A COGNITIVE STUDY OF ANTONYMY:
ON THE STABLE SENSE
OF THE PARTICLE DOWN IN ENGLISH

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1. Introduction

This paper aims at providing a cognitive insight into antonymy1 in
terms of the embodied framework as proposed by Lakoff and Johnson
(1999) and Evans and Green (2006). It proposes that antonymy is not
a semantic primitive but schematized from our daily experience. For
that purpose, I focus on the stable sense of the particle down.2 Down
has a series of senses which are based on an access to the stable
ground as in (1).

(1) a. The market settled down.
    b. He came down to earth.
    c. He got down to the bottom of a mystery.

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1 I use the term ‘antonymy’ in a broad sense, almost equivalent to the paradigmatic
opposition in Lyons (1977). This includes all types of opposition such as
CONTRADICTORIES (e.g. true-false), CONTRARIES (e.g. red-yellow), CONVERSIVES
(e.g. buy-sell), and REVERSIVES (e.g. tie-untie) (cf. Lehrer and Lehrer
(1982)).

2 Though I focus on the idiosyncratic semantic extensions of down, there is no
doubt that up and down behave symmetrically in most cases. However, in certain
linguistic contexts, they show asymmetrical behavior both in distributions and
semantics. This paper analyzes this symmetrical breaking between up and down.
The examples above are of considerable theoretical interest for two reasons. First, they are counterexamples to orientational metaphors such as GOOD IS UP and BAD IS DOWN in that the meanings of down in (1) have a positive value. Second, this stable sense is particular to down and no complementary opposite sense is observed in the particle up. This fact contradicts previous accounts of antonymy which stipulate that a pair of opposite words (e.g. antonymy, complementarity) tends to extend symmetrically in its semantic extension (cf. Lehrer (1990)).

In previous studies, antonymy or background concepts of antonymy, such as oppositeness and polarity, were once treated as a semantic primitive (Lyons (1977), Lehrer and Lehrer (1982)). In the case of the particles up and down, the two particles are conceptually opposite (or antonymic in a broad sense) in that they denote opposite directions along a vertical axis. Moreover, symmetrical semantic extensions are observed in Lakoff and Johnson's (1980) analysis of orientational metaphors. Even when metaphorically extended, up and down hold an opposite relation. Therefore, it can be concluded that the symmetrical relationship between up and down is true at a schematic level.

However, the asymmetrical behavior of antonymy has been reported in the cognitive account of particles such as Lindner (1982), Hampe (2002), Rudzka-Ostyn (2003). In these studies, the primary focus was on the asymmetrical behaviors of particle pairs (e.g. in-out, on-off). Evidence of this asymmetrical distribution can be seen in the following examples using the particle pair up and down:

(2)  
   a. He ate up/*down his lunch.
   b. He opened up/*opened down/closed up/closed down his shop.

Examples such as those in (2) suggest the need for a more fine-grained account of antonymy.

In this paper, I propose an embodied vertical axis; that is, the axis proposed is not an abstract scale but embodied in real life. This vertical axis is situated in the real world where human beings interact with their environments. Human beings use various strategies to categorize the events which are related to upward and downward movements.

From this embodied view of linguistics, this paper discusses the role of the ground which motivates the stable sense of down. In our physical experience, the goal of downward movement is the ground, and consequently, down has a series of sub-senses related to the ground. The stable sense is peculiar to down, and therefore, this constraint of our
physical environment leads to the asymmetrical semantic extension in the antonymy of *up* and *down*.$^3$

2. Properties of Antonymy

In previous studies, the opposite lexical relations of words have been studied within the field of lexical semantics (Lyons (1977), Lehrer and Lehrer (1982), Cruise (1986)). However, a major source of problems in the study of antonymy has been the use itself of terminology such as antonymy, oppositeness and contraries. In general, antonymy in a very broad sense can include each of the types of opposition represented in figure 1.

![Figure 1](image1)

Figure 1 is based on the classification of Lehrer and Lehrer (1982). However, as they note, “in the contemporary linguistics literature, antonymy is used rather narrowly to refer to GRADABLE ANTONYMS such as *large-small* and *good-bad*.” This statement reflects their interest in antonymy in that they did not deal with antonymy as taxonomy but as scale. The difference between a taxonomic approach and a scalar one can be understood as represented in Figures <2> and <3>.

![Figure 2](image2)

![Figure 3](image3)

$^3$ An anonymous reviewer suggests that antonymy is not a primitive but a secondary relation which is classified between two words. This is true at the linguistic level. Here, it is necessary to distinguish two major levels for linguistic analysis: the linguistic and conceptual levels. At the linguistic level, antonymy is a secondary relation and shows asymmetrical characteristics. However, at the conceptual level, antonymy is symmetrical in that it shows a conceptual opposite, that is, it shows opposite direction in a scale.
The goal of their study was to give a precise characterization of the scale.

2.1. A Cognitive Account of Antonymy: Cognitive Lexical Semantics

The specification of scales was further studied in Croft and Cruse (2004). They dealt with antonymy in terms of the image schemas SCALE\(^4\) and describe the property of each sub-SCALE. They note that "the general notion of opposite probably corresponds to a single image-schema," and furthermore that "the different types—complementaries, antonyms, reversives—will correspond to more specific image schemas" (ibid.: 169).

They presented four types of antonymy, in light of scalar types:

(3) (I) A monoscalar system: short-long
    (II) A disjunct equipollent system: hot-cold
    (III) A parallel equipollent system: hard-soft
    (IV) An overlapping system: good-bad

(cf. Croft and Cruse (2004))

These four systems are structured quite differently. Croft and Cruse illustrated these four systems to explain the asymmetrical behavior of each type of antonymy. For example, a full monoscalar system can be represented as in Figure 4.

\[
\begin{array}{c}
\text{X-ness} \\
\vline \\
\hline
0 \\
\hline \\
\text{Y} \quad \text{X}
\end{array}
\]

A Full Monoscalar System (cf. Croft and Cruse (2004)) <Figure 4>

Here, they made a crucial distinction between absolute and relative scale schemas. The members of a pair of antonyms do not have the same relationship to the absolute scale: one term denotes a higher value of the scaled property, while its partner denotes a lower value.\(^5\)

\(^4\) Croft and Cruse (2004) notes "the principal image-schema in this account of antonymy is SCALE, which construes a property in terms of more and less" (ibid.: 169).

\(^5\) Previously, higher or default values in opposite word pairs had been discussed in terms of markedness theory.
This specification of the scales partially explains the asymmetrical semantic extensions and distributions of antonymy as in (4).

(4)  a. She has short/long hair.
    b. What is its length?
    c. ?What is its shortness?  (ibid.: 174)

In the relative scale, the adjectives long and short behave symmetrically as in (4a). In contrast, the absolute scale, the nominal form of long length has a default value. Therefore, (4c) seems odd. Thus, the full specification of scales clarifies the reason for the asymmetrical distribution.

2.2. Problems with Previous Studies

Previous studies can be summarized as a fine-grained analysis of scales or axes. They attempted to clarify the characteristics of the scales behind antonymy. However, at least two problems still exist with the previous accounts of antonymy. The first problem is the asymmetry problem. Under the specification of scales, the asymmetry problem was solved to some extent as shown in (4). But, the asymmetrical semantic extensions which cannot be explained by the full specification of scales are still observed in the opposite word pairs.

(5)  a. long ago / ?short ago / long-ago days / ???short-ago days
    b. *In long, / In short, ...

The second problem is the value judgement reversal observed in opposite word pairs. For example, in paired particles such as in-out, up-down, on-off, it is said that the former words have a positive value, while the latter a negative one (Hampe (2005)). However, this value judgement is sometimes reversed.

(6)  a. My plan is up in the air.6
    b. He is a down-to-earth person.

The examples in (6) provide stark counterexamples to the orientational

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6 This paper does not deal with the negative value of up. But, as in (5a), the characteristics of the environment motivate the negative connotation of up, as well.

(i) The location of the museum is still up in the air.
(ii) He is up in the clouds.

In (i) and (ii), the characteristics of the sky and the cloud influence the negative value of up.
metaphor: GOOD IS UP; BAD IS DOWN, because the state of being up in the air in this case is a negative state, while the down-to-earth state is a positive state.

3. Alternatives

Though previous studies focused on the characteristics of scales or axes as in (3), they never discussed the contribution of environmental factors which surround scales. However, both environmental factors and scales motivate the semantic extensions of antonymy in a number of situations.

Here, the embodied cognitive view of language is essential in elucidating antonymy (Lakoff (1987), Lakoff and Johnson (1987, 1999), Gibbs (2006), Tyler and Evans (2003), Evans and Green (2006)). That is, each scale or axis is situated in a particular environment which interacts with humans. Not only scales but also environments are structured asymmetrically along the vertical axis (i.e., an up-down or top-bottom asymmetry). That is, there is a sky above us and a ground below us structuring the polar opposition of the vertical axis. These asymmetrical characteristics of the environment motivate the asymmetric semantic extensions of antonymy.

3.1. The Schematicity of Scale: The Embodied Vertical Axis

In light of vertical asymmetry in the human environment, the abstract and embodied vertical axes can be depicted in the following manner:
The following section delineates three senses of down, which derive from the relationship between a falling object and the ground. Surveying these senses of down will demonstrate that scales and axes are not merely abstract entities but are schematized from our daily experience.

4. The Stable Senses of Down

In this section, my aim is to elucidate the contribution of the ground to semantic extensions of down. It is impossible to have the stable senses if there is no ground as goal at the end of the downward movement.

Before analyzing these uses of down, it is necessary to briefly look at three characteristics of the ground as encountered in the human environment. First, the ground is stable and supports a stationary object. Second, the ground touches the object when it is stationary. Third, the ground is generally the goal of a falling object under normal conditions within the human environment. Sub-senses of down are motivated by these three structural relations between the object (TR) and the ground (LM).

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9 Many linguists have focused on semantic accommodation (Langacker (1987), Taylor (2002)). By Langacker’s definition, “one component may need to be adjusted in certain details when integrated with another to form a composite structure” (Langacker (1987: 75–76)).
The first semantic contribution of the ground is the stable sense, which has a positive default value.

(7)  
   a. The market settled down.  
   b. He settled down to married life.  

(8)  He got down to his work.  

(9)  Things are shaking down.

In (7)-(9), the subjects move downward metaphorically, toward the stable surface and finally attach to it. In all the examples, the relation between the subject (TR) and the surface (LM) is ‘contact’ and ‘support.’ The stable sense in down derives from the stability of the ground. Again, this stable sense is a counterexample to BAD IS DOWN and cannot be explained without considering the characteristics of the ground.

4.1. The Binding Sense

The ‘contact’ and ‘support’ relations between the TR and the LM tend to extend to the binding sense, when the support is too strong.

(10)  
   a. It is hard to bind him down to a commitment.  
   b. *It is hard to bind him up to a commitment.

(11)  
   a. We pinned him down to a promise.  
   b. *We pinned him up to a promise.

(12)  
   a. He tied up his shoelace.  
   b. He didn’t want to be tied down to a steady job.

In (10a) and (11a), the TR (him) moves downward and then connects to the commitment as LM (i.e. a stable surface). However, up does not have a corresponding symmetrical sense as (10b) and (11b) show. This difference in felicity reflects the nature of the sky and the ground. That is, the sky is not a binding goal and furthermore does not support us. Examples (12a) and (12b) show an intriguing contrast. (12a) describes the reflexive connection of the TR (his shoelace), where two shoelaces (TR) are bound to each other, while (12b) illustrates that the

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As an anonymous reviewer suggests, in (7), (8) and (9), the TR does not move toward the real ground rather toward a supporting surface which is also metaphorical to some extent. Here, the relation between the TR and the ground in the spatial domain maps onto more abstract domain (i.e. the Invariance Principles).
TR (he) is bound to the LM (a steady job). Here, the close relation between down and the ground (or downward direction) is obvious.\(^{11}\)

### 4.2. The Discovery Sense

The ‘contact’ and ‘support’ relations between the TR and the LM further extend to the discovery sense as follows:\(^{12}\)

(13) He got the dates down.

(14)  
  a. We want to pin down the source of this problem quickly.
  b. ??We want to pin up the source of this problem quickly.

This sense is more complex than the former two senses. In this sense, humans who stand on the ground play an important role. That is, the TR moves in a downward trajectory from outside to inside the human visual field. In (13), the dates metaphorically enter into the visible field of humans and consequently are understood by them, i.e., SEEING IS UNDERSTANDING. In (14a), the human visual field, which exists in the un-profiled base of down, is foregrounded and consequently motivates the semantic extension. In contrast, (14b) fails to be felicitous since humans live on the ground and not in the sky.

These three sub-senses of down suggest that the ground must be in the un-profiled base of down as shown in Figure 6. Then, as a result of semantic accommodation, the ground is profiled and the stable sense is foregrounded. Consequently, the structural relation between the object and the ground in the perceived world maps onto various abstract

\(^{11}\) As an anonymous reviewer points out, the binding sense is also motivated by the verbs bind, tie and pin; however, the relation that the TR is caught by the LM is foregrounded when these verbs co-occur with the particle down. This is clarified by a comparative investigation of V up to and V down to in British National Corpus. There, V + up to N is not observed. In contrast, bind down to (2), pin down to (6), tie down to (16) are observed, and the objects of these three combinations are things which bind the TR.

\(^{12}\) The same type of extension is pervasive in daily language.

(i)  
  a. I’ve got your point.
  b. We reached our conclusion.
  c. They arrived at their agreement.

(ia) is a example of the UNDERSTANDING IS GRASPING metaphor (Lakoff and Johnson (1999)).
5. Further Evidence of the Role of the Ground: *Down* and *On*

The existence of the un-profiled ground in *down* is further evidenced by similar extensions of the particle *on*. As pointed out in previous studies, the prototypical sense of *on* is an object's (TR) contact with a surface (LM). Taylor (2002: 229) states that “*on* designates a relation between a TR and a LM” and “simplifying somewhat, we can say that the relation is one of support and contact.” Here, the LM must be a supporting surface, and the TR is an object that is in contact with the LM. It is obvious that three meanings of *on* emerge from the stability of the LM as in the following examples.

(15) a. That generalization is based on insufficient data. (The Stable Sense)

b. He is on duty today. (The Binding Sense)

c. John hit on the great idea. (The Discovery Sense)

Interestingly, the particle *on* has all three senses which the particle *down* also has. This similar extension based on the stable surface of *on* strongly suggests the existence of the ground in the base of *down* in these senses. Both *down* and *on* have a stable surface which supports

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13 Lindstromberg (1997) provides another *down* sense which does not have negative associations.

(i) We've broken the date down into five categories. (Lindstromberg (1997: 191))

She states this sense as ‘down to eye level’ = ‘accessibility.’ The speaker can access an object, since an object moves down to eye level of the speaker. Though these expressions are not based on the ground, this is similar to the three senses above in that (1) the axis is embodied and the speaker's position is situated in the axis and (2) the negative association of *down* is cancelled.

14 One of the reviewers points out the following examples and suggests that the LM is not the ground but normal state, and then, points out that meanings of the sentence, i.e. the normal state, are motivated by the deictic verbs *come* and *go*.

(i) The patient's temperature came down today.

(ii) The patient's temperature went down today.

As such, the reviewer suggests that in the case of the stable senses of *down*, not only *down* but also verbs contribute to the meaning of the sentence. Though I exclusively focus on the role of *down* in this paper, it is certain that in many cases, verbs or other elements motivate the stable sense of *down*. This point will be discussed in the future.
the TR in their image schemas. The difference is that, while on has an inherent supporting surface as LM, down's supporting surface is usually un-profiled and as a result of semantic accommodation, the ground is foregrounded. From this similarity, it can be concluded that not only scales or vertical axes but also the situation which surrounds the axis motivate the semantic extensions of antonymy.

6. Conclusions

In this paper, I have provided a cognitive explanation of antonymy with special reference to the stable senses of down, i.e. the stable, binding and discovery senses. Down has a series of senses based on the structural relations between a falling object and the supporting ground. The fact that the ground supports the object maps onto various domains and motivates a large number of intriguing phenomena such as the reversal of value judgement and asymmetrical semantic extensions.\(^{15}\)

This study has also revealed that scales which exist behind antonymy are not semantic primitives but are instead abstracted from our daily experience. At a schematic level, opposite words such as up and down seem symmetrical; therefore, the scale, i.e. the vertical axis seems symmetrical as in Figure 5. However, at a more concrete level, not only the vertical axis but also the environment surrounding the axis is structured asymmetrically. These asymmetric characteristics, in turn, motivate the asymmetric semantic extensions in antonymy. Moreover, it can be concluded that this study is not merely a descriptive study of down but also a case study of antonymy in terms of the embodied framework. The method discussed here can apply to other antonymic pairs, because it is typical that the environments surrounding scales motivate the asymmetrical characteristics in antonymy.

The embodied cognitive approach adopted here emphasized the necessity of the fine-grained analysis of language. In contrast to previous

\(^{15}\) Though this study focuses on the stable senses of down which have idiosyncratic characteristics, they share a characteristic with other senses of down in that they both show the downward movement of TR. The only difference is whether an un-profiled ground, which is the goal of the movement, is foregrounded or not. If the ground is foregrounded, then the ‘support’ and ‘contact’ relation between TR and ground motivates three stable senses of down.
studies of paired words, this approach clarified not only asymmetrical distributions of antonymy at a descriptive level but also addressed motivations for the asymmetry at an explanatory level. This dual descriptive and explanatory power will certainly continue to provide new insights as the approach presented here is applied to other paired words not addressed in this paper (e.g. dexis, body part terms, spatial prepositions).

REFERENCES


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16 An anonymous reviewer suggests that the embodied framework is not an explanatory approach. However, in the Cognitive Linguistics view, ‘explanatory’ means to clarify the motivations which determine linguistic structures. From this perspective, this paper has done an explanatory analysis in that it analyzes motivations of idiosyncratic meanings of *down* and finds that the environment of the axis motivates idiosyncratic semantic extensions.


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**Corpus**

*The British National Corpus (BNC)*

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