a. *educated*: 3 *very* (2 attributive, both from same text) vs. 78 *well* in the British National Corpus (BNC)

b. *defined*: 2 *very* (both attributive) vs. 146 *well* in the BNC

c. *protected*: 2 *very* vs. 62 *well* in the BNC

The second question concerns the interpretation of *well*-modification. While *well* has a degree reading in the sentences in (1) (i.e., (1a) means that Beck is acquainted with the facts to a fairly high degree), in the examples in (3), it does not, but instead has a «quality» or «manner» interpretation. (3c), for example, means that the house was built in a high quality way, not that its construction was high on a scale of completion.

(3) a. The suit was well cut.

b. The book was well written.

c. The house was well built.

An initial response to these facts, in particular to the unacceptability of modification by *very* in the examples in (1), would be to claim that these participles simply are not adjectives, or at least are not gradable adjectives. As shown by the examples in (4), neither true verbal participles nor nongradable adjectives permit modification by *very*.

(4) a. *??*The president was *very impeached* by the House of Representatives.

b. *??*Richard Nixon, a *very former* president, resigned before he was impeached.

This response cannot be correct, however. First, the facts in (5) show that the participles that disallow modification by *very* allow *un*-prefixation, a property of adjectives, not verbs.

(5) a. Beck is *unacquainted* with the facts of the case.

b. The singer's *unpublicized* appearance caused a commotion at the restaurant.

c. These claims are *undocumented*, and therefore not admissible in court.

d. *uneducated, undefined, unprotected*

Second, they can appear as complements to copular verbs such as *seem*, *remain* or *become*, yet another adjectival property.

(6) a. Beck seemed *acquainted* with the facts of the case.

b. The phenomenon remains poorly *understood*.

c. The scandal became *publicized* after a leak to the press.

d. The case remained *documented* on file.

Finally, these participles appear in comparative constructions, a property that is true only of *gradable* adjectives. This is illustrated by the corpus data in (7).

(7) a. But as I became *more acquainted* with this set and stopped rushing from impossible passage to impossible passage, hoping against hope that at some point he would lose his balance and tumble like a second-rate trapeze artist off his swing, I was unwittingly dragged in to a more sinister, melancholic side to his playing. [*CD Review*, 1992. (BNC)]

b. The causes of weakness in adhesion are rather *less understood* at present than they are in cohesion but no doubt they are rather similar in character. [J. Gordon, *The New Science of Strong Materials*, 1991. (BNC)]

c. This was certainly more dramatic than the *more publicized* event that finished off the dinosaurs. [Antony Milne, *The Fate of the Dinosaurs: New Perspectives in Evolution*, 1971. (BNC)]

We therefore conclude that the facts in (1)–(3) cannot be explained in terms of category mismatch: the deverbal expressions are gradable adjectives (see Borer (1998:92-3) for the same conclusion). In the rest of the paper, we will show that the distinction between *very* and *well* is moreover not due to idiosyncratic properties of certain deverbal adjectives, but rather reflects deeper aspects of the semantics of degree modification, the scalar structure of gradable adjectives, and the relation between scale structure and the aspectual structure of verbs. In par-

ticular, we provide evidence for the following claims. First, the degree modifier *very* requires the adjective it modifies to be associated with an *open* scale: a scale that does not include an endpoint. In contrast, *well* combines only with those deverbal adjectives which are associated with *closed* scales: scales which include endpoints. Second, we show that the class of deverbal adjectives with closed scales corresponds to the class of verbs that introduce incremental themes (Dowty (1991)), and we argue that this connection can be explained in terms of the homomorphic relation between the progression of the event and (some property of) the incremental theme argument (see Krifka (1989, 1992); Ramchand (1997)). Finally, we demonstrate that the degree modifier reading of *well* is blocked when the standard for the participle it modifies corresponds to an *upper* endpoint of a scale, and we show that the orientation of the standard (upper or lower endpoint) can be predicted as a function of the semantic role that the target of predication has in the verbal form.

2. Scale Structure and Standard Values

2.1. Standards of Comparison and Context Dependence

As is well known, the interpretation of gradable adjectives like *tall* or *inexpensive* is highly context dependent: what «counts as» e.g. *tall* or *inexpensive* varies from context to context. One way to account for this variation is to characterize the meaning of a gradable adjective in terms of a contextually defined standard of comparison (see e.g. McConnell-Ginet (1973); Kamp (1975); Klein (1980, 1991); Bierwisch (1989); Ludlow (1989); Kennedy (1999) and others). On this view, sentences such as those in (8) are assigned truth conditions in (9).

(8) a. Michael Jordan is tall.

b. The Mars Pathfinder mission was inexpensive.

(9) a. Michael's height is at least as great as a standard of tallness (for basketball players).

b. The cost of the Mars Pathfinder mission was at least as great as a standard of inexpensiveness (for missions to outer space).

This idea can be implemented by adopting a model in which the semantic analysis of gradable adjectives is stated in terms of abstract representations of measurements, or «scales,» which are formalized as totally ordered sets of points, or «degrees» (see Klein (1991) for an overview). In this type of approach, the truth conditions of e.g. (8b) can be represented as in (10), where d_s is a free variable over degrees, and *inexpensive* is a function from objects to degrees (see Kennedy (1999) for a fully explicit compositional semantics for adjectival predicates along these lines; see also Bartsch and Vennemann (1973)).

(10) *inexpensive*(*the-marspathfinder-mission*) $.\geq d_s$

Since the value of the standard variable is fixed by the context, the truth of (8b) may vary. It may be true in a conversation about the space program, for example, but false in a discussion about things with the name «Pathfinder» (which might include compasses, bicycles, and sport utility vehicles in addition to missions to Mars).

Not all gradable adjectives show the same sort of context sensitivity, however. The standard values for the adjectives in (11) appear to be fixed.

(11)   a. The baby is awake.

   b. The cookie jar is empty.

   c. The line is straight.

Under normal usage, (11a) does not mean that the degree to which the baby is awake surpasses some standard (for babies), but rather simply means that the baby has achieved some minimal level of «awakeness.» Similarly, (11b) means that the cookie jar is completely empty, not that its contents fall below some standard of emptiness ((11c) is similar). Note that the context-independence of these adjectives does not indicate that they are not gradable: as shown by (12), they are perfectly felicitous in comparatives.

(12)   a. The baby is more awake now than it was a few minutes ago.

   b. The cookie jar is emptier than it was this morning.

   c. The red line is straighter than the blue one.

What is responsible for this difference in context-sensitivity?

2.2. Different scales, different standards

Intuitively, the difference between adjectives like *inexpensive*, *tall*, *interesting*, etc. and those in (11) is that the latter are conventionally associated with scales that allow mapping to *endpoints* —maximal or minimal degrees— while the former are not. This hypothesis has empirical justification: as illustrated by the contrasts in (13) and (14), the two classes of adjectives differ with respect to the acceptability of modification by «proportional modifiers» like *completely*, *partially*, and *half*.[1]

(13)   a. completely empty/full/awake

   b. partially empty/full/awake

   c. half empty/full/awake

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1.   It should be observed that maximality modifiers like *completely* and *totally* have both an end-point-oriented use and a use that is roughly synonymous with *very*; these two uses are distinguished by their entailments. An endpoint-oriented use entails that the end of a scale has been reached; thus, the sentence *The line is completely/totally straight, though you can make it straighter* is a contradiction. A nonendpoint-oriented use carries no such entailment, thus the contingency of *I'm completely/totally uninterested in phrenology, and Bob is even less interested than I am*.

(14)   a. ??completely tall/short/interesting/inexpensive

    b. ??partially tall/short/long/interesting/inexpensive

    c. ??half tall/short/long/interesting/inexpensive

These facts can be explained as follows (cf. Lehrer (1985); Hay (1998)). First, making more concrete the hypothesized difference in scale structure, assume that the adjectives in (13) map objects onto *closed* scales (scales that include endpoints), while those in (14) map objects onto open scales (scales that exclude endpoints). Second, assume that the compositional semantics of proportional modifiers requires reference to an endpoint of a scale. On this view, the examples in (14) are anomalous because the open scale adjectives do not introduce endpoints.

With these distinctions in scale structure in mind, we can make the following generalization about the context sensitivity of the standard value: adjectives associated with open scales have context-sensitive standards; adjectives with closed scales have context-insensitive standards. More precisely, the standard values for closed scale adjectives default to an endpoint of the scale (the lower point for e.g. *awake*, and the upper point for e.g. *full* and *straight*; we return to a discussion of the orientation of the standard in section 5). To distinguish between these two types of adjectives, we introduce the terminology in (15).

(15)   a. An adjective has a *trivial standard* iff its standard defaults to an endpoint of the scale.

    b. An adjective has a *nontrivial standard* iff its standard is context dependent.

Entailment patterns provide a test for determining whether a particular adjective has a trivial or nontrivial standard. If an adjective A has a trivial standard, then if this standard corresponds to the lower end of the scale, a statement of the form *x is not A* should entail that x has no amount of «*A*-ness» at all (see (16a), where «#» denotes contradiction). If A's trivial standard corresponds to the upper end of the scale, however, then *x is A* should entail that x has a maximal amount of «*A*-ness» (see (16b) and note 1). Neither of these entailments should hold, however, if A has a nontrivial standard (see (17)).

(16)   a. #My hands are not wet, but there is a little bit of water on them.

    b. #The candle is straight, but you could make it straighter.

(17)   a. Sam is not tall, but his height is normal for his age.

    b. That film is interesting, but it could be more interesting.

One consequence of these definitions is that if an adjective has a trivial standard, then it must have a closed scale.[2]

Whether all adjectives with closed scales have trivial standards is a question that remains to be determined; however, our research so far indicates that this is at least a (possibly overridable) default.[3] The broader conclusion to be drawn from the discussion in this section is that there is a direct correlation between scale structure and one of the most fundamental semantic properties of gradable adjectives: the context dependency of their standard values. As we will see in the next section, the relation between scale structure and standards also supports an explanation of the distribution of the degree modifiers *very* and *well*.

3. The Semantics of *very* and *well*

Roughly speaking, the difference between e.g. *expensive* and *very expensive* is that the latter denotes a property whose meaning is just like the former, except that the standard value is «boosted» by some amount. This is most clearly illustrated by pairs like the one in (18), which shows that the «standard boosting effect» of *very* (in terms of absolute increase) depends on how high the initial standard value is.

(18)   a.   The international space station is very expensive. (for space projects; large increase in the standard)

   b.   The coffee at the airport is very expensive. (for coffee; smaller increase in the standard)

The connection between *very* and the standard value is not unrestricted, however: in normal usage, adjectives associated with trivial standards reject modification by *very*:

(19)   a.   [??]They were very able to solve their own problems.

   b.   [??]The baby is very awake. (≠ wide awake)

To account for these facts, we propose that *very* presupposes that the adjective it modifies is associated with a nontrivial standard. This hypothesis is implemented in the semantic analysis in (20), in which G is a function from objects to degrees

2.   More precisely, a scale which is closed on at least one end. Our attention was recently called to the possible existence of adjectives with scales which are open on one end (specifically, the upper end) and closed on the other. Participial adjectives based on stative and activity verbs, such as *needed*, appear to fall into this category. However, we must leave such adjectives for future research, and in this paper confine our discussion to a two-way contrast between totally open and totally closed scales.

3.   There is a very plausible functional explanation for this: since the endpoint of the scale provides a natural and *fixed* reference point to use as a standard, closed scale adjectives are conventionally associated with trivial standards. Such a strategy is unavailable to open scale adjectives, however; therefore their standards must be context dependent.

(a gradable adjective meaning), d_s is a standard, and LARGE is a context-dependent function that identifies the amount by which the standard value should be increased (see Hellan (1981); von Stechow (1984b); and Klein (1991) for formal approaches to degree addition).

(20) $[very] = \lambda G \lambda d_s \lambda x \exists d[G(x) \geq d_s + d \wedge \text{LARGE}(d)]$
       CONDITION: d_s is nontrivial

In contrast to *very*, *well* combines felicitously with adjectives that have trivial standards, but not with adjectives that have nontrivial standards:[4]

(21)   a. We are well aware of the difficulties.

       b. They are well able to solve their own problems.

(22)   a. [??]The international space station is well expensive.

       b. [??]Michael Jordan is well tall.

Note also that the output of *well*-modification supports further modification by *very*:

(23)   a. We are very well aware of the difficulties.

       b. They are very well able to solve their own problems.

We account for these facts by analyzing *well* as a function from (gradable) adjective meanings to adjective meanings, such that the input is associated with a closed scale and the output is associated with an open scale, as stated in (24).

(24)   If *G* is a gradable adjective meaning whose range is a closed scale, [*well*](*G*) is a function just like *G* except that its range is an open scale.

Given the correlation between scale structure and standard values observed in the previous section, the result of this proposal is that adjectival expressions of the form *well A* should have nontrivial standards, and should therefore permit modification by *very*.[5] The data discussed above show that this is indeed the case. It is also the case that the resulting adjectival expression has a relatively high standard, which we assume to be part of the semantic contribution of *well*.

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4.   Not all nonderived adjectives with trivial standards permit modification by *well*, but this is possibly due to the independent morphosyntactic preference for *well* to modify participles. See Bolinger (1972:38ff).
5.   This proposal also accounts for the unacceptability of expressions of the form «[*well* [*very A*]].» According to (20), the constituent «[*very A*]» is of the wrong semantic type to combine with *well*, which requires an expression with a gradable adjective meaning (a function from objects to degrees).

More importantly, if the proposals outlined in this section are correct, then we can draw the larger generalizations in (25).

(25)   a. OPEN SCALE– NONTRIVIAL STANDARD– √*very*–??*well*

      b. CLOSED SCALE–TRIVIAL STANDARD–??*very*– √*well*

If these generalizations are valid, then they provide an important prove on the lexical semantic properties of gradable adjectives (derived or otherwise) on the basis of collocational patterns. As we will see in the next section, the distribution of degree modifiers in deverbal gradable adjectives provides initial confirmation of the generality of the patterns in (25).

4. From Event Structure to Scale Structure

Recall that the data in (1) showed that modification of certain deverbal gradable adjectives by *very* is infelicitous, while modification by *well* is possible. The examples in (26) extend this descriptive generalization, demonstrating that modification of the *well A* complex by *very* is also possible.

(26)   a. Martin Beck is very well acquainted with the facts of the case.

      b. The facts are very well understood.

      c. The concert was very well publicized.

      d. The abuse of public funds was very well documented.

According to the semantic analyses of *very* and *well* proposed in section 3, the facts in (1) and (26) follow if these participles are associated with trivial standards and closed scales. That such participles have closed scales is demonstrated by the acceptability of proportional modification:

(27)   a. Beck is completely/fully/partially acquainted with the facts of the case.

      b. Language change is completely/fully/partially understood.

      c. The concert was fully publicized in all of the mass media.

      d. Those war crimes are completely/fully/partially documented.

That these participles have trivial standards is demonstrated by their entailment patterns (see the discussion in section 2):

(28)   a. #Beck isn't acquainted with the facts facts of the case, though I did show him the coroner's report.

      b. #The importance of the Dolly experiments is not understood, though we know that the data suggests that it might be possible to clone humans.

c. #The concert was not publicized, but there were a few posters in the metro announcing it.

d. #The details of the murder were not documented, though the police reports contain a record of a weapon at the scene of the crime.

The answer to the first question raised in section 1, then, is that gradable adjectives like *acquainted*, *understood*, *publicized* and so forth accept modification by *well* but not *very* because (1) they are associated with closed scales, and (2) they have trivial standards. The fact that these adjectival participles have trivial standards follows from their scalar structure (given the hypothesis that closed scales are conventionally associated with trivial standards).

Moreover, further observation reveals striking correlations between a participle's scalar structure and certain characteristics of the situation described by the verb from which that participle derives. We thus hypothesize that we can, to a significant degree, predict the scalar structure of a participial adjective.[6] The data that we have observed indicate that the class of deverbal adjectives that have closed scales corresponds very closely to the class of verbs that introduce incremental themes. As pointed out by Krifka (1989, 1992) (see also Dowty (1991) and Ramchand (1997)), what is unique about this class of verbs is that it is possible to establish a homomorphic relationship from the events they denote to (some measurable property of) their incremental theme arguments (cf. Hay, Kennedy, and Levin (to appear)).[7] We claim that it is precisely this homomorphism that is responsible for the scalar properties of the derived adjectives, because it provides a template for building a closed scale, specifically a scale with a lower endpoint that corresponds to the minimal (sub)event involving (a minimal part of) the incremental theme or the relevant measurable property, and an upper endpoint that corresponds to the maximal event involving (all of) the incremental theme/property.

For example, consider *loaded*, as in *The truck is loaded with hay*. Let us assume, generalizing Dowty's (1991) analysis of *spray/load* verbs, that the truck is the incremental theme in the situation described. We can define a mapping from the progress of the event of loading to a property of the truck–namely, the volume of the material that it holds; the degree to which the truck can be said to be loaded corresponds to the degree to which it has progressed through a loading event. Since we can define a beginning point and endpoint for this event (corresponding to when the truck is empty and full, respectively), we can identify a lower bound and upper bound for the scale of «loadedness» of the truck.

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6.   In addition, in Kennedy and McNally (1999) we argue that most of the exceptional cases can be understood by principled processes of semantic change.

7.   Krifka (1989) captures this homomorphism formally in terms of his notion of «Mapping to Objects,» defined as a characteristic of thematic roles R as follows:

(i) $\forall R[\textbf{MAP-O}(R) \leftrightarrow \forall e \forall e' \forall x[R(e,x) \wedge e' \subseteq_E e \rightarrow \exists x'[x' \subseteq_O x \wedge R(e',x')]]]$

In prose, MAP-O guarantees that all subevents eN of a given event e with participant x in role R will involve a part x' of x. Building on MAP-O, Ramchand (1991) defines additional homomorphism-related properties. We refer the reader to her work for details.

Since, for reasons of space, we cannot exhaustively demonstrate the generality of the correlation between event structure and scale structure, we will simply consider some representative adjectival participles from various verb classes.[8] First, let us consider the implication that, if a participial adjective has a closed scale, it is derived from a verb that has an incremental theme. As discussed in section 2.2, closed-scale adjectives are identifiable by compatibility with proportional modifiers like *completely* and *partially*. If this implication is correct, we expect it to be impossible to say *completely/fully/partially A*, where *A* is a participle derived from a verb lacking an incremental theme. And indeed, the examples we have found, such as those illustrated in (29), systematically bear out this prediction.[9] The participles in (29) include states ((29a-c)), activities ((29d-g)), and change of state predicates in which the theme is affected wholistically and whose result state is associated with an open scale (such as *worry*) ((29h)).

(29)   a. #completely hated/loved/envied/admired neighbor

     b. #a fully needed/wanted rest

     c. #a partially regretted action

     d. #a completely looked for/expected reaction

     e. #a fully driven/pushed car

     f. #a completely watched suspect

     g. #a partially kissed/met/punched young man

     h. #a completely worried/pleased/surprised mother

Now consider the implication that, if a participial adjective is derived from a verb that has an incremental theme, it has a closed scale. As the following examples show, this implication also holds quite generally. Notice that while some of these participles, such as *eaten*, correspond to prototypical incremental theme verbs, others, such as *straightened* or *heard*, do not. The members of this latter class of verbs do, however, have arguments that share an important property with canonical incremental themes: they possess properties that can be homomorphically related to the structure of the corresponding event (e.g. the straightness of

8. Note that we crucially consider only those participles which are demonstrably adjectives according to the tests used in section 1. See e.g. Levin and Rappaport (1986) on the question of which participles can be adjectival. Moreover, we will not explicitly demonstrate that these and the remaining participles discussed in this paper are adjectives. We simply point out that the majority of them accept *un*-prefixation, and those which do not (like *hated*) occur readily as the complement to *seem*.

9. The only exception we have found to this prediction is *known*, which admits modification by proportional modifiers, as in *partially/fully known opinions*. Interestingly, although *known* behaves like a closed-scale adjective in English, it behaves like an open scale adjective e.g. French, Spanish, and Catalan insofar as it accepts modification by the equivalent of *very* in these languages (e.g. Catalan *molt conegut* 'very known'). See also footnote 10, below.

the teeth; the amount of the response that has been heard, and so forth). Given our remarks above, then, it is not surprising that these verbs pattern with the more prototypical incremental theme verbs with respect to the semantics of their adjectival forms:[10]

(30) a. a partially eaten meal

b. a fully written novel

c. completely loaded hay

d. a completely paid bill

e. fully straightened teeth

f. a partially heard response

g. a partially anticipated reply

h. a fully understood problem

The robustness of our generalizations could be challenged by the fact that certain participles derived from incremental theme verbs do cooccur with *very*, as noted in (2) and as seen in examples such as *a well/very balanced diet*. However, recall that the distribution of *well* and *very* depends on the type of standard associated with the adjective and not on the nature of the scale. It simply happens that closed scales have a strong tendency to be associated with trivial standards. Our analysis thus allows for the possibility that some participles may occur with both modifiers, but makes the prediction that the choice of modifier indicates what type of standard the speaker is using to evaluate the adjectival property: for example, if we talk about a very balanced diet, we are committed to the existence of a contextually determined standard of «balancedness» which does not entail (or even necessarily have anything to do with) the diet's having participated in a minimal event of being balanced.

Now that we have addressed the question of why participial adjectives have the types of scales they do, we are left with one remaining question theoretical question: whether we can predict the orientation of their standard values. This question turns out to be related to the second of the empirical puzzles presented at the beginning of the paper.

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10. *Understood*, *heard*, and certain other similar predicates could be argued to correspond to stative rather than nonstative verbs. However, even on their stative reading, the objects of the corresponding verbs manifest a characteristic similar to Mapping to Objects. It is possible for one to stand in these relations to not just the referent of the object as a whole, but also to proper parts of it, and we routinely measure e.g. the depth of or progress in our understanding in terms of the quantity or depth of the facts we understand. The same is true of *known*, and thus could explain its exceptional behavior.

5. The Orientation of Trivial Standards

Recall that we asked why it should be that some uses of *well* have a degree reading, while others (such as those in (3)) have a manner or quality reading instead. Our research shows that the answer to this question has to do with the «orientation» of the trivial standard. Specifically, when the trivial standard corresponds to the lower endpoint of a scale, a degree reading of *well* is available, but when the standard is the upper endpoint, this reading disappears. To see this, observe that the entailment tests for upper vs. lower endpoint standards indicate that *acquainted* has a lower endpoint standard, while *built* has an upper endpoint standard:

(31) a. #Beck isn't acquainted with the facts facts of the case, though I did show him the coroner's report.

     b. Beck is acquainted with the facts, though he is still missing some of the details.

     c. The house isn't built yet, though the foundation has been laid.

     d. #The house is built, but it still needs a roof.

Correspondingly, *acquainted* accepts degree modification by *well*, while *built* does not, as the contrast in (32) shows.

(32) a. Beck is well acquainted with the facts.

     b. The house was well built.

While we cannot pursue in detail here the question of why this correlation should exist, we can at least make some preliminary comments. Intuitively, *well* creates a partition on the set of things which have an adjectival property *A*, dividing them into those things which are *A* and fall above the standard established by the addition of *well*, and those which are *A* and do not meet this standard. Now, if the default standard for an adjective *A* is the maximum endpoint on a scale, it is impossible for *well* to introduce a nontrivial standard which can allow for the type of partition described above, since no scalar distinction can be made between things which, in order to qualify as having *A* at all, must be maximally *A*. Thus, degree modification by *well* should be unacceptable, although there would be no reason in principle for it not to have a manner or quality reading.

    The sensitivity of the interpretation of *well* to the orientation of the standard leads us to ask whether it is possible to predict whether an adjective's (trivial) standard corresponds to an upper or lower endpoint based on other aspects of its semantics. It turns out that it is. Specifically, the orientation of the standard depends on the role of the participial adjective's argument in the event associated with the corresponding verb: (participial) adjectives (with trivial standards) whose arguments satisfy Mapping to Objects, such as *cut* and *written*, have upper endpoints as standards, while those whose arguments do not, such as *acquainted* and *documented*,

have lower endpoints as standards. This is most clearly illustrated by the pairs in (33) and (34), in which the argument of the adjective in the (a) sentence does not satisfy Mapping to Objects, while the argument in the (b) sentence does.

(33)   a. Jones is well prepared for her talk. (degree reading possible)

     b. Jones' talk is well prepared. (no degree reading)

(34)   a. a well-loaded truck (degree reading possible)

     b. well-loaded hay (no degree reading)

The explanation for this distinction can be traced to aspects of the verbal predications. Consider first the case of the argument satisfying Mapping to Objects. Because it cannot be asserted that the eventuality corresponding to the participle is completed until the argument has been totally affected (in the relevant way), it follows that an adjectival participle truthfully applies to such an argument only if that argument possesses a maximal amount of the relevant (deverbal) property. The result is an upper endpoint standard.

The situation is different in the case of other types of arguments. Since the completion of the eventuality corresponding to the participle does not depend on affecting all of the relevant argument (or affecting that argument in its entirety), it may be asserted that the eventuality is completed even when that argument has been minimally affected. As a result, the adjectival participle may be truthfully applied to such an argument as long as the argument possesses a minimal degree of the relevant property. This derives a lower endpoint standard.

6. Conclusion

The work reported here illustrates some of the benefits to be gained from investigating even a very small lexical semantic phenomenon. Focusing on the distribution of the degree modifiers *very* and *well* in the context of deverbal gradable adjectives, we have gained insight into more general aspects of scalar structure to which natural language, and gradable adjectives in particular, are sensitive. In particular, our study has demonstrated that there is a strong correlation between an adjective's scalar structure (whether it is associated with a closed or open scale), the context sensitivity of its standard value (whether it has a trivial or nontrivial standard), and the acceptability and interpretation of degree modification by *very* and *well*. These observations provide a strong basis both for making predictions about the lexical semantic properties of gradable adjectives (derived or otherwise) on the basis of collocational patterns, and for determining which degree modifiers will be acceptable with which participles. Finally, we have provided new insight into the relationship between the aspectual structure of verbs and the scalar structure of adjectives. In so doing, we hope to have clarified to some degree why participial adjectives often behave ambivalently with respect to the tests for adjectival status.

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