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I. Introduction.

The purpose of this paper is to show that many of the same kinds of argument forms found in other areas of theoretical linguistics can be applied to lexical semantics. When this is done systematically, a very different picture of the lexicon emerges -- one in which the lexicon turns out to be highly structured by semantic principles of a general nature. Those principles are not mere redundancy rules. Rather, they are very general cognitive or conceptual principles.

Our chief source of evidence comes from polysemy -- cases where "one word" has a number of related senses. We will be looking chiefly at polysemous words whose most basic senses occur in easily-circumscribed semantic fields. Our purpose will be to show that there are principles relating one sense of a lexical item to other senses of the same item, and that the same principles relate senses of other lexical items in the same semantic field. Most of the argument forms discussed here have been used implicitly by modern semantic theorists like Fillmore, Talmy, Langacker and others. Our purpose is to make these argument forms explicit.

Above all else, it is the search for general principles that makes theoretical linguistics a scientific enterprise. Methodologically, argument forms play a central role in this enterprise, since they provide tests for the adequacy of proposed general principles. In some cases argument forms provide us with justification for proposed analyses. In other cases, they show us that proposed analyses fail.

The argument forms we will be discussing have been used widely in syntax and phonology. We will show that they apply to lexical semantics as well, and allow us to establish principles relating senses of polysemous lexical items. What follows from this finding, which we take as a major result, is that the lexicon is not just a repository of random, idiosyncratic information, structured only by principles characterizing lexical redundancies. Rather, the lexicon is structured by general semantic principles.

We should point out in advance that the argument forms we are discussing are independent of particular linguistic theories. They apply cross-theoretically, and provide constraints on the adequacy of linguistic theories in general. For example, consider the common generalization made in phonology that in a certain environment voiced stops are neutralized and the corresponding voiceless stops appear. The methodology requires that a single general principle be stated. Analyses that state such a principle are supported by the argument. Analyses that fail to state such a principle are ruled inadequate. And any theory in which such generalizations cannot be stated for essential reasons is also ruled inadequate. Though the argument form cannot tell us exactly which theories are right, it provides an adequacy criterion for theories. Such argument forms tell us a great deal about the kinds of structuring that we should expect from an adequate theory of phonology.

II. Major Argument Types.

The major kinds of arguments found in phonology and syntax and replicated in our findings include the following: basic distribution arguments, anti-abstraction

arguments, complex interaction arguments, and naturalness arguments. We will discuss each type first as it applies in phonology or syntax, and then demonstrate its applicability to polysemy. First we will give some examples in which generalization is a decisive criterion.

Consider the final devoicing of obstruents in German, in which word-final /d/, /b/, etc. are pronounced [t], [p], etc. One can either describe this situation with a list of correspondences (d-t, b-p, etc.), or one can state a general principle that relates voiced and unvoiced obstruents. The basic generalization criterion simply says that the general principle is to be chosen over a list of specific cases.

In semantics, one can find similar examples of general principles. One such example involves the class of English prepositions which code a path. These words can also code the endpoint of that path, as shown in examples 1 - 5:

1.a. Sam walked *over* the hill.
 b. Sam lives *over* the hill.
2.a. Harry walked *through* that doorway.
 b. The office is *through* that doorway.
3.a. Louise ran *around* the corner.
 b. Louise hid *around* the corner.
4.a. The truck sped *past* the post office.
 b. The truck is parked *past* the post office.
5.a. The helicopter flew *across* the bay.
 b. The helicopter landed *across* the bay.

Each of these sentence pairs exemplifies a single relationship between two senses of a preposition: in the (a) sentence of each pair, the preposition expresses the shape of a path relative to a reference location, and collocates with a motion verb. In the (b) member, the preposition expresses a stative location which is understood to be the endpoint of a path of the same shape as that coded by the motion sense of the preposition. The systematicity of the relationships between senses of these prepositions justifies the hypothesis of a single principle, which we call an image-schema transformation, relating path-focus to end-of-path focus.

It is important to notice that there are some plausible but nonoccurrent cases, where this principle does not hold. One of these is given in 6:

6.a. Sam walked *by* the post office.
 b. *Sam lives *by* the post office. (*by* = 'near'; ≠ end of path)

However, the existence of nonoccurrent cases does not invalidate the general principle. Exceptions to linguistic generalizations have long been noted in both phonology and syntax (cf. Lakoff 1970). While exceptionality must be described, and should be explained if possible, it does not affect the argument for the existence of a principle that covers the majority of cases. In this case, the nonexistence of an end-of-path reading for *by* suggests that only prepositions which code the shape of the path relative to the shape of the reference object are available for end-of-path readings. Here the existence of a putative exception provides the motivation for characterizing the generalization more precisely.

There are many other cases where relationships among the senses of lexical items can be accounted for by general image-schema transformations. First, there is a systematic relationship between sequences of points (SEQ) and lines (LINE), which covers cases like the following:

7.a. There are guards posted *along* the road. (SEQ)
  b. There is a fence *along* the road. (LINE)
8.a. He coughed *throughout* the concert. (SEQ)
  b. He slept *throughout* the concert. (LINE)
9.a. There were stains *down* his tie. (SEQ)
  b. There were stripes *down* his tie. (LINE)

There is also a systematic relationship of lines (LINE) to moving points (MP):

10.a. Sam ran *through* the forest. (MP)
  b. There is a road *through* the forest. (LINE)
11.a. Sam walked *across* the street. (MP)
  b. There was a rope stretched *across* the street. (LINE)
12.a. Sam *went to* the top of the mountain. (MP)
  b. The road *went to* the top of the mountain. (LINE)

In positing general image-schema transformations relating (1) lines and sequences of points and (2) lines and moving points, we are providing the general principles that relate the senses of the italicized words in these examples.

A. General Distribution Arguments.

Distribution arguments concern the existence of systematic structural correspondences. In syntax, the structural correspondences are taken as holding among grammatical constructions. These argument forms were originally developed within transformational grammar and used as constraints on the statement of general grammatical principles within that theory. Though new theories of grammar regularly appear, they are constrained by the same argument forms. Thus, for example, the same argument form used to justify the passive transformation in transformational grammar applies equally well to justify the corresponding redundancy rule in Lexical-Functional Grammar or the corresponding metarule in GPSG. The distribution argument in this case demonstrates the need for a general principle of structural correspondence, though it says nothing about the theory in which the general principle is to be stated.

In the case of the relation between active and passive constructions, the correspondences are the following:

The object of the active corresponds to the subject of the passive; the subject of the active corresponds to the object of the passive *by*-phrase.

The argument form can be sketched as follows: Certain distributional properties of active sentences are preserved under the postulated correspondences, in particular, selectional and subcategorization restrictions. Without the postulated correspondences, those distributional properties would have to be described twice (once for active sentences and once for passives) and a set of distributional generalizations would be missed.

The proposed correspondence thus constitutes a general principle, in that it permits the distributional properties of passives to be seen as systematic consequences of the distributional properties of actives. Examples are selectional restrictions and certain lexical idiosyncrasies. For example, idiosyncratic direct objects in certain active idioms have counterparts as passive subjects, as in *The hachet was buried, My day was made, The tide was turned*, etc.

This argument form as it is used in syntax does not demand a perfect correspondence between actives and passives. It permits individual lexical

exceptions (like *have*, which has no passive, and *rumored*, which has no active), exceptional classes (*cost, weigh*, etc.), and idioms that do not fit the pattern (*kick the bucket, give me a pain in the neck*, etc.). It tolerates other imperfect fits on the grounds that they can be accounted for by other principles. Thus, the two passives of *keep tabs on NP* is assumed to be attributed to the possibility of analyzing the active in two different ways. The lack of reflexive passives is taken as following from general crossover principles. And the unacceptability of certain pronominal passives (e.g., **Bill was hit by you*) is seen as having a general explanation in terms of conversational principles. None of these imperfect fits warrants giving up on the general principle relating active and passive constructions. The argument form tolerates imperfect fits of all these kinds.

Most importantly, the distribution argument makes use of the hypothesis that the correspondences are **asymmetric**. It is argued that if the correspondence is asymmetric, so that the distribution in the passive is dependent on that in the active, then one can **explain** the absence of intransitive passives such as **John was slept* on the grounds that there is a partial correspondence between active and passive -- that is, not all passives will have corresponding actives. Given the hypothesis that subjects of passives correspond to direct objects of actives it follows that, if the active is intransitive, there is no corresponding passive.

There are distribution arguments embedded in our description of image-schema transformations. For 1 - 5, for example, we noted that prepositions such as *over* and *across* can cooccur with either verbs of motion or verbs of state. When they cooccur with verbs of state, they have an end-of-path sense. To account for this distributional regularity, we hypothesized an image-schema transformation that related path focus to end-of-path focus.

A set of distributional facts of a different kind can be used to justify the postulation of metaphorical mappings. Let us consider perhaps the simplest case of such a mapping, the MORE IS UP metaphor. This is a mapping from the domain of verticality to the domain of quantity, and it has two simple correspondences:

UP corresponds to MORE; DOWN corresponds to LESS

Within the semantic field of verticality there are a considerable number of lexical expressions besides *up* and *down*. There are *rise* and *fall, peak* and *low point, soar* and *plummet*, and many more. Within the semantic field of verticality, these words are related to one another in a systematic way: *rise* refers to motion upwards, while *fall* refers to motion downwards; *peak* is the highest point on an object; *plummetting* is rapid *falling*, and suggests the strong possibility of something injurious happening.

The postulation of a single general mapping from verticality to quantity predicts that all these distributional relationships will be preserved. The argument form justifies the postulation of a general mapping by arguing that the distributions are, indeed, preserved. In a distribution argument, one would point to certain facts:

"Prices are rising" means that prices are going "up" not "down".
"Prices reached their peak" means that prices are at their "highest point".
"Prices plummetted" means that prices "fell" rapidly, and suggests that something injurious may happen.

A great many such examples could be given. Correspondingly, inferential relations from the verticality domain are mapped onto the quantity domain. Thus, if prices

rose, they are higher than they were before. If prices are at their peak, they have never been higher. In each such case, a distributional relationship in the semantic field of verticality is preserved under the mapping to the domain of quantity. In order to explain such regularities, one must postulate a general mapping that transcends particular lexical items: this is what we have called a metaphor. It must be a single general mapping at the conceptual level relating spatial concepts to concepts of quantity. The preservation of distributional relationships among particular words follows from the mapping principle. The polysemy of *rise, fall, plummet,* etc. is thus systematic, and the result of a single general principle.

B. Anti-Abstraction Arguments.

So far, we have considered two very different kinds of general principles: correspondence principles and abstraction principles. Metaphorical mappings are correspondence principles, as are syntactic transformations (or redundancy rules, metarules, etc.). They attempt to account for regularities via systematic correspondences between two structures. Abstraction principles, on the other hand, attempt to account for regularities by claiming that there is is something in common among two or more structures.

All distinctive feature analyses embody abstraction principles. For example, phonetic distinctive features embody the claim that there is something in common among the vowels /i/, /e/ and /ae/, and that phonological rules can refer to what is in common among them. Another kind of abstraction principle is the positing of a single syntactic structure, rather than two or more such structures, to account for a class of examples.

Anti-abstraction arguments show that a proposed abstraction principle cannot be correct. Such arguments can be made on one of three grounds: (a) Significant data cannot be explained if the abstraction principle is adopted. (b) The proposed principle rules out the possibility of stating other valid generalizations. (c) The proposed principle cannot be stated sensibly.

Anti-abstraction arguments are common in syntax. Many of them are demonstrations that constructions that superficially look alike are not really the same. For example, sentences 13 and 14 appear to have the same basic clause structure, and based on these sentences alone, one would be tempted to claim that the WH-clause in the complement of the verb is an example of the "same construction" in both cases.

> 13. I don't know what John eats.
> 14. I don't eat what John eats.

However, attention to a slightly more complicated range of environments reveals that, while there are striking similarities in both the form and the function of these complements, they are by no means identical:

> 15. *I don't know whatever John eats.
> 16. I don't eat whatever John eats.
> 17. I don't know what else John eats.
> 18. *I don't eat what else John eats.
> 19. I don't know what the hell John eats.
> 20. *I don't eat what the hell John eats.

The insertion into the complement clauses of various types of elements shows that the two clauses are quite different. Based in part on the distributional differences shown above, the first has been identified as an embedded question, and the second

a free relative clause. The suffix *-ever* appears with the WH element of a free relative clause, and the element *else* and expletives like *the hell* appear after the WH element in embedded questions. This same distinction is exhibited across the set of WH expressions, with the exception of *how*, which does not appear (at least in formal registers) introducing free relatives, as shown in 21 - 22:

21. I don't know how John eats.
22. #I don't eat how John eats.

Thus we can see that to claim that the two WH complements in 13 and 14 are instances of a single construction would render it impossible to capture, in any principled way, the differences in distribution either of the WH phrases themselves or of the inserted elements noted above. Positing only one structure would make incorrect predictions about English. Andd recognizing the distinction between embedded questions and free relatives does not preclude the statement of other generalizations that <u>do</u> adequately explain why they look alike in many ways.

Anti-abstraction arguments are also used in semantics. There they serve to justify polysemy analyses over proposed analyses where a single "abstract" general sense is proposed. Such an argument is made in Brugman's (1984) analysis of the hedge *very* as being polysemous, rather than having a single abstract meaning. The hedge (not the degree adverb) *very* has, among other senses, one which "picks out" a unique endpoint on a scale, either lexically or pragmatically constructed:

23. He begins his vituperations on the very {first / *second} page.
24. The photographers were standing on the very {edge / *side} of the basketball court.
25. The very {thought / ?*nomination / *election} of Rambo as President strikes terror into the heart of any thinking American.

There is another sense of *very* which "picks out" a previously-determined and unique member of a set of possible referents:

26. She's wearing the very dress I tried on last week.
27. He caught her at the very moment she was stuffing the shoes into her purse.

These two senses are very similar semantically, and one might claim that the hedge *very* is not polysemous at all, but is used simply to pick out some unique, previously-established referent from a set of possible referents. However, such a claim would make two incorrect predictions: first, it would predict that the starred versions of 23 - 25 would be grammatical, since an abstraction analysis could not make reference to an end of scale. Second, because it would not distinguish the two senses of *very*, it could not predict that an entailment relation holds between sentences 25 and 28, while no such relationship exists between 26 and 29:

28. The nomination or election of Rambo as President should (also) strike terror into the heart of any thinking American.
29. She's wearing every dress.

Sentence 25 entails 28 exactly because there is an end-of-scale reading for the expression containing *very*. (This was called the "implicational scale" use of *very* in Brugman 1984.) Because the expression containing *very* in 26 does not pick out an end of scale, 26 does not entail 29.

In addition to the incorrect predictions made, an abstractionist account of *very* would make two types of generalizations impossible to state: The first of

these is that the implicational-scale reading exemplified in 25 is really the result of a very general pragmatic principle, and is available for a large class of morphemes which express an end of scale (such as the superlative inflection; see Fauconnier 1975 for other examples). The second is that the nonscalar sense of *very* requires either a deictic expression of a particular type or a particular type of relative clause modifying the same noun on which *very* operates. Again, recognizing the distinctions between these two does not preclude our capturing the similarities between the two senses: in fact, the claim that *very* is an instance of polysemy, rather than homonymy, amounts to the claim that there is a higher-level generalization to be found.

Another class of anti-abstraction arguments is used in semantics to justify the postulation of metaphorical mappings, rather than a potential abstractionist analysis. One general objection that is commonly made against semantic analyses using metaphorical mappings is that the data can always be accounted for by abstractionist analyses. For example, it might be argued that the word *rise* is not polysemous between its verticality use in *The balloon rose* and its quantity reading in *Prices rose*. Rather, it has the same abstract meaning in both. Lakoff and Johnson (1980) contains a collection of anti-abstractionist arguments in defense of metaphorical analyses, some of which we sketch briefly here.

One argument against an abstraction analysis is that it cannot be stated adequately or sensibly. The abstractionist position is that there is no MORE IS UP metaphor; rather there is something abstract in common between VERTICALITY and QUANTITY. The response is that there is no sensible concept that is netural between VERTICALITY and QUANTITY and covers both.

This argument is given more force when combined with other abstractionist positions on VERTICALITY metaphors. The persistent abstractionist would be forced to argue in addition that other proposed metaphors like HAPPY IS UP, VIRTUE IS UP, CONTROL IS UP, REASON IS UP, NORTH IS UP, etc. do not exist and that in each case there is something in common between UP and HAPPINESS, VIRTUE, CONTROL, REASON, and NORTH, as well as MORE. In other words, for the entire collection of cases in which we have postulated a metaphorical mapping from verticality, the abstractionist position would require a single concept which would subsume all the domains onto which verticality maps. Clearly, there can be no such concept.

In other areas, an abstractionist analysis makes false predictions. Where the metaphorical analysis proposes a partial mapping from a structure in one domain to a structure in another, the abstractionist analysis claims that there are not two structures but one neutral structure. This fails in all cases where there is only a partial metaphorical mapping. Take, for example, the IDEAS ARE FOOD metaphor. There are *raw facts* and *half-baked ideas*, but no sauteed, broiled or poached ideas. The domain of ideas and food are separate domains with distinct structures, not a single domain with a common structure. If such distinct structures are recognized, the nonoccurring or exceptional cases can be noted; but if no distinction is made, there can be no basis on which to note such exceptions.

C. Complex Interaction and Intermediate Structure Arguments.

There are many cases in syntax where simple general principles interact in complex ways. The basic idea behind generative grammar was to account for such interactions. Every argument for complex interaction relies on the establishment and exploitation of previously existing, independently motivated principles to

account for complex cases with no additional machinery except for the principle of combination or composition. One consequence of complex interactions is the positing of "intermediate structures": structures or partial structures in which some but not all of the relevant principles apply. Sometimes such intermediate structures correspond to actual structures in the language; sometimes they do not.

Complex interaction arguments are also widespread in phonology. Consider the constraint in English to the effect that a vowel preceding a voiced stop will be considerably longer than the same vowel preceding the corresponding voiceless stop; thus *beat* is phonetically [bit], while *bead* is phonetically [bi:d]. Another fact about American English, usually stated as a phonological rule rather than a phonetic constraint, is that the voicing feature of the alveolar stops is neutralized when that consonant occurs between a stressed vowel and an unstressed vowel. However, the pronunciation of such pairs as *writer* and *rider* is still differentiated in some dialects by the maintenance of the vowel length distinction associated with voicing of the following consonant: thus the first is [raiDr] and the second [rai:Dr]. Here the effect of both correspondences is seen, even though for some such dialects no intermediate cases (that is, [raitr] and [rai:dr]) occur. The recognition of each principle, independently motivated from other environments, allows for the description of this complex case with no additional machinery.

Examples from syntax abound. Sentences like 30 exhibit a complex of syntactic properties:

30. He is believed to have stolen a lot of money.

This sentence exhibits properties both of the passive construction and a control phenomenon which used to be called "raising". But there is no need to take this sentence type as a justification for a "passive-raising" construction: that is, we do not need an additional principle relating this sentence to a corresponding active sentence, or to a corresponding "unraised" sentence. The already-hypothesized principles which relate passive sentences and raising sentences separately to their active and unraised counterparts can combine to explain the distribution of properties in sentences like 30. Besides the existence of other simple passive and simple raising sentences, we can observe that there is a simple passive and a simple raising version of 30:

31. That he has stolen a lot of money is widely believed.
32. We believe him to have stolen a lot of money.

On a nongenerative model, either 31 or 32 is a sentence which can be taken as corresponding to an intermediate structure for 30. However, there are other sentences which bear systematic structural resemblances to 30, but for which one of the intermediate structures is not available:

33. He was said to have stolen a lot of money.
34. That he has stolen a lot of money is said by his closest confidants.
35. *His closest confidants say him to have stolen a lot of money.

This is a case in which one possible intermediate structure does not correspond to a grammatical sentence. However, this exception is merely an idiosyncrasy of *say*, which cannot appear in active form with all complement types. Note that we must still state the correspondences between active and unraised sentence types and between passive and/or raised sentence types even in cases like this, because of the perceived relationship between 33 and both 34 and 36:

36. His closest confidants say that he has stolen a lot of money.

Since the badness of 35 is reduced to an exceptionality on *say*, the exceptionality of the example does no damage to the argument for the interaction of independent principles, which is justified by the majority of cases in which the interaction is fully general.

Complex interaction arguments are extremely prevalent in polysemy analyses. If there are two principles relating one sense of a word to another, it may be that both principles will relate one sense to still a third sense. For examples, there is a path sense of *over* in 1a. We have seen that the principle relating path senses to end-of-path senses accounts for the sense of *over* in 1b. There is another principle, which we call a metaphor, relating a GOAL-ORIENTED ACTIVITY to MOTION ALONG A PATH TO A DESTINATION. Part of this metaphor is that DIFFICULTIES correspond to PHYSICAL IMPEDIMENTS. It is hypothesized to account for such examples as *It's an uphill battle, We have smooth sailing from now on, There's nothing in the way of our achieving our goal, We're stuck, That's become a stumbling block,* etc. This metaphor links the endpoint sense of *over* to the *over* of:

37. He's finally over the most difficult part of the job.

Since the metaphor imposes a spatial structure on an abstract domain, it is not surprising to find that the same image-schema transformation which relates path-focus to end-of-path focus for spatial uses of prepositions can also apply to metaphorical uses. Thus, we have three senses of *over* that are linked to one another by two general principles.

The situation with *through* is largely parallel to that of *over*. There is a path sense in (38), and an end-of-path sense in (39):

38. He hiked through the jungle. 39. He is finally through the darkest part of the jungle.

There is also a sense based on the GOAL-ORIENTED ACTIVITY metaphor:

40. He is finally through the most difficult part of the job.

But, interestingly enough, there is a lexical difference between *through* and *over*. Within the GOAL-ORIENTED ACTIVITY metaphor, *through* can be used to focus on the path, while *over* may not.

41. He is going through the most difficult part of the job.
42. *He is going over the most difficult part of the job.

In 42, *going over* may mean "looking over" but not "performing". *Over* exhibits a lexical gap where *through* does not. This is akin to the kind of lexical gap we found with *say* in our discussion of raising and passive above. As in the syntactic case, the existence of such a gap in no way impugns the general principles, though it must be stated.

Extremely long chains of this sort have been described by Brugman (1981). We have already discussed the senses of *over* exemplified in the following sentences:

43. He walked over the hill.
44. He lives over the hill.
45. He's finally over the most difficult part of the job.

We characterize these as a motion schema with contact, a stative end-of-path schema, and a metaphorical projection of the end-of-path schema, respectively.

Some other senses of *over* include the following:

46. I threw the ball over the fence.
47. The jet plane flew high overhead.
48. We hung the canopy over the bed.
49. We spread the cloth over the table.

These link up to the previously-mentioned schemata in the following ways: 46 exemplifies a motion schema, like 43, except that the figure is not in contact with the ground. 47 is another motion schema, but here the path is unspecified for shape rather than being curved. In 48 we have another stative schema, but unlike in 44, this schema is a stative "above" configuration rather than an end-of-path focus. 49 differs from 48 in that it codes contact between figure and ground.

The MORE IS UP metaphorical mapping applies to the stative "above" sense of 48, yielding a quantity sense of *over*:

50. Our sales were over $20 million last year.

There are many more senses of *over* in the spatial and various metaphorical domains, but we will not review them here. Here we want only to show that each of the senses mentioned is linked, by image-schema transformation, abstraction, or metaphorical mapping, to the sense adjacent to it. By a series of such linking relations, each of them simple and independently motivated, we can arrive at a structure of senses which characterizes the complexity of the overall polysemy of this lexical item.

Such polysemy chains are hypothesized to account for synchronic connections in the semantic knowledge of the user. The arguments for these chains are basically of the same kind as the arguments for relationships among grammatical constructions. These chains exist statically to structure semantic information in the lexicon. We are not proposing them as parts of "semantic derivations", nor are we proposing them as recapitulations of historical change, any more than a syntactician who proposes a transformation (or lexical redundancy rule or metarule) is proposing either a mechanical manipulation of a "deep structure" or a recapitulation of historical development.

Image-schema transformations and metaphorical mappings share one thing with redundancy rules: they all characterize the structure of the lexicon. And the argument forms we have just given allow us to demonstrate that lexical structure is far more intricate than is commonly assumed.

D. Naturalness Arguments.

It is common in phonology to argue that proposed phonological rules are phonetically natural. Examples are cases like nasal assimilation and voicing assimilation, which are taken as being motivated by the nature of the speech apparatus. Nasal assimilation and voicing assimilation do not occur in every language. But when they do occur, it seems to be a natural kind of thing to happen, given phonetic constraints.

Naturalness arguments can also be found in semantics. Image-schema transformations are claimed to be natural given certain constraints on perception, motor activity, and visual processing. For example, when we walk to a place, we commonly focus on the endpoint of our intended path. Similarly, when we see something else moving, we commonly judge what the endpoint of its path will be. The relation between a path and its endpoint is not merely a principle that

structures the English lexicon. It is a general cognitive relationship having to do with our perceptual capacities. Similarly, the relationship between a moving point and the line it traces is an object that we have the ability to calculate when we see something in motion (Langacker (this volume) calls this "summary scanning"). The MP-LINE transformation is based on this capacity, and that makes polysemy based on that transformation natural. To our knowledge, all image-schema transformations that there is lexical evidence for are natural in this way, though they may not be reflected in every language.

There are also naturalness arguments for metaphors. Because a metaphor is a highly-structured set of correspondences between a concrete domain and an abstract domain, many subgeneralizations must be explained for each metaphor. For example, we must explain why a given source domain (for instance, VERTI-CALITY) is paired with a particular target domain (e.g., QUANTITY), and why, within that mapping, a given correspondence (such as MORE with UP, but not DOWN) occurs. Similarly, we want to characterize why purposeful activity should be understood and described in terms of motion toward a destination, and why the mapping should be made from PURPOSE to DESTINATION rather than to EMBAR-CATION POINT.

These concerns are answered in terms of regular correspondences in constant everyday experience. When you pile on MORE objects, the level of the pile goes UP. If you want to accomplish a PURPOSE, you often have to go to a particular DESTINATION to accomplish it. In other words, a metaphorical mapping often constitutes a distillation of commonly cooccurring events or states. There are an enormous number of these regular correspondences in our experience, providing a natural motivation for the mappings which structure our lexicon. Each argument for the experiential determination of such a structure constitutes a naturalness argument in semantics.

III. Further Argument Forms.

We have briefly exemplified only some of the argument forms used in contemporary semantic research. What such argument forms have in common is the assumption that finding generalizations is a chief goal in science. While we recognize that generalization in one area of a theory often creates complexities or precludes generalization in another area, we nevertheless work to maximize the statement of general principles.

Some scholars have argued explicitly against the goal of finding generalizations in linguistic research. One particularly important class of arguments against the goal of generality often arises. It is based on the grounds that people have large memories, larger in fact than they can use. The argument goes that people have such large memories that they don't need to use the generalizations found by analysts. Maybe people actually work with much less general principles, or even with completely unstructured lists.

This argument has been made against general rules of the sort argued for in generative phonology. The same argument has been made against the existence of principles that relate syntactic constructions to one another. The alternative is that we just have a big list of constructions that we use, without there being any psychologically real principles relating them to one another.

Within most contemporary syntax and phonology, such anti-generalization arguments have not been taken seriously. The one area where such anti-generalization arguments have not only been taken seriously, but have been widely assumed to be correct, is in lexical semantics. There, the argument goes, we have large memories and know lots of words. Why not assume the lexicon is just a list (perhaps with a characterization of redundancies), and that all the generalizations we have argued for are just the concoctions of analysts without any cognitive reality? The mood of the times seems to be:

Reject anti-generalization arguments for syntax and phonology and accept them for the lexicon.

Such a position is inconsistent both with assumptions made about other areas in linguistics and with assumptions about science in general. While we would not argue against the characterization of the semantic lexicon as the repository of "random" information, that randomness is not different in nature from such "random" facts as the consonantal inventory of a language, or the basic word order of a language, or whether a word synonymous with *possible* allows for "raising" in a given language. Pro-generalization arguments can be given for lexical semantics -- at least for a certain range of phenomena.

Moreover, an anti-generalization position has no more force in the area of semantics than it has in the area of syntax. For instance, the claim in favor of an active-passive relationship is made in order to capture generalizations about cooccurrence restrictions for both forms of verbs. But if there is no value to the generalization argument for semantics, there is no reason to apply it in syntactic explanation. From an anti-generalization viewpoint, a grammar would be nothing more than an unstructured list of constructions. Linguists have rightly rejected such a view for syntax and the same considerations should lead us to reject this view for semantics.

There are also arguments against the anti-generalization position which are particular to semantics. The first of these is that the existence of a large memory does not explain the existence of polysemy at all. In fact, if anything, it would favor rampant monosemy rather than polysemy, since it should be equally easy to remember words with single senses, and continually add new lexical items, each with only one sense. The evidence suggests, rather, that it is easier to learn and use new **motivated** senses for old lexical items than completely new lexical items.

Another response to the anti-generalization position is that the **kind** of polysemy that we have described above needs to be explained. It cannot be explained on historical grounds by recourse to item-by-item innovations, as Sweetser (1984) has conclusively demonstrated. She observes that certain general metaphorical principles must have been present in the minds of speakers of various Indo-European languages **before** certain item-by-item metaphorical extensions could have taken place.

A third response is that such a view cannot account for the production and comprehension of a wide class of novel or at least nonconventional utterances. Take Searle's well-known case: *Sally is a block of ice.* Such a sentence is understood in terms of a general metaphorical mapping that is part of our conceptual system and that structures our conventional lexicon. According to that mapping, AFFECTIONATENESS corresponds to WARMTH and LACK OF AFFECTIONATENESS corresponds to COLDNESS. This general principle accounts for conventional utterances like *She's a warm person, He's been cold to me, She's cooled toward me,* etc.

It is the mapping principle that explains why we understand *Sally is a block of ice* to mean that Sally is unaffectionate.

The fourth response is that an anti-generalization view cannot account for the way we reason using such novel sentences. We infer from *Sally is a block of ice* that Sally would not be pleasant to be romantically involved with (given our normal cultural assumptions about romance). This inference can be explained given the general AFFECTIONATENESS IS WARMTH metaphor. Much poetic or rhetorical language depends for its comprehensibility on the exploitation, in a novel way, of such existing principles. This argument from novel utterances is analogous to one given in syntax, that the **structure** of any novel utterance is an instantiation of general syntactic principles, that justifies the proposal of principles of syntactic combination.

In summary, even if we did not begin by assuming that seeking lexical generalization is a worthwhile endeavor, we would be led to such a conclusion by considerations like these.

IV. Conclusion.

What we hope to have shown is the following:

The argument forms used in lexical semantic research are the same as the argument forms used in syntax and phonology.

To the extent that those argument forms are justified in syntax and phonology, they are also justified in lexical semantics.

There is additional motivation for believing that such argument forms are being correctly applied. That motivation concerns the existence of polysemy of the sort that exists, as well as our ability to construct, understand, and reason with novel utterances.

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