

Antonymy and Semantic Change*

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While there has been much recent research focusing on antonymy, there has been little work exploring what role it plays in the semantic development of antonyms or how two words come to be in an antonymous relationship in the first place. This study examines the etymologies of four sets of antonymous lexemes in order to provide a preliminary answer to these questions. It concludes with the suggestion that antonymy may play a role, but that it does so alongside borrowing, disambiguation, and metaphorical extension in a way that leaves systematic patterns of semantic change.

Keywords: semantics, historical linguistics, semantic change, antonyms, gradable adjectives, borrowing, disambiguation, metaphorical extension

1 Introduction

Recent research on antonyms has largely focused on one of three things, modeling antonymy itself (e.g. Cruse 1992), modeling the mental lexicon (e.g. Murphy 2006), or further developing a semantics of gradable predicates (e.g. Paradis 2001, Kennedy & McNally 2005)¹. However, little attention has been paid to their historical development.

The central role of antonymy in both cognitive and formal accounts of gradable predicates prompts the question of what role, if any, antonymy may play in semantic change. To further explore this question, I chose to examine development patterns associated with multi-antonymous lexemes. Multi-antonymous as used in this paper refers to lexemes that are associated with more than one sense and have more than one antonym available depending on the sense being discussed.

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¹See also van de Weijer et al. (2014) for a succinct overview of a cognitive approach to antonymy's role in developing a semantics of gradable predicates.

For gradable adjectives, these different senses will be associated with different, though perhaps related, dimensions. An example of a multi-antonymous gradable adjective is *hard*, which is associated with both a dimension or sense of tactile sensations and one of effort. Along the dimension of tactility, the lexeme stands in contrast with *soft*, whereas along the dimension of effort, it stands in contrast with *easy*. For ease of exposition, I will often use the term near-synonyms to refer to the two lexemes that are both in an antonymous relationship with the same third lexeme. For example, *soft* and *easy* will be considered near-synonyms.

The null hypothesis chosen for this line of inquiry is that antonymy has no role to play in the historical semantic development of lexemes and that furthermore, if that is the case, no patterns will emerge across sets of antonyms.

As will be seen, this is not the case. A pattern does emerge. This pattern begins with borrowing, potentially for the purposes of disambiguation. In the triad given above, *hard* and *soft* are the original pair and *easy* was borrowed later, perhaps in part to help disambiguate which sense of *hard* or *soft* was meant. Antonymy then facilitates this disambiguation and encourages narrowing of the original, now near-synonymous term. In this case, the antonymous relationship of *hard* with both *soft* and *easy* encourages the narrowing of *soft*, which previously encompasses several senses now ascribed primarily to *easy*. Nevertheless, a tendency for metaphorical extension, particularly from the more concrete to the more abstract, results in the two near-synonyms *soft* and *easy* having similar historical patterns in development. If there was no indication as to what usage is current and what is obsolete, the entries for *soft* and *easy* would appear nearly identical. This complex interaction of processes results in the emergence of a pattern across the different multi-antonymous sets of lexemes that were investigated in this study.

2 Methods

As a first foray into examining the development of antonyms over time, I examined the entries of four sets of adjectives in the online *Oxford English Dictionary* and analyzed them for patterns of semantic change. These sets all met the following criteria:

- 1) at least one member of the set participates in more than one antonym pairing
- 2) those antonym pairings have been previously established in the literature as having a relatively symmetrical relationship in modern usage, and
- 3) the antonym pairings have been previously established in the literature as having a conventional relationship in modern usage.

The first criterion allows for a more complete and nuanced examination of antonymy and any role it may play in historical development.

The second criterion serves to disqualify pairs where native speaker judgments regarding whether or not the pair is a “good” example of an antonym is likely to vary wildly. To require a symmetrical relationship is to require bi-directional elicitation (Paradis, Willners & Jones 2009). For instance, native speakers respond to requests for the opposite of *hard* with *soft* as well as to requests for the

opposite of *soft* with *hard* with a high degree of consistency. Contrast this with a request for the opposite of *clear*, which may consistently receive a response of *dark* but requests for the opposite of *dark* only occasionally result in a response of *clear* (Paradis et al. 2009). I relied on the elicitation study in Paradis et al. (2009) for determining whether or not lexemes met this requirement².

The third criterion is meant to exclude pairs that speakers may accept as antonymous in context, for instance *courageous* and *weak*, but may otherwise not consider as “real” antonyms. To require a conventional relationship in modern usage is to require that the items in the antonym pairing co-occur in particular contrastive constructions with a relatively high degree of frequency (Murphy 2006, Jones 2007, Paradis et al. 2009). For this requirement, I again relied on Paradis et al. (2009), but also on Jones (2007)³.

The four sets of words chosen and the dimension labels that will be used to distinguish between them are as follows:

- EVALUATIVE: *good, bad, evil*
- TACTILE & EFFORT: *hard, easy, soft*
- SIZE: *small, large, little, big, (great)*
- LUMINOSITY & WEIGHT: *light, dark, heavy*

For the set labeled SIZE, *great* is presented above in parentheses because it does not meet the criteria previously laid out for the other antonym’s current usage. It is neither currently in a conventional nor a symmetrical relationship with either *small* or *little*. However, it became apparent in examining other entries within that set that the word likely did meet those criteria at some earlier point in the language. Additionally, in comparing the whole set with the patterns found in the other sets, it seems probable that *great* is simply at a later stage in the development pattern what is seen playing out across the other sets. Therefore, the word is included here because it contributes to a better understanding of those patterns.

²Paradis et al. (2009)’s study consisted of a corpus, a judgement, and an elicitation study. The initial choice of antonyms was based on a review of the literature and the selection of seven dimensions that the authors “perceived as central meaning dimensions in human communication.” The dimensions were SPEED, LUMINOSITY, STRENGTH, SIZE, WIDTH, MERIT and THICKNESS. They then selected what they felt were the most intuitive antonym pairs in English for each of those dimensions and verified them as direct antonyms in Princeton WordNet before pulling all synonyms from the same source. They then extracted the sentential co-occurrence statistics from the British National Corpus using *Coco* (Willners 2001, Holtsberg & Willners 2009) for all possible combinations of the previously selected lexemes. Based on those results, they selected two antonym pairs, two synonym pairs, and an un-related pair in addition to their original pair for each dimension to use for the judgement and elicitation studies. All six pairs for each dimension had greater than chance sentential co-occurrence. They additionally included eleven antonym pairs from Herrmann et al. (1986).

³Jones (2007) is a corpus-driven study that examines the co-occurrence and usage of 56 antonym pairs across four different corpora with different discourse domains. The antonym pairs used in this study were “chosen intuitively to maximize the number of contexts available for analysis” and relied in part on Jones (2002).

Conspicuously, this non-random sampling excludes a class of antonyms that Kennedy & McNally (2005) refer to as having an “absolute” standard⁴. These are antonym pairs, such as *wet* and *dry*, where the negation of one entails the affirmation of the other and vice versa. To claim that “The table is not wet,” entails the claim that “The table is dry.” This is in contrast with adjectives that have a “relative” standard of comparison, such as *tall* and *short*, where no such entailment pattern holds. To claim that “John is not tall,” does not entail that “John is short.” I am not sure at this time whether the lack of absolute adjectives stems from accidental bias in the literature that was used for evaluating the second and third criteria or if it is a consequence of the first criterion⁵. Either way, I think it would be prudent to reserve judgement on how or if findings presented here may be extended to absolute standard adjectives.

There are additional, obvious limitations with the chosen method that are worth discussing at this point. By choosing to rely on the *Oxford English Dictionary*, I am relying on what is, essentially, a pre-filtered, unbalanced corpus of quotations that has not been evenly updated across the entries examined. Also, by examining only four sets of lexemes, I am utilizing what is, obviously, a limited data-set. Given the exploratory nature of this study, I take both of these limitations as acceptable trade-offs for the benefits of having an extensive set of historical data with some initial analyses in place and of being efficient in determining whether there are any patterns that warrant further investigation. However, the limitations still stand and should be born in mind throughout the presentation of the results and the discussion that follows.

One final comment about the methodology before moving on to the results. In examining the entries, I attempted to balance on the one hand, utilizing the entries’ headings to facilitate the analysis and on the other, examining the individual quotations apart from the heading to validate and cross-check opposing or synonymous headings across entries. For ease of exposition, I will present information in terms of entry headings and sub-headings. However, it should be understood that it is the use of the lexeme that is under discussion and that the usage is supported by the quotations contained in the entry. As necessary, I will highlight cases where the headings obscure usage patterns evidenced by the quotations.

3 Results

Five main observations emerge from the data. First is that there are two distinct processes that may result in multi-antonymous items. One is phonological and the other semantic in nature. Which path led to the current state of affairs has consequences for what other processes the lexeme can be expected to have participated in.

Provided that the lexeme took the semantic path of developing multiple antonymous relationships, then three additional and related observations also apply. In such cases, there is a pattern of

⁴They follow Unger (1975) in their use of this term. Also, this term is taken to be related to if not encompass the total and partial predicate distinction found in Yoon (1996), which is further discussed in relationship to scale structure in Rotstein & Winter (2004).

⁵My suspicion is that it is a combination of the two. For reasons why the first criterion would result in this bias, I refer the reader to §4 in Bierwisch (1989). My belief is that those adjectives he refers to as “evaluative” always have a relative scale under the analysis in Kennedy & McNally (2005). He comments that these adjectives are much more likely to have multiple senses and antonyms than those he refers to as “dimensional.”

borrowing, narrowing, and extending metaphorically in such a way that the two near-synonymous items in the set exhibit similar developmental patterns.

Finally, regardless of whether the current state of ambiguity is the result of phonological or semantic processes, antonym pairs are able, but not obligated, to co-extend into new domains.

3.1 Phonological Change

The set labeled LUMINOSITY & WEIGHT stood apart from the others in terms of its items' developmental history. Most notably, it was the only set where a lexeme's possession of two antonyms was not the outcome of semantic processes, but rather of phonological ones. The two distinct senses of *light* were originally associated with two completely different words that had different phonological forms. In pre-Germanic, the word associated with WEIGHT was **legh^w-*, while the word associated with LUMINOSITY can be traced to the Aryan root **leuk-*. A series of phonological changes in the language resulted in the currently homophonous form *light*. There is no evidence that *heavy* and *dark* have influenced one another's development due to their relationship with *light*. Instead, development patterns for both terms can be adequately accounted for with the process of metaphorical extension. This set is excluded from the rest of the results until the section on co-extension.

3.2 Semantic Change

3.2.1 Borrowing

For the other three sets, semantic rather than phonological processes were responsible for the current state of multi-antonymy. The first commonality among them is the presence of a borrowed lexeme. The majority of the lexemes in these sets have been in the language since Old English and are accounted among the earliest 1% of attestations in the OED. Yet each set has at least one member that is not attested until sometime in the Middle English period and instead typically fall within the earliest 4-5% of earliest attestations in the OED.

Good and *evil* are both attested in Old English and are among the 1% of earliest attested words in the language and have clear cognates in other Germanic languages. *Bad*, however, is not attested—except as a surname—until c1203 and is among the earliest 4% of words in the language. Its origins are disputed.

Hard and *soft* are also both attested by late Old English and are among the earliest 2 and 3% respectively with well established cognates for *hard* in other Germanic languages and doubtful ones for *soft*. *Easy*, on the other hand, is a borrowing from Old French first attested c1200 and among the earliest 4%.

Small, *little*, and *great* are all attested in early Old English, are among the earliest 1%, and have well established cognates in other Germanic languages whereas both *large* and *big* are later borrowings with *large* being a borrowing from Old and Middle French first attested a1225 and among the earliest 4% and *big* being of unknown origin but not attested until c1300 and among the earliest 5%.

In each set, there is an older antonymous pair that often has clear cognates in other Germanic languages and therefore, that both items in the pair likely pre-date Old English. There is then a borrowed item in each set that came to stand in an antonymous relationship with one of the older lexemes and a near-synonymous relationship with the other. The reasons for borrowing will be further addressed in the discussion section, but it should be noted that the borrowing is concentrated in the Middle English period. The observation that is important at this time is that borrowing facilitated the two processes that followed, namely narrowing and metaphorical extension.

3.2.2 Narrowing

As the borrowings became established, the lexeme that initially stood in opposition to the now multi-antonymous lexeme underwent narrowing. It is here that I believe antonymy had the greatest role in the recurring pattern. Antonymy would have allowed the two near-synonyms to be used in order to disambiguate the different senses of the lexeme that they both stood in opposition to.

For example, *evil* and *good* at one point had antonymous usages along both a sub-dimension of QUALITY and MORALITY. After the borrowing of *bad*, however, *evil* underwent severe narrowing to only the MORAL domain. And while the sense of *bad* has since expanded to the point that it and *good* can be used antonymously along either the dimension of QUALITY or MORALITY, they are still more likely to be placed in opposition along the dimension of QUALITY.

This process is also seen for *soft* and *easy*. As *easy* expanded, there are uses of *soft* that became obsolete. In particular, the meaning that could be seen as most central to *easy*, that of being free from effort, is now relegated to being colloquial and is last attested in 1905.

This tendency is least obvious in the set relating to SIZE. However, there is evidence for the same phenomenon and is the reason why *great* was included in spite of not meeting the criteria listed in the methods. Upon examining the entries, it can be seen that while *big* can be used to indicate birth order, it is not attested in this usage until 1809, yet the same usage is found for *little* as early as Old English. A look at the quotations in the separate entry for *little sister* indicates that *great* used to stand in opposition to *little* in this sense. Further examination of the entry for *great* shows a similar development as that seen in *big*, with several now obsolete entries even noting that the present day equivalent is *big*. The major difference is that *great* has several senses that are more closely tied with speaker judgments and assessments than *big* has. Practically all of its entries related to SIZE, however, are now obsolete. I believe it is here that we see evidence that narrowing has indeed taken place within this group.

Consistently, the older term narrows, sometimes to the point of no longer belonging to the multi-antonymous set. In spite of this narrowing, there is still a marked tendency for the entries of the two near-synonyms to exhibit similar semantic development to the point of being nearly identical. These similarities in semantic development bring us to the third commonality among the three sets and the fourth main observation, that of metaphorical extension.

3.2.3 Metaphorical Extension

In the limited data set examined, there was a strong trend for any two lexemes that both stood in an antonymous relationship with the same third lexeme to also exhibit similar semantic trajectories,

with the additional tendency being to develop from the more concrete to the more abstract via metaphorical extension.

In the EVALUATIVE set, where both *bad* and *evil* are antonyms of *good*, the entries for *bad* and *evil* are very similar. The entries for both *bad* and *evil* are divided into two broad senses that the OED labels as “privative” and “positive,” but which may be easier to think of in terms of the dimensions QUALITY and MORALITY, respectively. It is difficult to ascertain which of these meanings developed first for *evil* due to the age of the lexical item, but for *bad* it appears that the sense related to QUALITY was prior to the one related to MORALITY. Within the subheadings related to the dimension of QUALITY in both entries, similar development and domains can be seen. For instance, both have at some point been available for describing food or drink that is no longer fit for consumption. The first attested usage of *evil* in this sense is c1000 and 1203 for *bad*. For both lexemes, this sense precedes the sense of being “unskilful” or “not competent or skilled” with the earliest attestation for *evil* occurring in 1530 and for *bad* a1600. About 4-500 years after the first attestation of *bad*, however, the last attested usage of *evil* in any sense related to QUALITY is given and all such senses are currently considered obsolete.

The similarity in the entries for *bad* and *evil* alone is not too surprising given the degree of synonymy that holds between the two lexemes in current usage. However, the same pattern is seen in the TACTILE & EFFORT set even though the two lexemes *easy* and *soft* have a lesser degree of synonymy. Broadly speaking, the development for each term goes from pleasant sensation to not causing unpleasantness and/or having the appearance of pleasantness, to unbound to pliable/manipulable, though the exact progression for each is not quite the same in some places. Several senses in both entries are practically identical in their wording. Consider “characterized by ease,” which is attested for *soft* by c1000 and for *easy* by c1380, or “of a slope...gradual,” which is attested for *soft* as early as a1122 and for *easy* as early as 1340. Others are very similar, though not as exact. Compare “of pace or movement...slow,” which sense is first attested for *soft* as early as 1290, with “not hurried, gentle; of motion...,” which sense is attested for *easy* as early as c1385. The two lexemes also exhibit extension to other similar domains, such as the elements. *Soft* could describe weather, water, and fire by a1325 and *easy* by 1398.

This same general pattern is repeated within the SIZE set, though it is not as strong as in the other two. For both the pairs *small* and *little*, which can both stand in opposition to *big*, and *big* and *large*, which can both stand in opposition to *small*, there are a large number of overlapping senses contained within their entries. It should be noted, though, that for *small* and *little*, it is not possible to determine the order of semantic development with certainty under the current methodology due to the number of senses that are attested as soon as early Old English. Also, while *small* and *little* are almost completely synonymous, there are at least four notable differences. First, *small* initially had a sense of having relatively small breadth or circumference compared to height, a sense that *little* has not had, or if it did, was well prior to early Old English. Second, the two lexemes behave differently when used to modify mass nouns. *Little* in such cases indicates the quantity while *small* indicates the size. Third, though *little* can be used to indicate the smaller of a set or the relative size compared to other items of the same kind or of a kind relative to other kinds, when discussing standardized sizes, *small* is available in a way that *little* is not. Which leads to the fourth notable difference, which is that though *small* can be antonymous with either *big* or *large*, *little* and

large are not a well-formed antonym pair. *Large*, like *small*, is preferred over *big* for indicating standardized sizes. Additionally, there are several senses for *big* that have no counterpart in the entry for *large*, such as the previously mentioned issue of describing birth order among siblings. So while there is a large degree of overlap across these items, the extent to which they exhibit similar semantic development is less certain than what is seen in the other two sets. As previously mentioned, though, *big* and *great* do exhibit similar developmental trajectories.

3.2.4 Co-extension

An additional observation that was seen in all four sets was the co-extension of antonym pairs into new domains. That is when one member of a pair extended to usage in a new domain, the other member of the pair did so as well, but in an opposing sense. For example the application of *hard* to mean a tangible, physical copy, was accompanied by the extension of *soft* in the opposing sense to mean a virtual copy. While this mechanism appears to be freely available, it is not obligatory in application. Additionally, the extension of each lexeme in the pair does not have to always take place at exactly the same time. In fact, sometimes the time-lag is quite large. Examples will be presented set by set and within each set, discussed antonym pair by antonym pair.

3.2.4.1 EVALUATIVE Within the EVALUATIVE set, there are two antonym pairs to consider. First that of *good* and *evil* and second that of *good* and *bad*. This set was sometimes particularly difficult to assess due to organizational differences across the entries and the need to frequently cross-reference quotes from different entries.

For *good* and *evil*, it is not always clear if a counterpart sense did not actually exist or if it is not given due to an accidental gap. For instance, *good* has a specific subentry dealing with how fertile the land is. No such subentry exists for *evil*, though it does have a subsense indicating that it applied to air and water to indicate that it was not nourishing. However, none of the quotations in the entry for *evil* mention land or soil. Otherwise, the two do seem to share two broad meanings, those of QUALITY and MORALITY, with *good* being more likely to have meanings further subdivided between objective and subjective uses. An objective use utilizes a standard based on the type of thing it is whereas a subjective use takes the needs or wishes of the speaker as the standard of evaluation.

With this pair, it is also not always clear which first obtained a particular sense due to how early many of the senses are attested. However, in at least two instances, *evil* is attested earlier than *good* for a particular, related sense. In regards to describing someones repute or reputation, the usage is attested for *evil* c1330, but not until 1484 for *good*. Also, in describing the relative virtue of people, it is attested earlier for *evil*, 971, than for *good*, a1387. However, to mean roughly “fortunate,” the attestation is earlier for *good* (compare c825 with c1175).

On the other hand, *bad* consistently enters into a sense after *good*. This is unsurprising given its later entry into the language. However a notable example occurring after the borrowing of *bad* is the extension to the description of the legitimacy of currency. *Good* is attested as indicating genuine money a1325, but *bad* is not attested as describing counterfeit money until c1405. This last sense is also notably one not given under the entry for *evil* and seems to indicate part of the

narrowing of that item previously discussed.

3.2.4.2 TACTILE & EFFORT The TACTILE & EFFORT set has both the best examples of near simultaneous co-extension and the best examples of only minor co-extension.

Hard and *soft* undergo several joint extensions. Initially, *hard* seems to lead. It is attested earlier for describing persons (971 compared to a1122), actions (OE compared to 1495), and how much calcium salts a given sample of water contains (1660 compared to 1775). But later extensions eventually become virtually simultaneous. For instance, iron's ability to maintain magnetization (compare 1830 and 1881), modification of the noun *copy* (compare 1964 and 1968), and modification of political leanings (compare 1975 and 1977) are attested closer and closer together. Altogether, roughly two-thirds of the senses listed under *soft* have an obvious counterpart in the entry for *hard*. I consider this rough estimate to be under-representative due to organizational differences between the entries. There are several sub-headings given in the entry for *hard* that do not have a counterpart in *soft*. However, examination of the the quotations justifies the belief that *soft* has a comparable sense, even if it is not given a separate sub-heading in its entry. In spite of the amount of co-extension seen in this pair, there are some senses that have no obvious counterpart. For instance, *soft* is used to designate "in the Soviet Union and China ... a class of railway carriage," while *hard* has no comparable, opposing sense.

Hard and *easy*, on the other hand, offer little evidence of co-extension. While most of the senses given for *easy* have a counterpart with *hard*, several of *hard*'s more technical uses, such as describing how well iron maintains magnetization or how complete a vacuum is, do not have counterparts with *easy*. For whatever reason, *hard* prefers to co-extend with *soft* instead.

3.2.4.3 SIZE Within the SIZE set, *small* and *little* typically precede *big* in cases where they have counterpart senses. For instance, to describe the quality of a voice, *small* is attested as early as Old English, *little* is attested by 1485, but the same use is not attested for *big* until 1549. This state of affairs is not surprising when one considers that *big* entered the language much later than *small* or *little*. In general, *big* co-extends extensively with both *small* and *little*, though not necessarily vice versa. For instance, *big* co-extends with *little* to describe the birth order of children in expressions like "big sister," but *small* does not co-extend with *big* into this sense. On the other hand, *big* patterns with *small* when modifying mass nouns, such as *furniture*, in that both are understood to indicate the size and not the quantity of the noun under discussion. This is in contrast to *little*, which indicates quantity rather than size in such cases. In this respect, *big* does not co-extend to include the sense in *little* and neither does *little* co-extend to include the sense in *big*.

As far as *small* and *large* are concerned, many of the senses listed under *large* have a counterpart available under *small*, but not all, such as the now obsolete meaning of "liberal in giving." As with *big*, *large* typically develops a sense after *small*. For example, in describing the scale of a business, *small* is attested by 1663 but not for *large* until 1883. *Small* and *large* do not have as much co-extension as *small* and *big* do. *Small* has a number of senses for which *large* has no obvious counterpart, such as in describing whether a letter is capitalized or lower-cased.

3.2.4.4 LUMINOSITY & WEIGHT Within the LUMINOSITY & WEIGHT set, co-extension is again possible, but not obligatory. For this set in particular, there is no pattern as to which lexeme is more likely to extend into a new domain first. There are also more examples in this set of co-extension failing to apply. In other words, there are more examples where a lexeme has a usage or sense for which its antonym has no counterpart.

Along the dimension of LUMINOSITY, some care needs to be taken in assessing the entries for *light* and *dark*. The entry for *light* is only five pages long while that for *dark* is twenty-one. At first glance, this makes it seem as though *light* lacks more counterparts with *dark* than is actually the case. Instead, instances where there is no obvious counterpart between this pair of lexemes fall into one of two categories. The first category involves cases where there is an accessible counterpart, but it involves a noun phrase rather than the verb or the usage is simply not listed, likely due to when the entry was last updated at the time of access. An example of the former is the use of *dark* to characterize something that is secret or hidden from view. While the adjective *light* does not have a counterpart, there is an expression which conveys the opposite but uses the related noun form of the word, “to bring to light.” An example of the latter is a heading in the entry for *light* noting its ability to modify prices to indicate that something is cheap. While there is no counterpart sense given and no quotations that I could find in the entry for *dark*, the expression “a heavy price to pay” definitely exists and indicates that such counterpart a meaning is available.

The second situation in which this pair has no discernible counterpart to various senses involves cases where another antonym seems more appropriate, most typically *bright* or *clear*. For example, in the sense described as “devoid of that which brightens or cheers,” the quotation, “To look on the dark side of things” is given, which has an obvious counterpart in the expression “To look on the bright side of things.” In short, *dark* seems to have near complete co-extension with *light*, but not the other way around.

Turning now to look along the dimension of WEIGHT, *light* and *heavy* do share a general development from the more physical to the more abstract starting with the primary physical sense and moving on to having the action of something that has the physical sense, to a sense of importance or seriousness to having some effect or other sensational aspect, such as sound. In some cases, the extension of *light* precedes that of *heavy* by several hundred years. For instance, *light* is attested as describing food in relationship to ease of digestion c1000, but the earliest attestation for *heavy* in a related sense is 1574. For other senses, *heavy* precedes *light*. For example, when it comes to describing a material’s specific gravity, *heavy* is first attested as early as c1000, but *light*’s first attestation in a comparable sense is not until 1559.

Additionally, this pair has clear examples of co-extension failing to occur. For instance, *heavy* can be used to describe a golf ball in the sand, but there is no evidence from either the entry’s headings or quotations for a comparable sense for *light*. In the other direction, *light* can be used in the phrase “light-headed” to indicate dizziness, but again, there is no comparable, antonymous sense for *heavy*⁶.

3.2.4.5 Co-extension: Summary Overall, each antonym pair exhibits evidence of co-extension, which their antonymous relationship may have facilitated. However, sometimes the time difference

⁶We can talk about feeling “heavy headed” in English, but its sense is not contrary to that of feeling dizzy.

between when one lexeme in a pair extends and the other follows is quite large, and co-extension is not obligatory. Therefore, while antonymy may play a role, it is not clear that it is either necessary or sufficient for explaining this observation about the current data set. This is a consideration that will be returned to in the discussion section.

4 Discussion

The null hypothesis adopted at the beginning of this work was that if antonymy has no role in semantic change, then no patterns would be found across the sets of words examined herein. Contrary to that hypothesis, a clear pattern—which consisted of borrowing, narrowing, and shared developmental trajectories—exists across three of the four sets. Furthermore, the lack of a similar pattern in the fourth set is easy to explain. This set was the only one where there were clear phonological reasons for the current state of multi-antonymy. However, the rejection of the null hypothesis does not mean that factors other than antonymy, such as disambiguation and metaphorical extension, are not sufficient for explaining the general pattern that emerged.

The adoption of a loan word may have been initially motivated by the desire to disambiguate the complex senses that had previously developed around one of the words in the antonym pair in much the same way that *picante* is used by some English speakers to disambiguate between the multiple senses available for *hot*⁷. Note that this particular contemporary example also suggests another potential stage⁸ where the near-synonym is clarified by use of the borrowing prior to being used to disambiguate among the senses of the antonym. For example, it seems feasible that statements like “It is hot, as in *picante*” precede statements like, “It is *picante*, not mild.” In other words, there may be a missing step of synonymy leading to antonymy that this data set cannot bear adequate witness to, but that a more complete corpus could elucidate.

One additional way to further elucidate the exact roles antonymy and synonymy play in facilitating disambiguation and subsequent narrowing would be to examine the development of an extended number of antonymous sets and compare them against a number of synonymous sets that do not have obvious, conventionalized, antonyms in the language. If antonymy facilitates disambiguation and narrowing more than synonymy, then disambiguation and narrowing should occur more frequently within the antonymous sets than within the synonymous sets that lack clear antonyms.

With or without an intermediate step involving synonymy, antonymy likely then provided a mechanism for facilitating the disambiguation of an adjective along particular dimensions and thereby encouraged the narrowing of the older, near-synonym of the borrowing. Some additional support for the first part of this claim comes from the methodology of Justeson & Katz (1995)⁹. In a corpus study examining what features of a noun may help disambiguate an adjective, they developed a disambiguated sub-corpora by utilizing the co-occurrence of adjectives with sense-specific antonyms. In other words, their methodology shows that use of antonyms is a viable strategy for

⁷Credit for my awareness of this particular example goes to Mary Niepokuj, who used it in her History of the English Language class in the fall of 2014 specifically in reference to borrowing.

⁸“Stage” is used loosely here and should be understood to allow for overlap.

⁹Thanks to an anonymous reviewer for highlighting this particular study.

disambiguation for the listener if not also for the speaker. It has also been shown that canonical antonyms co-occur at a higher frequency than chance and more often than other semantically related pairs, such as synonyms (Willners 2001). Taken together along with the data presented here, I think it likely that antonymy did play a role in both initial and ongoing disambiguation as well as subsequent narrowing of the near-synonym.

After this narrowing, however, application of metaphorical extension consistently resulted in the near-synonyms having similar patterns of development even if their current usage is distinct or they are used to disambiguate various senses of their shared antonym. This yielded a pattern where if A and B both stand in an antonymous relationship to C, then A and B have similar developmental histories. This particular finding is in line with and contributes to the growing body of evidence that semantic change is regular, even in contexts not involving grammaticalization, and that furthermore, metaphor is not peripheral to language use. (See Lakoff & Johnson 1980, Traugott & Dasher 2002, Hopper & Traugott 2003:.)

Besides this main pattern, there was a second commonality across the sets of original antonym pairs and the borrowed lexemes. Each set featured an older pair that is attested during the Old English period, and typically has roots or cognates in other Germanic languages that suggest both words in the pair pre-date Old English. Each set also featured a newer item that was typically borrowed during Middle English. Keeping in mind that the data set does not allow us to determine when speakers began to use words as antonyms, but only when and for how long the lexemes had contrary senses, it nevertheless seems plausible from the data that antonym pairs enjoy a certain degree of stability. The prediction that follows from this is that if a follow-up study were done comparing the age of conventionalized antonyms with other words in the language, then the average age of words belonging to a set of conventionalized antonyms should be older than that of a set of words otherwise chosen at random.

Another thing to note about the borrowings is that they all took place during in Middle English, a period when the language was undergoing a good deal of restructuring and experiencing a large influx of loan words. In other words, they were borrowed at a time when the language may have been less stable. It may be that a certain rate of borrowing or a certain degree of instability facilitated the conventionalization of new antonym pairs. If this is the case, then we would expect antonym formation to be concentrated in unstable periods of a language's history rather than evenly spread throughout. Again, this is a possibility the current study raises, but cannot directly address. To address this problem would require at least a way to operationalize language stability in addition to a well-formed historical corpus.

Returning to the question of what role antonymy plays in semantic change, it is possible that the extension of one lexeme may facilitate the extension of its antonym. This has been claimed previously in the literature and examples have been given for more contemporary changes, such as the extension of *cold* to mean "not stolen" on the basis of the use of *hot* to mean "stolen" (Lehrer (2002) via Paradis et al. (2009)) or the extension of *white* to describe coffee taken with milk on the basis of the use of *black* to describe coffee taken without milk (Murphy (2006)). Though the data presented here illustrates co-extension does occur, it is not clear from the present study that antonymy is ultimately responsible. For one thing, co-extension is optional. For another, the length of time between the extension of one lexeme and its antonym is variable. These large

time gaps indicate metaphorical extension may be sufficient, at least in some cases, to explain the resultant co-extension¹⁰. There was one pair, however, that exhibited nearly complete and nearly simultaneous co-extension that is easier to attribute to their antonymous relationship than to independent applications of metaphorical extension: *hard* and *soft*. To me, this suggests that the strength of the antonym pair may determine the extent to which antonymy is responsible for co-extension. To tease apart the roles of antonymy and metaphorical extension in driving these changes would require both a different study and methodology. The follow-up study would need an experimental design that first operationalizes and measures the strength of an antonym pair. Next, it would need to test a participant's willingness to extend the meaning of one lexeme when presented with the extension of its antonym. This could be done using either nonce words or well-designed hypothetical scenarios. It could then be determined whether or not antonym pair strength significantly correlates with co-extension.

Other ways the current study could be usefully extended to both compensate for some of the current methodology's weaknesses and to shed more light on the questions herein raised are to try to identify and examine more recently developed antonym pairs, to utilize a full, more robust corpus for data collection, and to examine a wider range of antonyms that includes absolute scale adjectives as well as other lexical categories, such as nouns and verbs. Additionally, a cross-linguistic study, particularly one that examined the cognates in related Indo-European languages to examine how they have developed over time, would give a better idea as to how prevalent the initial patterns noted here actually are.

5 Conclusion

While the outcome of this study raised more questions than it answered, the study nevertheless fulfilled its primary objectives by indicating that there is a potential pattern worth pursuing further and by giving rise to more refined hypotheses to structure that pursuit.

Continued investigation along these lines can provide insight into the cognitive processes that drive semantic change and language use, which in turn has implications for formal representations that rely on antonymous relationships for modeling aspects of gradable predicates (such as Paradis (2001), Kennedy & McNally (2005)).

What this investigation has done is contribute to our understanding of the regularity of semantic change. It has also shown that antonymy may play a role in that regularity, though it does so in tandem with other mechanisms of semantic change, such as borrowing, disambiguation, and metaphorical extension.

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¹⁰Given many of these items pre-date the printing press, this apparent gap may occasionally be an accident of the limited textual evidence available. Nevertheless, the main point still stands.

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