ABSTRACT

Title of dissertation: ON AN APPARENT LIMIT TO VERB IDIOSYNCRASY, GIVEN A MAPPING BETWEEN ARGUMENT REALIZATION AND POLYSEMY (OR ARGUMENT OPTIONALITY)

Scott C. Thomas
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Dissertation directed by: Professor Don Perlis
Department of Computer Science

Professor Tim Oates
Department of Computer Science
University of Maryland, Baltimore County

Full-scale natural language processing systems require lots of information on thousands of words. This is especially true for systems handling the meanings of words and phrases, and it seems especially true for the verbs of a language: at first glance at least, and when viewed as if they were argument-taking functions, verbs seem to have highly individual requirements—along at least two dimensions. 1) They vary in the range of arguments they take (further complicated by polysemy, i. e. the proliferation of their senses). And to a significant extent 2) they vary in the way in which those arguments are realized in syntax. Since arbitrary information must be stored anyway—such as the particular concept pairing with the sound and/or spelling of a word—it seems reasonable to expect to store other potentially idiosyncratic information, including what might be needed for polysemy and argu-

ment realization. But once the meanings of words are stored, it isn't completely clear how much else really needs to be stored, in principle. With a significant degree of patterning in polysemy, and in argument realization, real speakers extrapolate from known senses and realizations. To fully model the processing of natural language, there must be at least some automatic production, and/or verification, of polysemy and argument realization, from the semantics.

Since there are two phenomena here (polysemy and argument realization), the interaction between them could be crucial; and indeed particular instances of this interaction appear again and again in theoretical studies of syntax and meaning. Yet the real extent of the interaction has not itself been properly investigated. To do so, we supply a kind of high-level semantics for the varying argument-taking configurations of 3000 English verbs, analyzing the resulting patterns. The results suggest a rule of co-occurrences: divergences in argument realization are in fact rigorously accompanied by divergences in polysemy or argument optionality. We argue that this implies the existence of highly productive mechanisms for polysemy and argument realization, thus setting some crucial groundwork for their eventual production by automated means.

ON AN APPARENT LIMIT TO VERB IDIOSYNCRASY, GIVEN A MAPPING BETWEEN ARGUMENT REALIZATION AND POLYSEMY (OR ARGUMENT OPTIONALITY)

by

Scott Carlton Thomas

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Advisory Committee:
Professor Don Perlis, Chair
Professor Tim Oates, Co-advisor
Professor Michael Israel
Professor Michael Morreau
Professor Chau-When Tseng

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Mapping concepts 'into language'

A glance at the present work will suggest that it is all about language—and in unusual detail, for those of us whose core interests fall in another field, such as artificial intelligence (AI). But one of the traditional areas of AI, of course, is natural language processing (NLP); and one area of NLP seems rather fundamental, in fact, to the concerns of AI: that part of NLP that deals with the question of how concepts should be encoded. By 'concepts', we simply mean the stuff that we 'put into words' when we refer to (for instance) things that, depending on the case, might be concrete or abstract, or concern events (*so-and-so read that paper very carefully*), or states (*so-and-so knows all about the problem now*, that being an expression of the apparent current state of so-and-so's knowledge). Jackendoff (1983) argues for the psychological reality of what he calls conceptual structures: words (he argues) are stored in our minds attached to pieces of conceptual structure (lexical conceptual structures), and these lexical conceptual structures (partly) determine how the words can combine into larger phrases. In a rather broad way, we will effectively be (first) assuming, then (later) offering some evidence, that something like that is true.

Here's an example of how the sorts of things we are interested in here can impinge on the sorts of things one might want to accomplish in AI. Suppose you had a robot that could respond appropriately to commands like the following.[1] A simple command might be something like:

(1) Go over there, behind the bookcases.

If you want the robot to be robust in its interactions with the general English-speaking populace, it'll probably need to recognize paraphrases of the command; a seemingly trivial one is:

(2) Move over there, behind the bookcases.

[1]There's a complication here already: commands express neither states nor events nor things. But they can be directly related to an event or state, thinking of them in particular as a request or an order to bring some event or state into being: saying to someone (or some robot) to *close the door* means that you want (or are sounding as if you want) to see come into being the event expressible as *someone (or some robot) closed the door*. Speech acts like questions can also be converted into expressions of events or states in a roughly similar way, while other speech acts like greetings are quite different. Except for these initial examples using commands, we will be dealing almost exclusively with the expression of events and states, or other elements that are embedded in the expression of events and states.

Perhaps the robot can also handle commands like:

(3) Move the box over there, under the table.

All things being equal, you may also want the robot to learn things from its experiences, including new ways of saying things. *Go* and *move* are at least roughly interchangeable in the first two commands (1 and 2), and have other somewhat similar uses in common (*Go! Move!*). But they aren't even close to interchangeable in other cases (e. g. 3, the following putative *go* variant being ungrammatical, hence marked *):

(4) *Go the box over there, behind the table.

Perhaps the robot should be very reluctant, then, to use words outside the contexts they are attested in. Or is there some hidden semantic difference that might explain the difference between *move* and *go*? I. e., perhaps the lexical conceptual structures of *move* and *go* differ, such that they can *sometimes* combine with other words to express more or less the same concept (1, 2), but not always. Perhaps *go* in some way encodes the causer of the event, and the thing moved, such that an additional 'thing moved' can't be as easily specified (as in 4); perhaps *go* expresses an inherently internally caused event (Levin and Rappaport Hovav 1995). Hidden semantic distinctions behind the diverging behaviors of *move* and *go* might then make things problematic for a truly conservative language device. Consider another apparent property of language, manifest in the existence of 'one-shot innovations', as Pinker (1989) calls them: the occasional use of a verb in a syntactic context that is *almost*, but not quite, grammatical for that verb; examples that Pinker collected include:

(5) *He corresponded the stages to the training sets.
(I. e., *made* them correspond *with* the training sets)

(6) *She pierced needles under her fingernails.
(Pierced i. e. *the skin* under her nails *with* needles)

(7) *Can germs harbor in these things? (I. e., can these things harbor germs?)
(Pinker 1989, p. 154-157)

Pinker argues that there are functionally distinct broad-range and narrow range semantic requirements that determine which verbs can use which constructions; the above examples exist (Pinker argues) because they meet the broad-range requirements (which makes the utterances understandable) but violate the narrow-range requirements—which makes the utterances substandard.

Certain examples that Levin and Rappaport Hovav like to give are of a different kind, but help show that these phenomena, too, provide important challenges for a language processing device: these other examples have a more literary flavor, which might take a bit of thought to understand; but they ultimately seem more-or-less grammatical. One of Levin and Rappaort Hovav's examples (Levin and Rappaport Hovav 2005, p. 227):

(8) Clea eggbeatered the covers into a knot ... [2]

To make sense of the sentence, some thought about what an eggbeater is might be useful; further thought might turn it into a really nice sentence *if* one is familiar with the use of the term *eggbeatering* to describe a way of moving one's legs while in the water (or by extension, *not* in the water, as in the above example).

Meanwhile, a common way in English to tell someone to use x to do something is to simply say *Use the x*; but one can often also say *X it* (as in *Eggbeater it*). Imagine a (much more literal) exchange like the following:

(9) —Why don't you eggbeater it into ...
—How 'bout I just wooden-spoon it into ...

A more careful speech generator (artificial or human) might say *How about if I just use a wooden spoon* rather than *wooden-spoon it*. But the response as given (9) may be the more natural one, given that it echoes the syntactic structure of the utterance it is answering (and given that people do in fact do such echoing of syntactic structure, Bock 1986).

There are at least two broad issues here. Robust language processors will need to be able to process and understand the 'one-shot innovations', as well as the equally novel utterances that are more grammatical but more 'literary'. And the last example shows that in some cases it would even be good to generate such utterances, even if they're somewhat odd. Given that

(i) It's generally attractive (for the engineer as well as the user) to have a machine be able to learn things on its own,

(ii) There's a possible semantic basis underlying the peculiarities of the behaviors of different verbs (of which we'll give many more examples in the pages that follow), and

(iii) At least some language-processing devices are going to need to know the meaning of the utterances they process anyway

—it seems much more attractive, then, if it all can be worked out, to have a language learner that *isn't* conservative; it should be ready to use verbs in novel constructions, when something about those constructions makes it seem appropriate, and/or the context (as above in 9) makes it seem especially natural to do so. It seems unlikely, in fact, that a language device would be able to handle the interactions between meaning and the form of utterances *without* the ability (in principle at least) to be highly productive in the utterances it generates, too.

Unfortunately, there exists no agreement yet on exactly how much regularity is present in the lexicons of languages. Levin and Rappaport Hovav (1995) even suggest that there are certain causative uses of verbs that are like Pinker's 'one-shot innovations', except these happen to find a toe-hold in language, somehow; they

[2] from Irene Marcuse, 2000, *The Death of an Amiable Child*, Walker and Co., New York, NY.

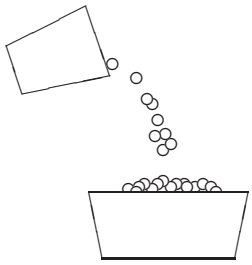
give as an example *bleed* and *burp*:

(10) The doctor bled the patient.
(11) The father burped the baby.
(12) The patient bled.
(13) The baby burped.

(The first two examples are causative—there's a separate entity, i. e., a doctor or a father, causing the event to take place. The other two example are non-causative.) Levin and Rappaport Hovav's suggest that these causative uses are like one-shot innovations because there are semantically similar verbs that lack such causative uses: cf. *belch*, *blush*, *hiccup*, *sneeze*, *yawn*, *breathe*, *cough*, *drool*, *puke*, *spit*, *drip*, *foam*, *gush*, *leak*, *ooze*, or *shed*—verbs that Levin (1993) classifies with *bleed* and *burp*. These other verbs have only paraphrastic causatives: *the long day made him yawn*, but not **the long day yawned him*. If Levin and Rappaport Hovav are correct that *bleed* and *burp*'s causatives are merely idiosyncratic, then this is yet another problem for the language learner: some of those unprincipled 'one-shot innovations' nonetheless can be considered grammatical.

Thus, there's a real question of the extent to which a system just has to store lots of idiosyncrasies anyway, and the extent to which the regularities in language can be relied upon by a system to extend its behavior beyond the frequently attested cases. In spite of problems like that, though, we will be arguing that there are in fact interactions between the encodings of concepts and their expression in language, and that the patterns in language are thus big clues to the way that work in AI should proceed in this area—something that is too often overlooked, unfortunately. Perhaps that shouldn't be too surprising: linguists not only offer what we take as discouraging views (sometimes) about the possible regularities of language; they also have shown that there is still a lot of work left to build up a theory that actually explains the interactions that we just alluded to (as discussed in Levin and Rappaport Hovav 2005, p. 234 and earlier). This might make it a bit more understandable when the corresponding language phenomena (as the linguistics would take them to be) are largely ignored in the more AI-centered systems, such as those building on Schank (1975) or Schank and Riesbeck (1981).

We will be attempting, then, to narrow this gap between these two fields. To determine certain essential constraints on the way concepts are encoded—at least at the point that such encodings interact with the human language facility—we will look at a set of more than 3000 English verbs—the 'Levin verbs' (Levin 1993). The main issue for us is the way the behaviors of those verbs (with respect to other verbs in the same set), seem to rampantly diverge. At first glance—and even later, possibly after lots of consideration—the divergences will in fact appear to give the language-learner a potentially endless stream of idiosyncrasies (bounded only by the number of verbs, or verb senses); they (seemingly) will simply have to be learned verb by verb. We will argue against this, however—or at least, we will argue that there is much more to it than that; we'll attempt to provide evidence that the seemingly irregular structure of the lexicon most likely follows from hidden systematicities; these happen



(iα) The children poured marbles into the bowl.
*The children filled marbles into the bowl.

(β) The children filled the bowl with marbles.
*The children poured the bowl with marbles.

$\Downarrow$

(iiα) Marbles completely fill the bowl.

(β) *Marbles completely pour the bowl.

Figure 1.1: Our study concerns an apparently general feature of the relationship between two facts of language. i) Different verbs express similar concepts differently: above, *pour* and *fill*, used to describe the event pictured on the left, both express a core element of the event (the movement of the marbles into the bowl) but diverge in how their (logical) arguments (here, the marbles and the bowl) are realized (iα vs. iβ). Furthermore, ii) different verbs express different clusters of related concepts: only *fill* can express a state—here, the apparent end state of the event (as in iiα; iiβ is ungrammatical, hence marked with *). Our hypothesis: modulo some general caveats and complications (the precise statement of the hypothesis is on p. 103), divergences of the first type (i) are always accompanied by divergences of the second type (ii). We call this the 'Rule of Co-occurrences'.

to cause words to take on a complicated range of behaviors depending on their meaning. Fig. 1.1 introduces the hypothesis that we will be developing. We will see that, crucially (for the computer scientist, among others), these systematicities seem to allow real speakers to automatically extrapolate from the attested properties of words; computational systems that depend merely on a list of such properties, stipulated on a word-by-word basis, won't be able to replicate that behavior.

1.1 An example

The *apparent* idiosyncrasies of language, nonetheless, are so wide-spread that it is hard not to stumble upon a variety of potential counterexamples to purported systematicities. Several different contrastive pairs of words will prove particularly apt for our exposition; we've introduced *move* vs. *go* and *pour* vs. *fill*; there were also several implicit contrasting pairs in our discussion of *bleed* and *burp* (p. 5): *bleed* and *burp* vs. *drool* and *hiccup*, respectively, and so on. The next contrastive pair is *rob* and *steal*. Someone acquiring this pair has to learn that, though they can be used to express more or less the same thing, they too can't be used interchangeably in the same sentences—

(14) They robbed the bank of $1,000,000.
(15) *They stole the bank of $1,000,000.
(16) They stole $1,000,000 from the bank.
(17) *They robbed $1,000,000 from the bank.

—the starred sentences, again, begin ungrammatical. (One of them, 15, is highly ungrammatical, the other at least problematic for many speakers, though similar uses have in fact been attested for centuries).[3] Thus right away we see a concept being expressed in two different ways, with no appropriately semantic distinction that could explain the difference in syntax (i. e. in the specific syntactic configurations in which the words *rob* and *steal* appear). (The meaning of 'no appropriately semantic distinction' will become clearer as we develop our way of representing the semantics.)

[3] *The Oxford English Dictionary* (Simpson and Weiner 1989) cites Dryden (1697) *They themselves contrive To Rob the Honey, and subvert the Hive* and G. B. Shaw (1919) *I should rob all the money back from Mangan.* Of course, what we really want to know is what the general usages of the word are, rather than the artful instances from its most creative users. As of July 2007, http://www.google.com was returning a few hundred cached cases each of *robbed from the rich* and of *robbed it from*, etc., i.e. the ungrammatical forms. One can find similar numbers for many of the other cases of supposed ungrammaticalities that we will give here, however. In Pinker's (1989) discussions of these subgrammatical attestations, he argues that their speakers will tend to recognize them as ungrammatical when their attention is drawn to them later. (He appears to be merely speaking from personal experience, however.) For things like this, without a detailed theory of which of these behaviors we should expect speakers to have (and which ungrammaticalities they might nonetheless regularly produce, with Pinker's broad and narrow rules an attempt in that direction) and without a variety of ways of testing that theory, other than just counting up attestations, it's hard to be sure of the true bounds of grammaticality.

Many similar syntactic distinctions seem to lie in waiting ready to trip up the language-learner—especially those learning a foreign language (and dictionaries can be surprisingly unhelpful here); we'll supply some actual numbers to partly quantify this later, for English (chs. 3 and 4).[4] And though individual, and dialectal, differences will remain evident, language learners, in the course of their exposure to a language, if they are young enough, eventually come to apparently strong agreement with their language communities on these (seemingly) finicky requirements—enough, at least, to make those dialectal differences quite noticeable.

The seemingly intuitive sense native speakers have of what is or isn't grammatical in a language doesn't leave the computer scientist who wants to replicate the behavior of the native speaker much room for error. A natural first response, again, is to encode, for each of the thousands of words like *rob* and *steal* that exist in the native speaker's lexicon, the precise syntactic requirements of those words. Thus, if these distinctions really are idiosyncratic, and really do just have to be learned word by word—and if that's all there is to it—then the problem for the computer scientist reduces more-or-less to a question of database management and data acquisition. And in fact, much of the computational linguistics work of recent years has focused on taking advantage of the great amount of data now available in digital form—in the form of raw corpora, or in the form of the large gold standards (Marcus *et al.* 1993) for statistical and other analyses—a way to get the large databases without a huge amount of person-hour input per word.

And clearly, the problem of learning the idiosyncrasies exists in any case: one must learn that certain activities can be described, for instance, as *thieves robbing* (people), or *stealing* (things)—i e. *robbing*, *stealing*, *thievery*, etc., are the labels the language gives arbitrarily to the expression of those concepts in English, when more or less any other combination of sounds would serve just as well (Saussure 1916).[5,6] Another obvious example of idiosyncrasy in some languages is the existence of irregular word forms, such as for the past tense form in English, the normal suffix (written *ed*, as above in *robbed*) being blocked by irregular forms for some verbs (such as *steal*—*steal*'s past tense form being *stole*, not **stealed*). And similarly for other suffixes, such as the English plural (*two mice*, not *two mouses*).

[4]For a time, Longman published a dictionary (Procter 1978) that was exceptional with respect to these subtle distinctions, and written especially for learners of English; it drew some attention for its potential use by computational linguistists in the construction of artificial lexicons (Boguraev and Briscoe 1987, Boguraev and Briscoe 1989, Carroll and Grover 1989). Unfortunately, later editions of the dictionary dropped the relevant information.

[5]Adopted words can't literally have 'any combinations of sounds', of course; some sounds will be too foreign to a particular language community, and even familiar sounds will be reshaped to match the language in question. The word *dorobō*, with a long final *o*—it's a way of saying 'thief' in Japanese—would differ systematically in its pronunciation if it were adopted by English speakers, just as the hundreds of English words adopted by the Japanese do. (*Building* appears in Japanese as something closer to *biruding* or just *biru*.)

[6]That the mapping from sound to meaning is arbitrary has even been considered a design feature (Hockett 1960), and argued to have a learning advantage (Gasser 2004), as discussed in Monaghan and Christiansen (2006), along with some recent experimental results on important qualifications to the idea.

Certain phrases, or skeletal phrases, must be memorized, too: they're idioms (Jackendoff 1997, Nunberg *et al.* 1994). The standard example is *to kick the bucket*, meaning *to die*. Its meaning isn't compositional—it isn't predictable from its parts (i. e. the words and their arrangement). In other ways, though, an idiomatic phrase may act the way a non-idiomatic phrase of the same sorts of words would act: in the case above, the verb inside the idiom (*kick*) is still the place where the past tense is marked (we say *he kicked the bucket*, not *he kick-the-bucketed*).[7]

Thus there are lots of arbitrary things that clearly just have to be stored in the lexicon. From that, it may appear quite reasonable to think that language learners when learning to associate the word *rob* with a certain event just happen to associate *steal* with the same kind of event, and easily learn the distinct syntactic structures for each word in the meantime—because it's just part of the language-learning process to treat such structures as one of the many (potential) idiosyncrasies that seem to exist and have to be learned. (Culicover and Jackendoff (2005, p. 148) make the same sort of argument: "If one can learn tens of thousands of lexical items, a few dozen or even a few hundred idiosyncratic syntactic patterns would not seem to be such a problem.")

But is this really 'all there is to it'? There are other bodies of work on what does or does not need to be stored in the lexicon, such as that which builds on Pinker's contrast between words and rules (Pinker 1999, Pinker and Ullman 2002). There are rules, in Pinker's formulation, to account for things like the English past tense suffix *ed*; and there's something quite different (in Pinker's view), some sort of associative mechanism, to account for the arbitrary association between irregular verbs and their (irregular) past tense forms, and also—crucially—to allow for some semi-regular patterns among these irregular forms. (From Pinker 1999, p. 75: the pattern *ring-rang-rung* extends to *sing-sang-sung*, and similarly for *pring, drink, shrink, sink, stink*; but not *cling, fling, sling, sting, string, swing, wring, stick*, which are missing the middle form—**flanged*, **slang* ...) From that alone, we can already see that there's more to these things that 'just' putting the appropriate stuff in the lexicon; though it is sometimes said that the irregular things 'just have to be stored', we still need to deal with the patterns that are at least semi-regular. In fact, certain critiques from the linguistic side (Embick and Marantz 2005, Halle 2000) evidently see the words and rules distinction as leaving behind too much hand-waving on the 'words' side of things; Halle (2000) argues that such semi-irregularities, as found in the German plural, require that Pinker's rules be applied to attached lists of words; '[t]he modified theory, however, differs little from that of' Chomsky and Halle (1968)—i. e. the purely rule-based system which Pinker intended to contrast with the 'words half' of his words-and-rules system.

So "that's all there is to it", and "it's all just idiosyncratic" aren't very good responses to the data. We'll call an approach based on such responses a 'less-than-associative' approach, contrasting it with 'associative approaches', the latter

[7]See Jackendoff (1997) and citations therein for comments on how common idioms are, and for the ways in which they blend in with the rest of the language apparatus.

being the sort of thing Pinker has argued might be appropriate for capturing the semi-regular patterns of the irregular verbs and plurals. But in fact there's a much deeper problem that will probably afflict either approaches. For the phenomena we will focus on here, both approaches seem to ignore certain apparent regularities of language that probably constrain in some strong ways the store of possible syntactic configurations in which a word can appear; a theory such as Hale and Keyer's (Hale and Keyser 2002) attempts to reduce, in fact, these configurations to structures already seen in the area of syntax.

We will be developing an argument here of a rather indirect sort that there is indeed additional structure behind these phenomena. As introduced in Fig. 1.1, p. 6, our essential piece of evidence makes use of the following: it's not only the case that a concept will tend to have more than one way of being expressed, as we just saw with *rob* and *steal*; the spoken form of a word will also tend to map to more than one concept, sometimes in ways that are hard to notice because the concepts are almost identical. (In Fig. 1.1, the contrast is between stative and non-stative senses of the verbs.) In the central section of this work (Ch. 5) we will show that there's an apparent relation between these two phenomena, apparently overlooked until now, that will lead us to conclude that there's more systematicity here, and less idiosyncrasy, than is commonly believed.

Incidentally, on the connection between language and thought, we don't intend to argue a Whorfian stance here (Whorf 1956), i. e. that language influences thought. Some very recent work supports a kind of Whorfianism, sometimes in an extremely limited, though concrete way, (Gilbert *et al.* 2006, Drivonikou *et al.* 2007). We tend however to think that we're giving roughly the opposite of a Whorfian argument. We're saying—and it might be our interest in AI that is influencing us here—that certain encodings that are part of the mechanism of thought probably influence language, so we should get to those encodings by looking closer at language. The door may be opened to a more Whorfian stance, however, to the extent that some of these encodings may differ cross-linguistically. Consider recent psychological studies (among others, Matlock *et al.* 2003, Bergen *et al.* 2003, Glenberg and Kaschak 2002) on the apparent use of spatial constructions in non-spatial uses, building on earlier, more linguistically theoretical work (Jackendoff 1983, Gruber 1965), or more directly on Talmy's (1983, 1996) notion of 'fictive motion'; the linguistic work is very much related to the present study. (Section 4.1, pp. 72–87, builds directly on Jackendoff.) Jackendoff makes much of the fact that certain constructions that seem in some 'canonical' way to be associated with location or displacement also get used for non-locational meanings. Compare

(18) The children ran from the second to the fourth floor, where they were caught by their teacher.

(19) The stairway ran from the second to the fourth floor, until it was blocked off at the third.

(20) The light went from red to green, and then everyone took off.

The frame *from ... to ...*, common to all three sentences, is used for locational dis-

placement (18), extent through space (19, with the same verb as 18) or a change of state (20). Jackendoff would call the latter (20) and instance of a different semantic field in use: Identificationalather than Locational.Other fields that he defines, and that we will occasionally refer to here, include the Possessional, for verbs like *give*, in which the thing being 'moved' is, in general, going from begin 'in' one person's possession to begin 'in' another's; and the Circumstantial field, with which Jackendoff asserts a similarity between

(21) Louise kept him in the attic.
(22) Louise kept him composing quartets.
(adapted from Jackendoff 1983, p. 198)

—the first (21) being Locational, the second (22) Circumstantial.

Perhaps, though, a language may have some freedom in whether it emphasizes the spatial (i. e. Locational) nature of an event or not. Perhaps *steal* is English's example of treating the underlying concept as a kind of removal (i. e. an event spatial in nature); it fits the pattern of other putative verbs of removal (Levin 1993, for some of these):

(23) They took/stole/removed/extracted/withdrew/... $1,000,000.

Rob on the other hand patterns like a different set of verbs that have an argument naming something that is affected by the event the verb is used to express:

(24) They harmed/victimized/robbed/terrorized/... their neighbors.

We are going to focus purely on a broad-scale approach to English, so we will not be considering in any significant way the degrees to which languages differ in their patterns of argument expression. But they do differ, and sometimes in substantial ways (though apparently there are also broad agreements, Kim *et al.* 1999). Baker (1988), citing Kimenyi (1980), gives the following example from Kinyarwanda, a Bantu language:

(25a) Umwaana y-a-taa-ye igitabo mu maazi.
b) child has-thrown book in water
(26a) Umwaana y-a-taa-ye-mo amaazi igitabo.
b) child has-thrown water book
'The child has thrown the book into the water.'

The words meaning 'book' and 'water' have swapped positions. This alternation of the verb's argument realizations is comparable, as Baker notes, to something that appears in English:[8]

[8]These examples seem to be another case of two different ways of expressing the same arguments (as with *rob* and *steal*), but the English example that follows shows differences in meaning, as is more often the case. Note the additional suffix *-mo* on the Kinyarwanda verb (26); which might make this more closely related, in a certain way, to a different kind of construction in English—the passive, which we'll discuss later.

(27a) The child threw the book into the water.
b) (*)The child threw the water the book.
(28a) The child threw the book to his friend.
b) The child threw his friend the book.

Here one sentence (27b) is not acceptable without some special interpretation. (The sentence might be made acceptable by thinking of the water as an animate being to which something can be thrown, for instance.) But for other verbs, such as *say*, the alternation never works:

(29a) The child said something { to her father. / into the microphone.
b) *The child said { her father / the microphone } something.

Thus a child may *throw something to a friend*, or *say something to a friend*, and *throw a friend something*, but not **say a friend something*. The greater restrictiveness that English puts on such patterns, compared to Kinyarwanda, and many other cross-language divergences of a similar sort, show that languages differ in their patterns of argument realization. Since only one of the *rob* and *steal* verbs looks spatial, it might be the case that a concept that seems to have 'spatialized' its argument in one language might not do so in another.

1.2 'Argumentation'

To get a better handle on these issues, we'll start by looking at some potential encodings of the meaning of our initial contrasting word pair, i. e. *rob* and *steal*. We recognize that, having made an extremely brief mention of associative approaches to certain kinds of things, some might expect that an encoding of the meaning of a word would be exactly the kind of thing such an approach could be applied to—given the fuzzy mass of connotations that may seem to (indeed) associate with a word. We sympathize with that reasoning; nonetheless, we will be presenting an old-fashioned 'symbolic' approach for the possible encodings of *rob* and *steal*; at first, it will look, to computer scientists, like forms of Prolog (a computer programming language that just happens to have grown out of a natural language processing project in question-answering, see Kowalski 1988). We claim this is appropriate because, however associative the cloud of connotations of a word may be, language also has a clearly discrete nature, in the way that utterances are made up of words that can be moved around and combined only in very particular ways. This will become clearer, we hope, by the end of this thesis.

So the question with *rob* and *steal*, then, concerns this: should we think, as a question of how concepts get realized in words, that expressions using *rob* or *steal* both stem from a similar form? I. e., we should consider whether there is a legitimate reason for thinking that both expressions can be seen as being generated in some way from some common encoding in our minds. As a rough first step we might start

with something simple, say

(30) `take_improperly(Loot, Victim, Thief)`

with *rob* and *steal* just happening to choose different ways of realizing their arguments—i. e. the `Thief`, `Loot`, and `Victim`. Recall that the `Loot` and `Victim` swap positions between *rob* and *steal* (old examples 14 and 16):

(31=14) They robbed $\underbrace{\text{the bank}}_{\texttt{Victim}}$ of $\underbrace{\$1,000,000}_{\texttt{Loot}}$.

(32=16) They stole $\underbrace{\$1,000,000}_{\texttt{Loot}}$ from $\underbrace{\text{the bank}}_{\texttt{Victim}}$.

Giving both verbs the same representation, one will need to add information to each verb's entry in the lexicon to further describe its chosen realization—and similarly for all the other pairs of words that differ in their argument expression—of which some such pair might exist for nearly every verb in the lexicon, as we shall see.

Or: perhaps *rob* and *steal* are in some deeper way encoded differently. As we suggested earlier, perhaps *steal* is just a special case of a verb like *remove*; for the sake of the exposition, we might encode it with something along the lines of

(33) `remove_from(Source, Theme, Agent)`

taking the `Source` as the traditional name for the location from which something is taken, the `Theme` as the entity being moved (as used in Jackendoff 1983, following Gruber 1965), and the `Agent` as the entity acting to bring about this event; these are the possible thematic roles, or θ-roles, for any verb whose semantic representation might be based on this `remove_from` form. There are in fact quite a few such verbs: Levin (1993) lists a few dozen such words, such as *extract*, *withdraw*, (one sense of) *pull*, etc. (mostly in Levin 1993, sect. 10.1). Perhaps the encoding should be broken down further to something like

(34) `cause(go_from(Source, Theme), Agent)`

which brings it closer to the sort of form Jackendoff (1983) has proposed (he'd further decompose the `go_from` form), these questions of alternate decompositions being, in fact, the kinds of things that Jackendoff has wrestled with over many years—Jackendoff 1976, 1983, 1990, 1991, 1996).

The verb *rob*, meanwhile, taken as a variant of the many verbs that take an affected object, encoded as the θ-role `Patient`, might be represented with

(35) `act_on(Patient, Agent)`

Something would have to be added to specify the actual action taken upon the `Patient`, i. e. one that involves taking something (the `Theme`, not shown) from the `Patient`; as is, the representation would probably suffice only for something more like

(36) $\underbrace{\text{His last girlfriend}}_{\texttt{Agent}}$ apparently affected $\underbrace{\text{our new neighbor}}_{\texttt{Patient}}$ deeply.

i. e. for a statement that says little or nothing about the kind of effect. Of course, the previous form (34) needs to be extended in the same way, receiving something to specify that the movement of the (there specified) `Theme` from the `Source` is not just any 'movement', but one that victimizes the `Source`, etc.

Note the choice here: one can encode these verbs the same way, and add realization information: or encode them differently, and hope that some sort of rules of realization can be found to handle the realizations without further, verb-specific specification; the decompositions of the `act_on` and `remove_from` forms, which we'll given in a moment, will suggest how they might provide the correct, though diverging, realizations for *rob*'s and *steal*'s arguments. Either way, though, from the computer scientist's view, verb-specific encodings have to be made—in the representation, or in explicit realization stipulations (i. e. specifying a subcategorization frame—the category of these words being verb, the subcategorization specifying the number and the realizations of their arguments). So the question is, can anything be gained from richer semantics that can't be gained from just stipulating all the details of realization, etc.? We'll be arguing strongly in the affirmative here, for reasons that will become more apparent in the next chapter. But our remarks about patterns among the irregular verbs, and novel language use by real users, should suggest already the reason for preferring the richer semantics; if the patterns in argument realization are dependent on the semantics, then to the extent that people can extrapolate using those patterns to handle new words or new contexts, then we'll want our artificial systems to have this richer, more syntax-affecting semantics, too.

1.2.1 Argument types

Meanwhile, these Prolog-style examples should make it clear that we are in fact dealing with a kind of mystery of argument realization, *rob* and *steal* (14–17, 31–32) exhibiting a clear case of argument realization divergence—the argument realization proceeding differently for the `Loot` and `Victim` arguments, if one thinks in terms of the `take_improperly` predicate; or for the `Theme` and `Source` arguments, if you take things all the way down to the `remove_from` or `go_from` predicates; or for the `Theme` and `Patient` arguments, taking things down to the `act_on` predicate. We call this a 'clear case' of argument divergence because no matter how finely you try to define the semantics, *rob* and *steal* are probably going to look the same at least in terms of the semantic roles their arguments play: through successive refinements (getting more specific in the semantic role at each step), the arguments might be described as {`Agent`, `Source`, `Theme`}, or {`Agent`, `Source/Victim`, `Theme`}, or {`Perpetrator`, `Source/Victim`, `Goods`}, or {`Thief`, `Source/Victim`, `Loot`}—regardless of the refinements, the designated roles apply as much *rob* as to *steal*. (We'll give this a more thorough defense later, p. 43.)

If all divergences were like *rob* and *steal*, then we might in fact end up resigning ourselves to filling the lexicon with a lot of stipulations. But let's move (finally) to a different contrastive pair of words; things will turn out slightly different with them. The next pair is *put* and *fill* (cf. *pour* and *fill*, Fig. 1.1).

(37) Suzy put clothes in(to) the bags.

(38) *Suzy filled clothes into the bags.

(39) *Suzy put the bags with clothes.
(Intended to mean the same as 37.)

(40) Suzy filled the bags with clothes.

Here were have a swapping of arguments (*clothes* and *bags*) similar to that of *rob* and *steal*'s swapping of `Loot` and `Victim`. But it probably doesn't seem surprising that *put* (39) can't behave like *fill* (40), since its meaning evidently lacks the component meaning *in*; unless you explicitly supply the word *in*, *put* isn't going to come very close to meaning *fill*. One the other hand, why can't *fill* (38) act like a use of *put* that does include *in* (37)? The apparent redundancy of the explicit *in* paired with *fill* (38) isn't necessarily a problem; *insert*, which would seem to have the *in* component as much as *fill*, nonetheless sides with *put*, not *fill*:

(41) Suzy inserted the cards into the slots.

(42) *Suzy inserted the slots with the cards.
(Intended to mean the same as 41.)

So the presense or absence of an *in* component does not by itself seem relevant.

A first attempt to encode *put*'s meaning might be something like:

(43) `move_to(Goal, Theme, Agent)`

giving the traditional name `Goal` to the argument to which the `Theme` is being moved. One might be tempted to also think of this as the underlying encoding of *fill*, minus the extra piece of meaning that suggests that in the end of the event expressed by *fill*, not only does the entity expressed by the `Goal` argument contain that expressed by the `Theme` argument, but in some way it can be taken to be *full* of the `Theme`; and, of course, it (43) is also still missing the actual component for *in*. But *put*'s argument isn't just the entity to which the `Theme` goes, but an expression of a position in some spatial relation with the `Goal` entity (*in* the bags, in the above example, Jackendoff 1983). So though *put* and *fill* diverge in their expression of their `Goal` and `Theme` arguments, it also looks like *put*'s `Goal` is more than just a `Goal`, so the divergence could have something to do with that. In terms of some more finely tailored argument descriptions, this wouldn't be a divergence at all. Thus, in Jackendoff's (1983) explication of things, conceptual structures (his variants on semantic predicates) may have slots that need to be filled with additional conceptual structures of differing types, in this case, of one type for a simple *fill*-type `Goal`, and of a different type for the *put*-type `Goal`. Jackendoff gives his pieces of conceptual

structure types such as Event, Thing, Path, Position; following Jackendoff's general use of $\texttt{[}_{\text{X}}\ \texttt{Y]}$ to designate an element $\texttt{Y}$ of type $\texttt{X}$, we can take an operator

(44) $\texttt{in} : \texttt{Thing} \rightarrow \texttt{Position}$

and apply it to an object

(45) $\texttt{[}_{\text{Thing}}\ \texttt{bag]}$,

giving

(46) $\texttt{[}_{\text{Position}}\ \texttt{in(bag)]}$.

Thinking of these as the type designations (44, 45) of *in* and *bag*, respectively, we then get the type (46), and the sanctioning of the construction, of the phrase *in the bag* (ignoring the difference between *bag* and *the bag* for expository convenience). We can continue and build up the entire sentence

(47≈37) Suzy put clothes in the bag.

according to the following chart, where each element in the first column applies to the element in the second column, giving an element in the next row—the first or second column, according to the arrows.

(48)	$\texttt{to} : \texttt{Position} \rightarrow \texttt{Path}$	$\left[_{\text{Position}}\ \texttt{in(bag)}\right]$
		$\downarrow$
(49)	$\texttt{go} : \texttt{Path} \rightarrow (\texttt{Thing} \rightarrow \texttt{Event})$	$\left[_{\text{Path}}\ \texttt{to(in(bag))}\right]$
	$\swarrow$	
(50)	$\texttt{go(to(in(bag)))} : \texttt{Thing} \rightarrow \texttt{Event}$	$\left[_{\text{Thing}}\ \texttt{clothes}\right]$
		$\downarrow$
(51)	$\texttt{cause} : \texttt{Event} \rightarrow (\texttt{Thing} \rightarrow \texttt{Event})$	$\left[_{\text{Event}}\ \texttt{go}\begin{pmatrix}\texttt{to(in(bag))},\\ \texttt{clothes}\end{pmatrix}\right]$
	$\swarrow$	
(52)	$\texttt{cause}\left(\texttt{go}\begin{pmatrix}\texttt{to(in(bag))},\\ \texttt{clothes}\end{pmatrix}\right) : \texttt{Thing} \rightarrow \texttt{Event}$	$\left[_{\texttt{Thing}}\ \texttt{suzy}\right]$
		$\downarrow$
(53)		$\left[_{\text{Event}}\ \texttt{cause}\begin{pmatrix}\texttt{go}\begin{pmatrix}\texttt{to(in(bag))},\\ \texttt{clothes}\end{pmatrix},\\ \texttt{suzy}\end{pmatrix}\right]$

The result (49, right-hand column) of the application in the first row (48) can be considered the representation for (at least one sense of) *into (the) bag*. The word *into* seems to have been built from the standard mathematical process of composition: $(\texttt{to}(\texttt{in}(x) = (\texttt{to} \circ \texttt{in})(x))$, thus making *into* the word with which we express $\texttt{to} \circ \texttt{in}$ (with a similar decomposition derivable for *onto*; compare Jackendoff (1983)).[9]

[9] For the reader who might have been wondering about the orderings of `Agent`, `Source`, `Theme`, etc. in the some of the above forms (30, 33, 34, 35, 43), we can defend those now. (Why `Goal`, `Theme`, `Agent` (43) and not `Agent`, `Theme`, `Goal`? the latter matching the ordering of at least some English sentences, e.g. 37, as well as the ordering in Jackendoff's representations.) In a nutshell,

Given the above form for (at least one sense of) *go* (49, left-hand side), after a couple of applications the result is a form (51, right-hand side) that can be considered the representation for something like

(54) The clothes went into the bag.

(Clearly, we're ignoring tense distinctions: *the clothes went into the bag* vs. *the clothes go into the bag*, etc.) The result of the last application (i. e. 52) could be the sentence

(55) Suzy caused clothes to go into the bag.

or, finally, our target sentence

(56=47) Suzy put clothes in the bag,

for which we can subtract the representations for *Suzy*, *clothes*, and *in the bag* to get the form for *put*:

(57) $[_{\texttt{Event}}\ \texttt{cause}(\texttt{go}(\texttt{to}([_{\texttt{position}}\ ]), [_{\texttt{Thing}}\ ]), [_{\texttt{Thing}}\ ])]$

(Note then, that a language may offer multiple ways of cutting up a structure, i. e. the various pieces of conceptual matter in 53 can be composed to produce 55 or 47. Thus the larger issue is for us not just how a verb's arguments are realized, but how the concept one is expressing is cut up into predicate and arguments. That's why we chose to play on the word 'argumentation' in giving a title to the current parent section (1.2), the standard label 'argument realization' suggesting too narrow a focus.)[10] At a minimum, the conceptual structure for *fill* would be closer to:

---

we are currying the forms (Curry 1961, Schönfinkel 1924); for instance, we treat a function of a pair of arguments not as a function that is applied directly to that pair, say $f(x, y)$, but as a function whose value on the first argument $f(x)$ is itself a function which can then be applied to the second argument. Thus, in the programming language Haskell, $(x+)y$ is a valid way of writing $x + y$; $(x+)$ designates a function (a 'section') that adds x to the value of the argument it's applied to. (Curry 1963, p. 33: forms like $f(x, y)$ are "in the spirit of ordinary mathematics" while something like $(fx)y$ is more suggestive of the procedure "usually followed in linguistics". Heim and Kratzer (1998) use currying in their exposition of semantics and syntactic phenomena; categorial grammar thoroughly relies on it (e. g. Steedman 2000).) So the application of `go` as defined here (49) results in a value of type `Thing` → `Event`, i. e. another function. Thus, these pieces of conceptual structure, and their compositions, align with actual words in interesting ways. The `cause` operator as we've defined it (51, left hand side), composed with the result of the application shown above (50, left hand side), i. e. `cause` ∘ `go(to(in(bag)))`, might be considered the representation for the verb *bag* as used in something like *Finally, the shopkeeper bagged our groceries.*

[10]Our decompositions are not intended to minimize Fodor's (1970) warnings against deconstructing *kill* as *cause to die*; but see Jackendoff's own sketch of a rejoinder (Jackendoff 1990, p. 150–151).

One might also try to give (*)*clothes entered the bag* instead of *clothes went into the bag* (for 51, right-hand side), taking *enter* as the expression of the composition `go` ∘ `to` ∘ `in`, where (`go` ∘ `to` ∘ `in`)(x) = `go`(`to`(`in`(x))). For a first attempt at explaining the '(*)', one might consider the argument for *enter* as something like `AnimateTheme` rather than `Theme`. (Though that isn't quite right either; it probably has something to do with the `Theme` being able to move on its own.) As Jackendoff mentions in his discussion of Fodor, it isn't unusual for (what we will think of as) the

(58) $[_{\texttt{Event}}\ \texttt{cause}(\texttt{go}(\texttt{to}(\texttt{in}([_{\texttt{Thing}}\ ])), [_{\texttt{Thing}}\ ]), [_{\texttt{Thing}}\ ])]$

but we've already seen that the `in` component—the only thing added here—is not the essential element (*insert* behaving more like *put*, though *put* requires the `in` component to be 'spoken'); and of course the form above fails to capture the notion that the first `Thing` is *full* of the second `Thing` (by some heavily context-dependent criteria), and not merely containing some arbitrary amount of the second. So a decomposition of this sort still leaves a lot unexplained.

Note, too, for *rob* and *steal*, how little the amount of semantics is that is added to the concepts expressed by *of* and *from* (prepositions, so called because they're preposed relative to their argument). On the one hand, these verbs have three arguments, so there has to be some way of distinguishing the two that come after the verb; but in other cases the ordering after the verb is itself available to serve that purpose, as in:

(59) $\underbrace{\text{The neighbors}}_{\texttt{Agent}}$ gave $\underbrace{\text{the stranger}}_{\texttt{Recipient}}$ $\underbrace{\text{some chocolate cake}}_{\texttt{Theme}}$.

(60) $\underbrace{\text{The neighbors}}_{\texttt{Agent}}$ baked $\underbrace{\text{the stranger}}_{\texttt{Beneficiary}}$ $\underbrace{\text{a chocolate cake}}_{\texttt{Patient}}$.

(We've given *give*'s second argument the traditional name `Recipient`, rather than `Goal`, to distinguish the argument with preposed *to* (in the other construction *give* appears in) from those that take a variety of prepositions; the sentence above (59) is paraphrasable as

(61) The neghbors gave some cake to/*on/*in/*under the stranger,

while for a verb like *put* there are a variety of prepositions available to introduce the `Goal` argument—but *not* the preposition *to*:

(62) The neighbors put the food $\left\{\begin{array}{c} *\text{to} \\ \text{on} \\ \text{in} \\ \text{under} \\ \vdots \end{array}\right\} \left\{\begin{array}{c} \text{the table} \\ \text{the fridge} \\ \text{the microwave} \\ \vdots \end{array}\right\}$.

So we are using the different prepositional requirements (61 vs. 62) to justify distinct argument types `Recipient` and `Goal`, and assuming the two uses of *give* above (59 and 61) can be used to justify giving the same role names to those two cases. Similar arguments can be made for `Beneficiary`, given the following paraphrase (of 60):

(63) The neighbors baked a cake for the stranger.

This in turn shows that *for* and *to* are also taking on semantic roles that otherwise can simply be performed by the syntax.)

composed form to be much more specialized than the uncomposed form.

So it might not only be *insert* that has an apparent redundancy (the required *into* before one of its arguments). *Steal* and *rob*'s prepositional requirements can seem close to redundant, too. So why do they have to be there? One might think, first of all, that we have here another complication in argument realization, thus more evidence, perhaps, of idiosyncrasy, contrary to our stated goals. But these may also be clues to constraints on surface forms hidden in the mechanisms of syntax or semantic representation.

1.2.2 Linking

Our immediate response to the decompositions of the previous section, however, is that they aren't completely helpful (at least, not yet) in trying to determine how the constituents of those structures (as attached to the words that express them) are realized; again, if *insert*'s inherent `in` component is nonetheless realized again by its argument, why isn't *fill*'s? The structures don't by themselves show us what the link is between syntax and semantics, e. g. they don't help us yet with the 'linking' of elements of the concept to the elements of syntax (Carter 1988), i. e. argument realization; all that we can conclude so far is that, if there is indeed a strong link between these things, we should consider giving *put* and *fill* different semantic representations, just as we suggested for *rob* and *steal*. Jackendoff, among many others, has attempted to come to terms with some of these problems (Jackendoff 1990, ch. 11); we'll return to him later (p. 95).

Meanwhile, we can note that, of all the general argument types for the above predicates (i. e. the arguments `Agent`, `Goal`, `Source`, `Theme`, `Patient`, ignoring the highly specialized argument types `Loot`, `Victim`, `Thief`) only an `Agent` is, in general, largely unproblematic in the way it is realized. As a first step to getting closer to some of the possible issues here, one can look at the problem in a way that roughly complements that of the previous section; there, we tried to break up the apparent semantic components of the concept, closely following Jackendoff (1983), but with an ordering of the concepts that was somewhat different. (We chose, contra Jackendoff, to order things to maximize the ease of representation of composition in the mathematical sense, and of function currying.) Meanwhile, the traditional approach of the syntactician (at least in generative tradition, the more-or-less Chomskyan tradition, starting back with Chomsky 1957) has been, in part, to start with a known order (the order in which words appear in natural speech) and then to look for evidence of particular groupings of the words—and, where seemingly appropriate, to look for evidence that different arrangements of those groupings may have existed in some way in speakers' minds before the string of words are given their final shape and uttered.

So, to use a very simple example, a string like

(64) They robbed the bank

can be built up of its constituent phrases, as in:

(65a) They robbed the bank
↓
b) They robbed [the bank]
↓
c) They [robbed [the bank]]
↓
d) [They [robbed [the bank]]]

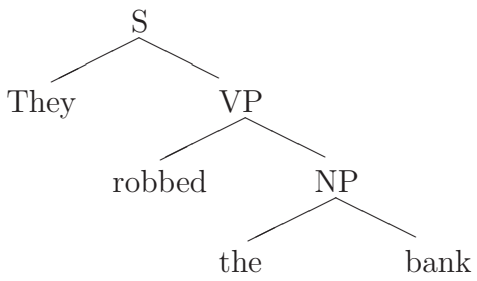
A complete explication of the way that words seem to group into phrases would include discussion of things like the possibility of substituting pronouns (*she*, *he*, *it*, etc.) for phrases, and the way that a sentence can seemingly be transformed by moving parts of it around; there are a number of complications, in fact. Santorini and Kroch (2007) give the following examples, to which we've added brackets:

(66) Did [the dog] chase [the cat]?
(67) Did she chase him?
(68) Did [the dog the children like] chase the cat?
(69) *Did [she the children like] chase the cat?
(70) Did she chase the cat?

She substitutes easily for *the dog* (66, 67) but not for *the dog* that the children are said to like (68, 69), thus suggesting that the grouping is [*the* [*dog the children like*]] (in 68).

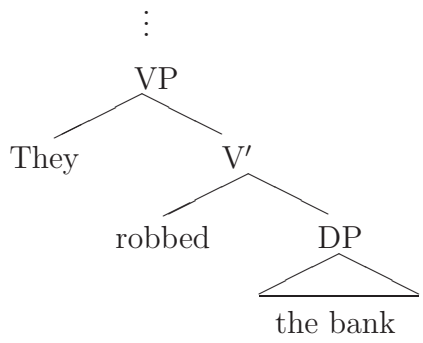
Given the grouping of the earlier sentence (64 as in 65); we can view it pictorially (and in a somewhat simplified fashion) as

(71)



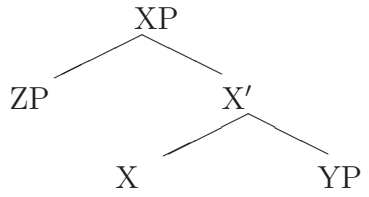
where the labels S, VP, and NP denote sentence (or clause), verb phrase, and noun phrase, respectively. The noun phrase is an internal argument of the verb, since it is inside the VP, and the word *they* here is an external argument. We aren't going to delve into syntax in any real depth in this work. But certain apparent properties are both crucial to understanding what follows, and to seeing some of the possible implications of the results that we will eventually arrive at. A somewhat more sophisticated labeling of these trees, better reflecting their apparent regularities follows (Chomsky 1970, Jackendoff 1977, i. e. X-bar theory; the X′ below (73) also written as $\overline{\text{X}}$, for X = V, N, D, ...).

(72)



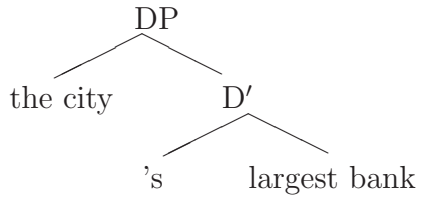
This has DP for determiner phrase (Abney 1987)—*the* being a determiner, and in this analysis the head of the phrase. (More on the internal structure of the DP in a moment; we've also left off elements from the top of the tree, into which some elements technically should be moved, in order to bring the whole sentence fully into the X-bar system.) This VP (72) then generalizes to

(73)



with YP defined as the complement of X, and ZP the specifier of X. (Thus the complement of V holds an internal argument of V, and its specifier holds its external argument.) Substitute V for X to get [$_{\text{VP}}$ *They* [$_{\text{V}'}$ [$_{\text{V}}$ *robbed*] [$_{\text{DP}}$ *the bank*]]], or D for X to get the subtree [$_{\text{DP}}$ [$_{\text{D}'}$ [$_{\text{D}}$ *the*] [$_{\text{NP}}$ *bank*]]]. An example DP that fills out more of its structure might be something like *the city's largest bank*:

(74)



One of the important symmetries of these trees is as follows: there's a tendency of languages that create a phrase by attaching a word to an already existing phrase

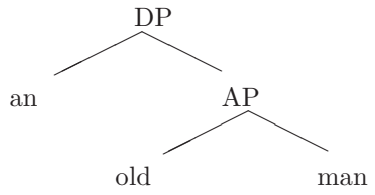
to systematically put the word—the head of the new phrase, i. e. the X (73)—in the same position; in English, at the front; in Japanese, the head comes at the end. English is *head initial*, Japanese is *head final*. Thus, for the following sentence (75a, discussed in Baker 2001, p. 58), with the given word-by-word gloss (75b), and translation (75c), a speaker of, say, English, unaware of the symmetries here, will probably fail to notice the intrinsic order of the Japanese sentence, even given the gloss (i. e. 75b).

(75a) Tarō-ga Hiro-ga Hanako ni zibun no syasin-o miseta to omette iru
b) Tarō Hiro Hanako to self of picture showed that thinking be
c) Tarō is thinking that Hiro showed a picture of himself to Hanako

The order can be recovered easily by comparing the build-up of phrases for English and Japanese—unfortunately it will be a bit of a digression, so we'll push it down into a footnote. The essential thing is: various pairings of words or phrases are reversed—but not all such pairings are reversed, making it extremely hard for someone whose native language is a language like English to make sense of the gloss. So everything appears (to the English-speaking reader) scrambled rather than simply reversed. This is because phrases can also be built up out of other phrases, and here Japanese and English have less of a chance to differ. In almost all languages (see Baker's (2001) discussion of Dryer 1992) the subject phrase (here, *Tarō ga*) comes before the verb phrase, and here both English and Japanese adhere to the norm. (Baker mentions the Mayan language Tzotil as one of the rare ones: head initial, like English, but with subjects last. Thus it's mirror Japanese.)[11]

There is no norm for headness, however; none cross-linguistically, that is. Where it exists, you have roughly an equal chance of finding a head-initial language (like English) or a head-final one like Japanese. (That makes it perfect example of a parameter, Chomsky 1981.) Thus, in the computer scientist's terminology, there really seems to be just a single bit in the description of Japanese that needs to be flipped to account for this difference in word ordering.[12]

[11]Traditional notions of headedness and phrase types sometimes conflict with the orderliness implied by the head directionality parameter. The traditional head of a noun phrase in English (a noun) is expected in final, rather than initial, position: in *an old man*, *man* is taken as the noun, so the head of [NP old man] seems to come last. But following Abney (1987), it is also analyzed as



i. e. making the noun (*man*) the complement of the adjective (*old*), with the adjective the head, thus creating an AP (adjective phrase) rather than an NP.

[12]Here's the analysis of the Japanese sentence and its English translation. At the risk of turning away the reader who is used to reading parse trees, we'd like to present the English translation first as a series of bracketed forms into which new words are inserted—not the way you'd want to read these things in general, admittedly; but the standard tree forms seem to make things a bit

The above discussion allows us to be quite precise when we discuss where the `Agent` argument appears in a sentence; it can found, pretty reliably, in the external argument, or subject, position. Other argument types appear there only when there is no `Agent` role—with the exception of a rather special construction (in English): the passive, to which we will return later. Unfortunately, it is much harder to specify with equal accuracy what happens in the internal argument positions; i. e. where in

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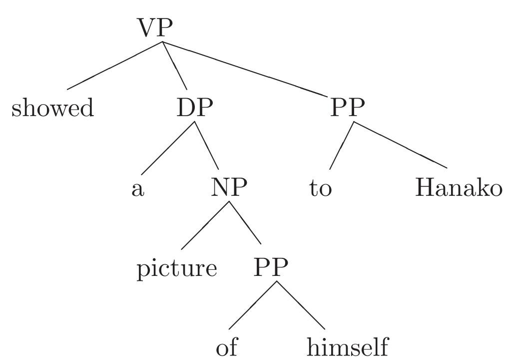
too easy to read (it seems to us), possibly making it harder to think about how the words might be gathered together to form the full utterance.

For the English sentence, the new words are almost always inserted (given this particular sentence), and as is often the case (for English sentences in general, depending to some degree on the details of one's theory), into the far lower right corner of the tree; the rightward branching is already suggested in the small trees given earlier (71 and later). (We'll come back to the lines below marked ().) The only complication is the phrase *to Hanako*, which is an arguent not of *himself*, or of *a picture*, but of *showed*, thus grouping with a word a little farther back in the sentence.

	[Tarō										]
()	[...	[is	....								]]
	[...	[...	[thinking								]]]
	[...	[...	[...	[that	....						]]]]
	[...	[...	[...	[...	[Hiro	....					]]]]]
()	[...	[...	[...	[...	[...	[showed	....				]]]]]]
	[...	[...	[...	[...	[...	[...	[a	....			]]]]]]]
	[...	[...	[...	[...	[...	[...	[...	[picture	]		]]]]]]]
	[...	[...	[...	[...	[....	[...	[...	[...	[of ....]]		]]]]]]]
	[...	[...	[...	[...	[...	[...	[...	[...	[... himself]]		]]]]]]]
	[...	[...	[...	[...	[...	[...	[...	[...	[... ...]]	[to	]]]]]]]]
	[...	[...	[...	[...	[...	[...	[...	[...	[... ...]]	[... Hanako	]]]]]]]]

[Tarō [is [thinking [that [Hiro [showed [a [picture [of himself]] [to Hanako]]]]]]]

The structure into which *to Hanako* is inserted is in fact harder to read in this form; there's also, possibly, more room for disagreement here as to what the structure should be. On one instantiation of X-bar theory, the branching should be binary; the tree form of this fragment, though, as we presented it above, shows tertiary branching at the top:



Note that the complication here is with the placement of an argument of a *verb*; the complication exists because of the ability of verbs to take more than one internal argument, and that's one of the things that makes them the target of this study.

Of course, to build these phrases one has to know what the apparent phrase-structuring rules of the language are. In fact, almost all of the phrases exemplify a head being attached to a phrase (its complement) to make a larger phrase, as in the left-hand side of the following chart.

general does a `Goal`, `Source`, `Patient`, or a `Theme` appear in a sentence.

`Source` may be a subject:

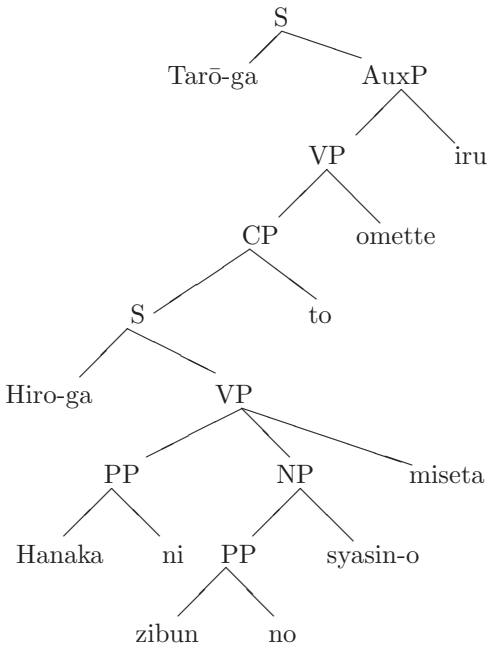
(76) $\underbrace{\text{This device}}_{\texttt{Source}}$ emits a sound.

English head complement	Japanese complement head
is [thinking ...]	[... omette] iru
thinking [that ...]	[... to] omette
that [Hiro ...]	[Hiro ...] to
showed [a picture]	[syasin-o] miseta

The English prepositions (corresponding to Japanese postpositions) are also part of the head parameter setting, and the cross-language comparisons, though we left them off the chart because at least some of them in Japanese are treated as attaching to their complements like suffixes

English head complement	Japanese complement head
of (him)self	zibun no
to Hanako	Hanako ni

The structure of the original Japanese (partially built from the right-hand side of the charts above) is harder to grasp written out like the English—and harder to write out as well, given the less-orderly bracketing. So here's the tree-form (reverting to the simpler labels of the first tree, 71); it makes things clear that almost every new word of the Japanese sentence, instead of being attached to the lower-right corner as in English, effectively causes parts of the already existing tree to be pushed down into new subtrees growing down toward the left.



(CP = complementizer phrase, PP = adpositional phrase (postpositional in Japanese, prepositional in English), AuxP = auxiliary verb phrase; we'll mostly only need to consider PPs in what follows)

A `Goal` may also be a subject:

(77) $\underbrace{\text{The cloth}}_{\texttt{Goal}}$ absorbed most of the liquid.

Levin and Rappaport Hovav (1995) state without further comment that `Patient`s are known to be realized as direct objects; Pesetsky (1995) is a bit more cautious, saying that `Patient`s are realized as direct objects (for `Agent`/`Patient` verbs) 'with certain exceptions' in verbs of motion (Pesetsky 1995, p. 11, inc. footnote 2). But our *rob* and *steal* examples show that both claims are problematic. They can't be maintained unless one asserts that the victim from whom something is *stolen* is less a patient than the victim who is *robbed* of something. Levin and Rappaport Hovav's assumption implies that only *rob*'s argument is construed as a `Patient`; or else, neither of the verbs have `Patient` arguments.[13]

1.3 Polysemy

One of the interesting things about language is that, for most of us, we know thousands of words, but there isn't a single one of them that is completely of our own invention. Effectively, in order to refer to things (and actions and ideas) by name, we are entirely dependent on other people to show us what those names are; and on the rare ocasion that one of us does coin a word, it's often done in the most artificial way: we'll think of a descriptive phrase and pick out the first letters of its words, i. e. forming an acronym; or simply re-use some arbitrary, pre-existing word and make up a relevant acronym for it. Or we'll borrow a word from some language conventionally respected for such borrowings, such as Latin or Greek.[14]

As for the lines marked () in the English version of the sentence, these are lines in which a subject is joined to its verb phrase; since Japanese matches English at this point (as do almost all languages), but doesn't match elsewhere, the point of alignment ends up only adding to the confusion (of the non- Japanese-speaker, that is). An example fragment of Japanese that lacks any subjects (as Baker gives elsewhere, in fact—Baker 2003) can look quite simple in tree form: everything may just branch down to the left, in mirror image of the English.

[13]There are complications in assigning `Agent`s to subject position, too. A sentence like
(i) You can buy a pretty decent meal here for $20
has `Agent` in subjet position, as expected; but the sentence can be paraphrased as
(ii) $20 buys you a pretty decent meal here
in which the former subject seems to have been demoted to a `Beneficiary` (compare 60, 63). (Another example: *doing this should buy us some time.*) In other languages this type of construction might be more problematic; Callies (2006) discusses difficulties German speakers have encountered in trying to learn the English construction.

[14]True inventiveness in words is probably rarer than most people think, because the mere derivation of new words from old ones (using an old word in a new category—a noun as a verb, for instance) is also often considered a new coining; supposed word-coiners like Shakespeare are just word-derivers, most of the time. (Hope (1999) in noting *laced* as a verb (from the noun, from French) and *unlived* for *killed* (*Lucrece*, 1754); "Shakespeare was almost uniquely positioned to take advantage of the variation offered by Early Modern English" i. e. before "standardization gave way to prescriptivism".)

As for the already existing words, and as we mentioned briefly earlier (p. 10), almost all of them are effectively 're-used' for a variety of purposes, sometimes related and sometimes not, often without us noticing that such 're-use' is going on. A simple sentence like

(78) John put some books on the table

is trivial for us to process, but its words will generally have other, very different uses. So there's the noun *books*, as above, but also the verb, as in

(79) He books all his flights online.

Table of course can also be used as a verb, as in: enter something into a (different kind of) table; or as in: remove it from the agenda. And so on. So here's another way in which the mapping from labels (*John*, *books*, *table*, etc.) to concepts seems quite messy; some concepts seem to share labels because the concepts have something in common, while others share them purely by accident—or it might as well be that way (you *hail* a taxi, and *hail* also falls from the sky). Lakoff (1987) refers to certain label-sharing by related concepts as 'motivated': it's not necessarily predictable (in Lakoff's view), but it's not entirely arbitrary either. And yet we are proposing that there is a great deal of systematicity here.[15]

Things can get even more complicated with other labels, depending on how rich and complex the interaction between the world and the entity primarily picked out by the label is. Take for instance the label *string*, and the fact that things can be positioned into a string-like arrangement (*string them together*); strings, or string-like things, can be attached to things (*string the guitar*), or removed (*string the beans*). And there are other string-like arrangements that dictionary-builders will tend to see as distinct senses, such as the stretching out of something, like a string; and there are other kinds of attachment that might seem special, such as for the purpose of binding something up.

Different entities will have different ranges of use at any point in time, of course. Circular arrangements can be requested (*circle the wagons*), and drawn around things (*circle the correct answer*). Since *circle* names a path of a particular shape, one can (apparently) also use the label to describe a movement along a

[15]Note, too, the way that this complicates things for parsing. The reader probably had no trouble at all parsing the last example sentence (79). But why was it so easy? The phrase *all his flights online* could refer to some sort of online simulation, as in
(i) The disks all his flights online were stored on were erased by accident.
Note, too, that we sometimes refer to macho men as *he men*. Is it farfetched to think there might be *he books*? Perhaps it is. But it probably isn't easy to get an artificial system to recognize distinctions like that and act accordingly. And a system that considers the possibility that *he books* might be a phrase like *he men* could attempt to pair it with a phrase beginning *all his flights online*, as is done with *the disks* (i), and the parser wouldn't know it had a problem until it reached the end of the sentence (79) and found no more words to complete the sentence. A system that, in spite of sentences like this one, manages to parse with ease the earlier example (79) might be doing a wonderful job of capturing the human sentence processing capabilities, or it might have just been succeeding with the simple sentences only because it tends to fail with the more complicated ones.

path of that shape; *circle the wagons* could also mean: go around the wagons. It could even mean: place a circle on each of the wagons. And though it might strain our imaginations, we can't discount the possibility that *circle the wagons*, in some special situation, might mean doing something else involving some sort of circle; perhaps it could even mean: remove a particular circular object from each wagon. These conflict with the idiomatic use of the phrase, and may thoroughly strain our imaginations, but there isn't necessarily any reason why the language couldn't support them. So far, then, it may be that the only significant difference between *string* and *circle*, in spite of the major differences in how they are commonly used, is in the 'movement along a path' sense (as in *circle the building*, meaning: go around the building). *String* appears to lack a comparable use; perhaps because it isn't conceived of as a 'real' shape, whatever that would mean—nor as the right kind of path.

The above examples are relatively easy to spot just by thinking of different ways of using a verb, and noting if they seem obviously different in meaning. Other closely related senses of a word are much more subtle in their relationships, and harder to spot in English than in other languages. Levin and Rappaport Hovav (1995, p. 181) make this point with the following Hungarian example (taken from Moravcsik 1978, p. 257; the gloss element -ACC is for the accusative case ending, which marks the noun phrase that is the direct object of the verb):

(80a) János rámázolta a festéket a falra.
(b) John onto-smeared-he-it the paint-ACC the wall-onto
(c) 'John smeared paint on the wall.'

(81a) János bemázolta a falat festékkel.
(b) John in-smeared-he-it the wall-ACC paint-with
(c) 'John smeared the wall with paint.'

Here we have a case of an English verb *smear* that can realize its arguments in two different ways; the Hungarian equivalents, however, use two different verb forms, taking the prefixes *rá-* or *be-*. Compare next our earlier example of the verb *fill* in use (40), referring to an event of moving some substance into some container. Another example of *fill* being used in the same way:

(82) The scientists filled the space with pure oxygen.

But as we saw early on (Fig. 1.1), *fill* can also refer to the mere state of something being in a particular relation to a container:

(83) Pure oxygen (completely) fills this space.

But, as we saw, not all eventive verbs have a stative sense, and vice versa. Native speakers of English don't accept the sentence

(84) *The card inserts this slot.

as a valid alternative of the (stative) *The card is in the slot. Insert* lacks a stative use—and this, too, would count as a different sense of the word. I. e., *insert* is

polysemous: it has multiple senses.[16]

1.4 The category Verb

So far, in laying out some of the basic elements of this work, we've been looking at some of the core ideas of argument realization and of polysemy, sketching certain ways in which we might think of the concepts we express in language as being encoded in our minds—thus providing, by implication, a guide to how the computer scientist should encode them in order to get similar behavior from a natural language system. In the next chapter, we'll discuss polysemy a little more, and note a couple of additional phenomena that either further complicate, or provide more clues for, the problem we are investigating. Meanwhile, we may have appeared to be taking it for granted (in the above discussion of predication) that the language element at the 'heart' of such predications is always a verb—and also be taking it for granted that the reader knows what it means for something to be a verb. We'll use a brief note on this, and on a few other complications in the mapping from concepts into language, to close the chapter.

Actually, there is precedence for taking it for granted that the reader knows what a verb is, even among linguistics. Baker (2005), speaking from his own experience, suggests that even the typical linguistics program leaves its students with an idea of what a verb is that isn't much deeper than whatever they knew coming into the program. He's engaging in a bit of hyperbole, presumably, since the language student will surely learn a lot more about the appearance of verbs in different languages, and of the environments in which they appear; but it's a different matter to come up with an actual definition of what a verb is. One introductory textbook (Fromkin and Rodman 1993, in the glossary) gives:

> [A Verb is]: The syntactic category of words that function as the heads of Verb Phrases ...

This of course leads you to search for the entry for Verb Phrase, for which a modest experience with glossaries and dictionaries will allow you to see a circularity coming:

> [A Verb Phrase is]: A syntactic category of expressions containing a verb and, possibly, other elements such as a Noun Phrase ...

[16]The sentence for *fill* (83) includes the optional modifier *completely* to help pick out the stative, rather than the eventive, interpretation—the nonagentive, eventive interpretation being elicited with something like

> Pure oxygen slowly filled the space.

Events can be further subdivided—though we won't do so here, unfortunately, in spite of its relevance to the kinds of constructions a verb can appear in; a subclassification into activities, achievements, or accomplishments is found in Vendler (1957).

Baker, however, shows that a lot of work is needed to come up with a better definition. There are a number of features of verbs that should interest us here, given our concerns, i. e. with the mapping from concepts into language. The first issue shows up in the simplistic grammar-school notion of syntactic categories, which describe a noun as a "person, place, or thing" and a verb as that which names the "action". These of course aren't quite correct: *destruction* is a noun that names a particular kind of action, and *know* is a verb that describes a state (the state of having knowledge of something) rather than an action; and we saw a moment ago (83, p. 27) how the verb *fill* can describe a state rather than an event. Nonetheless, these highly approximate associations have gotten some attention for their possible psychological significance: within theories of language acquisition, the notion of semantic bootstrapping (Pinker 1984) relies on hypothesized innate associations like the above as a guide to the learning of language.

On the practical matter of identifying syntactic categories, Pullum (2004) makes the nice point concerning nouns (and pointing further to Huddleston and Pullum (2002)), that in trying to decipher an unfamiliar language, searching for the words that name persons, places, or things is a good way of looking for examples of the category noun; but the converse (that a noun is a person, place, or thing) doesn't hold, as we have just seen. The situation with verbs is more complicated though, since, while looking for words that name events might also be a good first stab at finding a possible verb, it will sometimes get you a noun like *destruction* instead. For many languages you can refine your search by looking for evidence of affixes on the potential verbs; thus in English, one would hopefully eventually figure out that *learn* gets marked as a verb in some sentences by virtue of the endings like *ing*, *s*, and *ed*, as in

(85) Jill is learning French.

(86) Jill learns new things easily.

(87) Jill learned about that yesterday.

(Though these things aren't foolproof either, of course.) And there may be other formal criteria that could delineate what a verb in a particular language is, according to a particular language (the main verb of a Japanese sentence being at the very end, with just a couple of exceptions—to take the simplest example). Thus, Fromkin and Rodman (1993), in giving a purely structural definition, were being quite reasonable, though circular.

And in fact, Baker (2005) gives a structural definition: verbs are simply the syntactic category that takes an external argument. (Or more precisely, they have a specifier, above p. 21.) Certainly, for us, argumenthood is the key thing: the fact that the concepts expressed by verbs may need more than one argument is one of the things that makes possible the complications in argument realization (and polysemy) that (we claim) will allow us to discover interesting things about the way concepts are encoded. Prepositions take arguments, too; but to us they are not nearly as interesting for a couple of reasons. First, the overall syntactic environment

available to a preposition is simpler than a verb's—possibly much, much simpler. Semantically, many prepositions seem to take two or ever three (logical) arguments: they can be used to express the notion that one element is *in*, *on*, *over* or *under* another element, etc., or that one element is *between* a second element and a third. The second and third elements are expressed as a single phrase, however—*between* [*the bookcase and the wall*]—thus they're a single 'internal argument' syntactically speaking, i. e. the complement of the preposition. By comparison, we shall see (Table 3.2, p. 60) at least a dozen different kinds of cases where many, many verbs similarly express two logical arguments as a single syntactic (internal) argument; but in each of those cases they have an alternate way of expressing things, in which the two logical arguments are given as distinct syntactic arguments (possibly). (We say 'possibly' because if we were to follow Baker (2005), we would call some of the 'arguments', given in Table 3.2 as PPs, obligatory adjuncts instead.) Baker even argues that, unlike verbs, prepositions really have no specifier: something like *We found* [*the book (to be) difficult*] is considered to contain *the book difficult* as a small clause (Stowell 1983) even when the verb *to be* is omitted; Baker argues something similar for *the book on the table*. (I. e. there's an unpronounced predicative element before the PP *on the table* without which, according to Baker, the PP wouldn't be able to modify *book*.)

In any case, a second property of prepositions renders the issue of their precise syntactic nature considerably less important: they're a closed-class category. I. e. there are only a small, fixed number of them. Language users don't routinely invent new prepositions the way they invent verbs and nouns, for instance. (Take a couple of common words to name, say, a new shipping company, form a one-word abbreviation for that name, and the result can often easily be a new verb: *they decided to fedex the package.* See Levin's (1993) Class 11.1 verbs.) Computationally, then, prepositions (and postpositions) are not as interesting.[17]

[17]The complications we saw earlier in the different ways of decomposing a verb's meaning also arise with the concept expressed by a verb combined with a preposition. There may be other ways of 'cutting up' the concept (or: of labeling it in words), as can be seen in the following sentences, (rough) paraphrases of one another:

(1) They went across the bridge on foot.
(2) They crossed the bridge on foot.
(3) They walked across the bridge.

Three core semantic elements expressed in each sentence (displacement, manner of locomotion, and path) are distributed across verbs (*go*, *cross*, *walk*), a preposition (*across*), or an idiom (*on foot*) in different combinations.

For various reasons, decompositions like the above won't be available in all languages: languages differ in how they combine the core motion and manner of motion components of concepts (satellite- vs. verb-framed languages, Talmy 1985, as anticipated in other kinds of work, i. e. in the *chassé croisé* of Vinay and Darbelnet 1958, as Levin and Rappaport Hovav 1995 mention). In French, two of the above sentences are problematic; only the sentence using the verb *cross* (2) can be directly translated into French. (French really has no preposition meaning *across*.) Slobin (1996) found manner components were usually dropped translating from the text of a satellite-frame language (English) to that of a verb-framed language (Spanish). Incidentally, one can't assume

So what of the fact that nouns like *destruction* also name events? They take arguments, too. Compare

(88) Those invaders (Agent) destroyed the city (Patient), and it was shocking to witness.

(89) The destruction of the city (Patient) by those invaders (Agent) was shocking to witness.

The arguments of the verb (88) also can appear as modifiers of the noun (89). The real variety in argument realization appears with the verbs, however; and eventive nouns are often derived from verbs, as *destruction* is, i. e. from *destroy*. So our study will focus exclusively on verbs.

These last examples, however, being pretty close paraphrases of one another, remind us that there were additional things missing from our Prolog-style representations given earlier. A first approximate encoding of the above examples might be something like

(90) `shock(destroy(city, invaders), _)`

which might more directly represent something like

(91) The invaders' destruction of the city shocked everyone.

or

(92) The invaders' destruction of the city was shocking.

Note the demotion of *shock* from a direct verbal use (91) to an expression of an attribute of the destruction (92). We could expand the last example, and previous examples, to

(93) The invaders' destruction of the city was shocking to everyone.

bringing it more or line with the other one (91). (The _ is the standard Prolog variable that roughly speaking binds to anything, hence the interpretation here as *everyone*.) Note that the argument requirements of the verb *shock* seem to more strongly want the explicit expression of *everyone* (in 91), or of another phrase in its place; with the other realizations of the semantic representation it is easier to leave that piece of the concept unexpressed. Again, it's the verb that has the more complicated requirements.[18]

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that dictionary makers will warn users of these 'holes' in a language. Cassell's (Girard 1962) lists *à travers* as a translation of *across*; use that (mis-)translation, and you'll likely express the idea of going through something rather than across it.

[18]Actually, Levin lists *shock* as an instance of a verb that *doesn't* always need an object, giving the example *that movie always shocks* (Levin 1993, p. 38). So the difference here is a matter of degree.

As for the representations, we're still leaving out all sorts of details; we need something other

As one more example of the complications in the mapping from concepts into language, we should note that the syntax can have other, more drastic effects on what gets expressed. We're thinking about the forced appearance of an apparent argument where the underlying predicate wouldn't require one: e. g. from the apparent need in English (and French and German, but not Spanish or Italian, etc.) for an explicit subject. This causes a dummy word to appear in subject position, because the underlying predicate doesn't have anything it needs to express—as in *it's raining*, which logically might be considered a way of saying *rain is falling*, and thus given a comparable representation that *is* predicated of something, namely, 'rain' (i. e. `fall(rain)`)—though Jackendoff, for one, seems a bit reluctant to do so (Jackendoff 2002, p. 135). If we think of that as its structure, then, lacking any logical argument to express—the entity 'rain' is already named by the verb—a meaningless *it* appears in subject position of the sentence. This complication might be bigger than it seems at first. From one point of view, it looks like syntax in English (and French and German) may tempt us into thinking a verb takes an argument, when the underlying predicate might not really need one, at least hypothetically. (And the syntax may in fact cause the dummy subject to take on some of the properties of a real subject; Pesetsky (1995) and Chomsky (1981) argue that it is a quasi-argument, and Bolinger (1972) calls it an 'ambient *it*'.) From another viewpoint, it's clear that the lexicalization process is the real problem here: we are able to cover all of `fall(rain)` with the verb *rain*, even thought it has two distinct parts; the pronouncement *rain is falling* would be a perfectly direct reflection of that conceptualization, but the one we routinely give, *it's raining*, seems to obscure that (possible) encoding.[19]

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than the _ variable in

```
know(destroy(property, _), john)).
```

to represent forms such as:

John knows about the destruction of the property.

John knows that someone destroyed the property.

John knows that someone destroys property.

John knows about the event in which someone or something destroyed the property.

—all of which have crucial semantic distinctions—and of which language evidently supplies the means to make those distinctions (with *know* being special—there being a difference between events and knowing about the event, requiring an encoding of situations (Barwise 1981, Barwise and Perry 1983) or events themselves (Higginbotham 1983, Davidson 1967).)

And of course, the possibility of nominalization exists here, too:

John's knowledge of the destruction of the property bothered him.

John's knowledge of the property's destruction bothered him.

```
bother(john, know(destroy(property, someone), john)).
```

[19]See Baker (2001, p. 39) for some discussion of the rich syntactic consequences of the dummy subject (also apparently parameterized in language), especially as it can be linked to cross-language differences, depending on whether one needs an overt subject (as in English) or not (as in Italian):

Chi credi che verrà?
Who think-you that come-will?
(Who do you think *that will come?)
(Chomsky 1981, Perlmutter 1971, Rizzi 1982, Kayne 1984)
—the word *that* being obligatorily supressed in English.

Chapter 2

The extent of the mapping

Given that thousands of lexical entries are affected, and in (seemingly) individual ways, the complications in the expression of concepts that we introduced in the preceding pages would, if widespread, certainly make things (appear) messy: words have multiple meanings, thanks to polysemy, and semantically similar words can appear in completely different syntactic configurations, thanks to variations in argument realization—which is really just a one instance of how more-or-less identical concepts can be 'cut up' by language (i. e. have their parts map into language) in different ways. (The reader who—reasonably—is skeptical of just how widespread these divergences are, given the data we've presented so far, will get a lot more data in the next chapter.) From a computational viewpoint, however, this messiness by itself could simply make things far less interesting: if things really are just random, they just have to be stored in the lexicon, arbitrary piece by arbitrary piece.

Except, of course, it isn't clear that things like this could ever be 'just random', as we noted—given the existence of semi-regular patterns, among, for instance, the irregular verbs. So we're back to the question of the degree to which things are more than just random. And those semi-regular patterns (if that's what they are) are, we will argue, a big piece of the puzzle. Or rather, the relationship between two big parts of that puzzle-piece—namely, the patterns in argument realization and in polysemy—is a crucial clue, as we will show, to the degree to which native speakers of a language can extrapolate beyond the individual word-behaviors they are most familiar with, thus potentially providing evidence of the productive processes that might lie behind the apparent semi-regularities. In this chapter, we'll look a bit more deeply into some of the issues concerning those possible regularities, and at words themselves, and their meanings.

2.1 Productivity

We suggested earlier (p. 26) that we could think of polysemy as the re-use of words for semantically similar concepts. We might also think of the syntactic patterns in which words appear as if they were frequent candidates for re-use. At first this seems silly or naive, especially in light of the work leading to X-bar theory, and more-or-less building on it, which strives to understand the larger syntactic patterns in terms of

their more basic components and combinatory principles—though nowadays this 're-use' of patterns might also be seen as something akin to the constructional approach taken in certain language acquisition work (i. e. Tomasello 2003, with the possible caveat that the constructions are originally associated with particular words, etc.). In any case, simply as a matter of convenience, it may be useful to think of things in that way, at least initially, given the way that verbs seem to 'share' different constructions. The link to language acquisition, justified or not, is also interesting in light of the behavior of mature speakers of a language. Take for instance the verb *fax*, which is a fairly new verb (newly in widespread use, at least); one might imagine not so long ago that a speaker might have first heard it being used in a sentence such as

(94) He faxed that resume to at least a hundred companies.

By a sentence 'such as' the above, we mean one where a particular element of the underlying concept—here, the entities that are being the faxed the documents (we'll consider it another instance of a `Recipient` argument)—are always named in a phrase headed by a particular word, namely *to* (i. e. *to at least a hundred companies*). Even if you had only heard the word *fax* being used in that way, one can reasonably predict that you might find yourself saying sentences like either of the following

(95) I faxed them the document yesterday.
(96) I faxed the document to them yesterday.

even though the ordering of terms in the second part of the sentence is inverted, and in the first sentence (95) the word *to* is missing. As a native speaker of English, you probably know (seemingly intuitively) that this other way of expressing the elements of the sentence is available, even if you have never heard it being used with the word *fax*. (One's personal intuitions about the productivityof the construction (95) can't be trusted, of course, since the verb is probably already familiar in that construction. Recall, though, that verbs like *fax* can be made up on the fly (as with *fedexing a package*, see p. 30), and when these made-up verbs can appear in the construction (95), the possible productivity of the above example with *fax* follows immediately.)

And yet this construction is not available for just any verb—

(97) *She said him something.
(98) She said something to him.

—the first construction (97) being one that a native speaker of English would not normally use with the word *say* (nor, of course, its (irregular) past tense form *said*). ((97) is to (95) is to (98) as to (96).) It's an instance of 'Baker's paradox' (Baker 1979, and earlier Green 1974) as described by Pinker (1989).

In other ways it is taken for granted that a language has highly productive ways

of combining various elements into larger structures, in order to express more and more concepts; language makes 'infinite use of finite means' (von Humboldt 1836 as cited by Chomsky 1965). There are a number of ways in which one can pile up certain kinds words or phrases, without any fixed limit, to create ever-large phrases. In the area of suffixation, there are straightforward cases of productivity, too (in this case creating new words of a finite number of affixes, though); as soon as a native speaker of English hears someone saying that they had *just faxed a document*, without even knowing what it means to *fax* something, they might immediately be able to say e. g.—

(99) Are we going to be, er, 'faxing' other things later?

—the *+ing* suffix (underlined below) being fully productive, attaching to all English verbs to give the progressive form (even for the verb *be*, with all its other irregular forms, italicized below):

(100) I *am* being careful. I *was* feeling sarcastic.
(101) She *is* saying something. She *was* noticing the effects.
(102) You *are* looking better. They *were* seeing stars.

The problem now is that with something like the English past tense suffix (+ed), deviations that block its application are limited—only about 130 of the thousands of English verbs have an irregular form, i. e. one not formed simply by adding +ed (Pinker 1998). Thus there is a clear case of an apparent default rule (which isn't fully productive, unlike the +ing suffix), and a handful of exceptions.

In any case, the (apparent) idiosyncrasies we will be looking at (distinguishing e. g. *fax* from *say*, according to the constructions they appear in, as above) are clearly more complicated: they're spread over so much of the data that the rules that come to mind often have a limited application, and it may seem like much of what we want to handle are just 'exceptions' to those rules (if 'rules' is even the right term); each verb (as we've been promising) is close to unique.

And yet we will indeed be arguing here that the level of productivity in language has been under-estimated up until now. Certain mechanisms that are thought to be only semi-productive might actually deserve to be considered, with important caveats, fully productive. (The problem is that productivity is necessarily defined with respect to particular conditions; if the conditions are given too broadly, then the mechanism will appear to be only semi-productive. The above examples show that it would be patently false to say, regarding the oblique dative dative construction (which is what is being used in 96), that all that all verbs expressing their arguments in that construction also use a double object construction (used in 95); what about all such verbs that don't sound latinate? Closer to the truth (discussions in Pinker 1994), but still not completely true. Should we conclude that this is something that is only semi-productive? We really aren't in a position to support that yet—all we really know for sure is that we don't yet know how to form a productive

rule.)

2.2 A connection?

So verbs vary in the way they realize their arguments, vary in the range of arguments they take—sometimes reflecting a subtle variations in meaning (due to polysemy), as between a stative sense of *fill* (e. g. 103) and a nonstative one (104)—

(103≈83) The audience completely fills the room.

(104≈40) The audience quickly filled the room.

—and nonetheless the verbs may exhibit patterns in their behavior (more on this in subsequent chapters) that suggest that there are productive forces behind this.

We have presented examples of these phenomena (argument realization, polysemy, and productivity) as if they were essentially complications in the mapping from concepts to words—and we've only begun to show just how messy that mapping can appear; in fact, though, we are going to attempt to show that there is a way of looking at the first two phenomena (argument realization and polysemy) such that it will become apparent that, together, they offer evidence of a hidden systematicity, for which (we will argue) a very nice and reasonable explanation exists: namely, that there are mechanisms underlying those phenomena that are in fact highly productive.

None of which is intended to suggest that the idea is new that, taken together or viewed separately, argument realization and polysemy can offer clues to the way language works; on the contrary, lots and lots of work in linguistics in recent years implicitly takes that to be the case. Comparisons of the different range of arguments that a verb takes, the general meaning of the verb with the different arguments, and how those arguments are realized, is standard practice, especially for people looking at lexical semantics and/or the interface between semantics and syntax; we'll see some examples of this from Levin (1993), Levin and Rappaport Hovav (1995), and Jackendoff (1990). But the degree to which such connections can be systematically found (specifically, between the range and type of arguments a verb takes, and how they are realized) does not seem to have been properly studied. There are substantial attempts to regularize the system; a late chapter of Jackendoff (1990) specifically is aimed at trying to make his lexical entries as 'minimalist' as possible—'minimalist' entries being, in this context, ones that specify phonological structure, part of speech information, conceptual structure, and nothing else. (Thus verb argument realization would have to following automatically from those minimalist elements, i. e. mostly from the conceptual structures, i. e. the meaning of the verb.) But in general the productivity of systems proposed are judged only with respect to a handful of particular mechanisms; Jackendoff himself concludes, as we shall see, that a lot of stuff just needs to be stipulated in the lexicon. Levin and Rappaport Hovav (1995) make similarly pessimistic statements, suggesting w. r. t. e. g. *bleed* and *burp*, as we

saw earlier, that the causative uses

(105=10) The doctor bled the patient.
(106=11) The father burped the baby.

are simply idiosyncratic—not the result of some regular process. One thing that seems to be lacking is a *broad-scale* look at how often things are idiosyncratic, and when they are, how deeply so—an important issue for anyone trying to store the necessary information on a word-by-word basis for the thousands of words of a language, and trying to build all the right machinery on top of all those lexical entries.

Levin's categorization of verbs (Levin 1993), the data of which forms the basis for the present work, is largely based—almost entirely based, for the first part of Levin's book—on divergences in argument realization or polysemy. Levin presents a number of divergences such as the one we just gave above comparing *fax* and *say*; here are the examples again with a few more verbs inserted.

(107≈95) I faxed/mailed/sent/... them the document yesterday.
(108≈96) I faxed/mailed/sent/... the document to them yesterday.
(109=98) She said/stated/asserted/... something to him.
(110=97) *She said/stated/asserted/... him something.

Levin then lists other verbs of similar (or not so similar) meanings that behave similarly with respect to that divergence. (We'll introduce more of Levin's comparisons in the next chapter.) Levin focuses on apparent semantic commonalities, which is reasonable, because there is an assumption that there is a strong degree of semantic determination to the way verbs behave; but the data seems sufficiently messy that just how strong a factor semantics is, and how it plays out, has been hard to define.

But that focus, we suspect, has led to something being missed. If semantics forms an essential, if hard to delineate, basis to argument realization *and* patterns of polysemy, other questions should arise, which might be easier to (partially) answer. Such as: what is the 'general shape' of the relation between argument realization and polysemy? I. e., to what degree are divergences in the one reflected in the other? The latter question is especially interesting for one very practical reason: it should be possible to figure out more-or-less the degree to which the divergences in the two phenomena correlate with one another without first solving the much more difficult problem of how both the phenomena actually operate. That idea, and its follow-through in the pages that follow, is the contribution of this thesis.

We introduced our hypothesis connecting these two phenomena in Fig. 1.1, p. 6, but without naming the phenomena; we've also been more-or-less presenting the connecting data points of the two phenomena in many of our examples, but usually without making the connection explicit. *Put* and *fill*, we saw, seem to diverge in argument realization:

(111=37) They put clothes in the bags.
(112=40) They filled the bags with clothes.

(We say they *seem* to diverge because, as we discussed earlier (Sect. 1.2) we don't really know if we should consider them as expressing the same types of arguments, as far as argument realization is concerned, e. g. {`Agent`, `Theme`, `Goal`}, or somewhat different arguments (e. g. `Goal` *the bags* vs. something like `Goal-Path` *in the bags*).) We also saw that the verb *insert* patterns more like *put* than *fill*:

(113=41) They inserted the cards into the slots.

(114=42) *They inserted the slots with the cards.

As it happens, these verbs pattern differently in polysemy, too. *Put*, like *insert*, and like *pour* (from Fig. 1.1), lacks a stative sense comparable to *fill*'s.

(115≈83) Air (completely) fills this space.

(116) *Air completely pours this space.

(117=84) *The card inserts this slot.

(118) *The card puts this slot.

As the reader will have gathered by now, we are arguing that this is not just a coincidence. From the data we will present in the chapters that follow, and our subsequent analysis, we will argue (Sect. 5.3.1) that all such divergences will be accompanied by a similar correspondence, given the appropriate notion of what a divergence is (and some careful consideration of what a 'similar correspondence' is). This is our 'Rule of co-occurrences'.

2.3 Polysemy, homonymy, and synonymy

Our prior discussions of polysemy touched only briefly on an important complication: though a verb's behaviors may appear to diverge because it can be used to express slightly different concepts, it's also possible that the concepts it expresses are essentially unrelated, sharing the same name effectively by accident. We gave the example earlier of the two words given as *hail* (p. 26); another example is the word that refers to a certain action of attaching, possibly involving the use of small nail-like hardware, vs. the one involving maneuvering a sailboat—both actions known as *tacking*. Thanks to these complications, we will sometimes have to decide whether we are dealing with two senses of a verb expressing different arguments, or two different verbs that are really unrelated (except by their pronunciation and/or spelling); in the latter case we can basically ignore any differences in argument realization, since we have no particular reason to expect two semantically unrelated verbs to behave the same. The curious reader can take an early peek at Appendix A (pp. 123–126) for a particular list of such verbs; they comprise the (relatively small) portion of Levin's (1993) set of 3000+ verbs which (we decided) we could not reasonably take as being semantically related, given the main task of this research; first, however, there are a few definitions that we need to present.

2.3.1 Mapping from labels to words to senses

At first glance, then, the mapping from concepts into language would seem to be many-to-many: thinking now in terms of the written forms of words for concreteness, we have verb pairs spelled with the strings *rob* and *steal* that seem to map to the same concept, while different concepts—i. e. slightly different senses of a word, or totally unrelated concepts—can map to the same strings, as we just saw in the case of *hail* and *tack*. Viewed from one direction (and attempting to directly reuse the traditional terminology), we could focus on the different concepts that just happen to be expressed with the same word (they're homonyms, having the same name); or from the other direction, we could focus on the single word that gets attached to different concepts—i. e., different meanings (thus the word is polysemous, having multiple senses). But worked out in detail, it's really more complicated than just a many-to-many mapping. First, we will follow here the convention of positing an indirect mapping, from names to an abstract thing, and from the abstract thing to concepts; the abstract thing might in fact be considered the word. Homonymy and polysemy are then two completely separate mappings; homonymy, 'coming first' in Fig. 2.1, being accidental (mapping from labels L_i to words W_j), polysemy being potentially regular (mapping from words W_j to the senses whose expression is represented by the edges going to the different S_k). One can infer from the picture that what we are thinking of here as 'labels' (L_1 and L_2 in the picture) can be considered simply the spoken or written forms of words. Thus W_2 and W_3 are two words (homonyms) that just happen to have the same pronunciation L_2 (perhaps *tow* and *toe*, to give another example); or possibly the same spelling (like the *bank* you trust your money to, vs. the *bank* that lines a river). The edges leading to S_1 and S_2 represent the expression of the two (polysemous) senses of W_1 (with edges to S_3 and S_4, similarly, representing the expression of the senses of W_3). The C_j represent the particular ways in which verbs realize their arguments. To present another example divergence: suppose, for the sake of the argument, that *cover* and *lay* share an S_k that simply represents the putting of something somewhere—or perhaps, more narrowly, the putting of something on top of something; then they would have distinct C_j, since they realize that putative S_k differently, as the following examples show.

(119a) *They covered the blanket over the child.
b) They covered the child with the blanket.
(120a) They laid the blanket over the child.
b) *They laid the child with the blanket. (Intended to = 120a)

Note the extra verbiage in the previous paragraph about 'expressing the senses of W_j'; we did not simply say that the S_k *are* the senses of the various W_j. This is because it isn't completely clear what the formal definition of a sense should be here; and there are further complications stemming from the notion of of synonymy, which we've also attempted to represent in Fig. 2.1. Merriam-Webster's Collegiate Dictionary (1993) defines synonyms simply as words that mean the same or the nearly the same thing (in one or more of their senses); this is, for us, a definition that is both useful and problematic. It's useful, because one of the fundamental

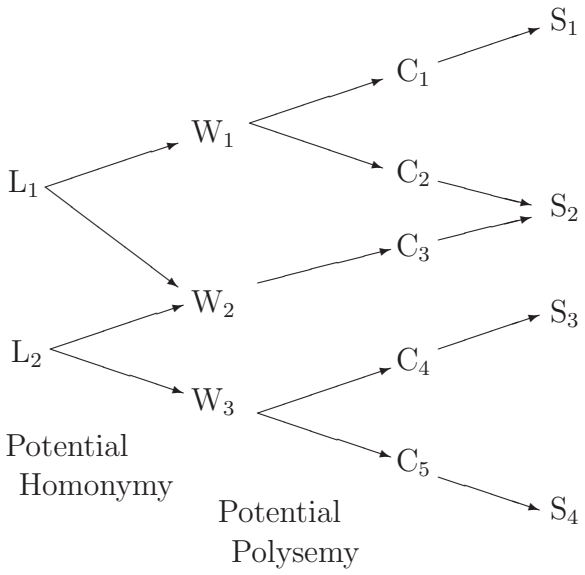

Figure 2.1: Homonymy vs. polysemy. Homonymy potentially appears in the mapping from L_i to W_j, i. e. whenever an L_i maps to more than one W_j; polysemy, similarly, appears in when a W_j maps to more than one S_k. Each C_j represents the realization of an S_k by the adjacent W_j.

problems that led to this research is, obviously, the existence of verbs that mean nearly the same thing, but realize their arguments differently; in the extreme case, and in a particular formulation that we will describe in a moment, two verbs could be considered, in a kind of deep way, to be identical in meaning—and thus it could be convenient to describe them as instances of true synonymy. But it's also useful to be able to say that true synonyms can be used interchangeably; yet, given that the verbs that we are interested in are the ones that mean nearly the same thing but express their arguments differently, they by definition they can't be used interchangeably. We showed this in our example with *rob* and *steal*:

(121=14) They robbed the bank of $1,000,000.
(122=15) *They stole the bank of $1,000,000.
(123=16) They stole $1,000,000 from the bank.
(124=17) *They robbed $1,000,000 from the bank.

We've been coming back to this example precisely because the two verbs really do seem to express the same event (again, the defense of this claim is coming up shortly); the other thousands of pairs we could have chosen from will tend to have more obvious differences in meaning. For example, we saw *fill* and *pour* diverging in their argument realizations (Fig. 1.1, p. 6), and chose them because they can in fact be used to describe, though in a different way, the same event; but we clearly wouldn't normally call them synonyms, given the difference in the aspects of the event that they pick out (i. e. with *fill* saying something about the placement and configuration of one entity with respect to another, and *pour* describing something about the manner in which some substance is moving—e. g. it's *pouring* out of one location and into another).

There are, on the other hand, other sets of verbs that one also wouldn't normally describe as synonyms, and yet there might be good reasons for doing so, because they seem *not* to diverge in their argument realizations (at least as used here), apparently because they also express something quite similar:

(125) $\underbrace{\text{The workers}}_{\texttt{Agent}}$ { coated, covered, edged, encircled, filled, framed, lined, littered, padded, surrounded, ⋮ } $\underbrace{\text{the device}}_{\texttt{Goal}}$ with $\underbrace{\text{new material}}_{\texttt{Theme}}$

With examples like this we can stress what is—for us—the utility of thematic roles, or θ-roles. Sets of them may appear to be an odd (if traditional) way of looking at the meaning of the verbs themselves; but note that such sets (θ-sets), though they might seem at first like the 'negative image' of the verb's meaning—they represent a semantics in terms of the elements that have to appear with the verb, not the verb itself—nonetheless, because they define the *roles* of those elements when used with the verb, they indirectly say something about the meaning of the verb, too. The particular set of θ-roles shown here ({`Agent`, `Goal`, `Theme`}) shows that they capture something that each of these verbs has in common (all of them are from Levin's (1993) verb class number 9.8, the *Fill* Verbs; we'll return to the notion of a verb class later). Each of these verbs refers (as used here) to some entity (the `Agent`) putting something (the `Theme`) into (roughly speaking) a particular configuration with respect to some other object (the `Goal`); but the particular 'configuration' depends on the particular verb.[1]

In fact, we can think of θ-sets (like {`Agent`, `Goal`, `Theme`}) as being a kind of generalization of a verb's meaning. Given a set of verbs that realize a θ-set in the same way (as e. g. in 125), we could even think of those verbs as being 'generalized synonyms'; all of verbs listed above (125) have obvious differences in meaning, but at the level of generalization specified by their θ-set, they are identical, and since they realize that θ-set in the same way, they might also be considered truly interchangeable—at that same level of generalization, that is; i. e. one might be able

[1]This particular θ-set doesn't by itself imply that there need be any such configurational component to the concept expressed. (Cf. *put*, which we earlier gave the same θ-set to.) A constructional approach (Goldberg 1995, Fillmore and Kay 1995) might simply assert that there is a construction giving that order to the θ-set that imparts that configurational component of meaning to the concept expressed whenever that construction is used by verbs with the right (usually semantic) components. We'll define more precisely what we mean by a construction later, but we are using the term only as a convenience—essentially, as something that gives structure to a θ-set.

to ignore the difference between, say, coating something and filling something, if one were only concerned with the putting of something (i. e. the `Theme`) somewhere with respect to something else (i. e. the `Goal`). This 'generalized synonymy' might be especially appropriate for the L_j that label a particular W_k, since in this case all of the θ-sets for the W_k would be realized the same for each of the L_j; i. e., the L_j are interchangeable in all of their senses (under this highly generalized sense of meaning). We will in fact produce a number of such cases in the work that follows, because with our system of delimiting the senses we will intentionally ignore distinctions that seem irrelevant to the way the arguments of the verb are realized syntactically.

The case of *rob* and *steal* is interesting in a different way. Here, as we've been claiming (starting on p. 14), the level of generalization is not really an issue: whether we use general roles (`Agent`, `Source/Patient`, `Theme`), or extremely specific ones (`Thief`, `Source/Victim`, `Loot`), *rob* and *steal*, we claim, are going to get the same roles. This isn't a logical necessity, of course, but one that follows from the use we are making of the θ-roles: we have to try to identify the differences between concepts independent of their realization in syntax, else those realizations in syntax will end up biasing our characterizations of the semantics. This can be seen by looking at verbs being used without all their (semantic) arguments expressed. Compare for instance:

(126a) They robbed me.
b) They stole from me.
(127a) They stole something from me.
b) They robbed me of something.

From first appearances at least, it looks like it might be easier to find potential semantic differences between the first pair (126a/b, with `Theme` unexpressed) than the second pair (127a/b). One might wonder, for instance, if the argument realization requirements of *steal* somehow produce sentences that more strongly bring out the `Theme` regardless of whether it is absent (126b) or not (127a): the first sentence (126b), continuing in this line of thought, might seem to open up the possibility, in a way that first *rob* sentence (126a) doesn't (though further testing would need to be done to confirm this), that the theft might have been habitual. (Compare, too, the following sentences—

(128) They robbed me for weeks.
(129) They stole from me for weeks.

—in which one can almost get a continuous reading with the first sentence, 128, but less so, perhaps, with the second, 129). Alternately, the first *steal* sentence (i. e. 126b) might open up, in a stronger way, the possibility that more than one thing was stolen. The other *steal* sentence (127a), by comparison, explicitly specifies, in a way the earlier sentences (126a/b) don't, that it was just one thing that was taken. Either way, should something like this be right, the *steal* sentences would seem to put a focus on the `Theme`, rather than the `Source/Victim`. And a similar line of thought might suggest that *rob* puts a focus on the `Source/Victim` rather than the `Theme`. But why do such impressions come to mind? Things become clearer if one tries

to introspect on the infinitive forms *to rob* vs. *to steal*. Of course a native speaker of English can feel a difference: the noun phrase that *rob* realizes as its object is the (often human) (`Source`/)`Victim`, whereas *steal*'s is just a (typically inanimate) `Theme`. One's knowledge of the syntactic requirements of those verbs automatically makes them seem different. And there may be strong statistical differences, too, with *rob* perhaps appearing a lot with just the `Victim` but not the `Theme`, and vice versa with *steal*. But we want to know if there is a difference in the event being expressed by these verbs. For the *Fill* Verbs from Levin that we listed above, there are obvious differences: *filling*, *covering*, *surrounding*, etc., are all different events, and an event that is one of those can't necessarily (or even typically) be described as any of the others. But a *robbing* event is also a *stealing* event, and vice versa. Arguably, it isn't even a matter of picking out different aspects of the event. While *pouring water into the tank*, or *filling the tank with water*, might be used to refer to the same event, they *are* obviously picking out, and leaving out, different aspects of the event (and we gave them a moment ago: it's the manner in which the water flows into the tank—*pouring in*—vs. the end-state configuration of the water in the tank—the tank becoming full of the water); *rob* and *steal*, both used with all their (logical) arguments, i. e. `Agent`, `Source/Victim`, `Theme`, are picking out the same features of the event, and at most putting a bit more focus on one feature over the other.

The extent to which these effects of syntactic expectations 'infect' our impressions can be seen with another verb pair: *buy* and *sell*. These are conventionally considered opposites. Yet when we consider them with the above discussion in mind, something surprising happens: they turn out to seem no better as opposites than *rob* and *steal*, which normally might not be considered opposites at all; furthermore, with the sloppy definition of synonymy we gave above (i. e. two words that mean more or less the same thing), *rob* and *steal* might be loosely, if misleadingly, considered synonyms (sloppily, since they are not interchangeable), and *buy* and *sell*, it turns out, along that sloppy train of thought, will appear as even better synonyms—a seemingly bizarre result. But consider some possible θ-roles for *buy* and *sell*:

(130) $\underbrace{\text{Our neighbors}}_{\texttt{Buyer}}$ bought $\underbrace{\text{a used car}}_{\texttt{Theme}}$ from $\underbrace{\text{the local dealership}}_{\texttt{Seller}}$ for $\underbrace{\$10,000}_{\texttt{Theme}}$.

(131) $\underbrace{\text{The local dealership}}_{\texttt{Seller}}$ sold $\underbrace{\text{our neighbors}}_{\texttt{Buyer}}$ $\underbrace{\text{a used car}}_{\texttt{Theme}}$ for $\underbrace{\$10,000}_{\texttt{Theme}}$.

Like *rob* and *steal*, the verbs *buy* and *sell* appear to be expressing exactly the same event, picking out (in the sense we used above, and in the full-blown expression of their logical arguments) the same features—though presenting them in a different order. In fact, if we were, contrary to the arguments above, to consider *rob* more of a verb affecting its object than a verb of removal, and vice versa for *steal* (as in Section 1.2), than *rob* and *steal* would seem to be farther from synonymous than *buy* and *sell*—though, again, since neither pair is syntactically interchangeable, labeling

them as synonyms at all is problematic.

To capture what is essential here, given our focus on θ-roles (and alluding to the use of the symbol θ as—sometimes—a shorthand for thematic), we'll call pairs like *rob* and *steal*, or *buy* and *sell*, thematically identical verbs. For verbs like *fill*, *cover*, *surround*, etc., we'll avoid that term, even though they may have identical θ-sets, given the obvious semantic differences that might in principle be used to distinguish them. We'll call them thematically *similar* instead, with the implication that any appearance of thematic identity for them, in any particular analysis, is an artifact of the level of semantic generalization in play in that analysis, rather than a fundamental (thematic) identity as found with *rob* and *steal*, and *buy* and *sell*.[2]

2.3.2 Senses or words

We will close Section 2.3 with two more notes about the distinction between polysemy and homonymy. The previous picture diagrams a way of talking about things (distinguishing "those are two different senses of the word" from "those are really two *different* words that just happen to be pronounced the same"); and it shows that there are some differences we should want to try to account for (they're instances of putative polysemy) and others we should try to ignore (they're instances of a random process, i. e. homonymy). In practice the distinction between polysemy and homonymy can be hard to make. And it depends on exactly how those productive and (we claim) largely semantically based mechanisms that we are investigating here turn out to operate. Thus, whenever possible, we will try to imagine that polysemy, rather than homonymy, is involved, and posit homonymy, rather than polysemy, only as a last resort. And we'll list in Appendix A, as we mentioned, those words we decided to treat as homonyms; i. e., words that are 'pronounced the same' but seem too dissimilar semantically to be seen as senses of a single word, at least in the system that we will be developing.

And whenever we refer to a word, or the category of word that is most important to us (i. e. the category Verb), we'll tend to mean it in this technical sense of the abstract thing that can have more than one sense (thanks to polysemy), and in the extreme case might be written or spoken in more than one way (if we consider 'generalized synonymy').ctually, we'll be dealing with an even narrower sense of pol-

[2]Again, this is not to say that, as a matter of logic, a different theory of argument realization couldn't choose to label the θ-sets for *rob* and *steal* differently; perhaps as something like {`Agent`, `Patient`, `Theme`} and {`Agent`, `Source`, `Theme`}, respectively, thus explaining away their different realizations. (Their argument realizations don't technically diverge in this case, since their θ-sets differ.) The distinct, Prolog-like, conceptual structures we gave them earlier (Sect. 1.2) suggest exactly those θ-set differences. But to provide such θ-sets in earnest, a theory would simply be describing the 'end result' of some putative process that allows a fixed event to be encoded in different ways, as if there were different types of events present; we're effectively trying to figure out what that putative process is, so to turn a single event into two different ones (only one of which, according to those θ-sets, involves a 'real' `Patient`) would—for our purposes—be tantamount to falsifying the data.

ysemy. We won't care much about a sense distinction, even if one might find it in a dictionary, for instance, if it should happen to be the case that the corresponding sets of argument types are more or less the same, and have identical realizations. For instance, PropBank (Palmer *et al.* 2005) gives several distinct entries for *move*. On the one hand, one of them covers a lot of ground, namely, what might be called the 'everyday' senses of *move*: it will refer to some entity whose location or position changed (132); or refer to the location to which such an entity (or entities) moved (133); or refer to another entity that directly brings about such events (134); it might refer to a change-of-location event that exists, say, in time rather than space (135).

(132) Suddenly, the so-called statue moved.

(133) The guests moved into the adjacent room.

(134) We moved the furniture.

(135) We moved the meeting to the following day.

There are four distinct sets of θ-roles being used here, thus, by our (simplifying) formalization, four distinct senses. On the other hand, PropBank provides a distinct entry for a sense of *move* that they describe as one of attacking; something like

(136) They were determined to move against their opponents while there was still time.

Now, *against* is commonly used to introduce an entity that some sort of force is being applied to—perhaps even systematically used that way, judging from examples in Levin (1993). Whether or not we want to call this a distinct sense, however (i. e. 136 distinct from 133), given that they might use the same θ-roles, i. e. {`Theme`, `Goal`}, is going to depend on whether we need to do so in order to distinguish this verb *move* from others that use *against* similarly.

We'll see more of how this plays out in later chapters (especially Ch. 5), and at that point see the big practical reason we have for using sets such as {`Agent`, `Goal`, `Theme`} and {`Goal`, `Theme`}, referring to the arguments of a verb, to label the senses of that verb. For us, polysemy is (above all else) simply a process by which a verb expressing a set of arguments of certain semantic types can also be used to express something related in meaning, but requiring a different set of argument types.

2.4 More potential 'atoms' of language?

That we introduced tree structures in the earlier sections shouldn't be surprising in a work on language; perhaps they still seem out of place, though, since the present work otherwise presents only a minimal amount of material on syntax. Partly it was so we could introduce terms like NP, PP or VP. But we also had another motive for introducing them. Having introduced them, we can now refer to a 'working

metaphor' that we have kept in mind while doing our research, with which we will close this chapter.

It shouldn't surprise the reader to find out that, language being language, headedness—which is what distinguishes the structuring of words in English from Japanese—has its own complications. Baker (2001, pp. 82–83) points to German and the African language Nupe (citing Zepter 2000) as languages that are not perfectly head-initial or head-final (the appearance of verbs at the end of a German sentence being a clue that it might be head-final, inspite of having prepositions like (head-initial) English); and Baker cites Amharic (Amberber 1997), as a case where historical and geocultural reasons might partially explain why it is a mixed case. So even in this clear case of something that seems to be highly systematized, there are exceptions (though they are rare—Dryer 1992).

And yet, there's enough regularity there that Baker is comfortable constructing an entire book around a particular metaphor (Baker 2001), building on the history of certain scientific discoveries, and the structure of the corresponding phenomena, in a completely different field of inquiry. Baker argues that our current understanding of the range of possible languages (or language types) is similar to our scientific understanding of chemical compounds (and their makeup) prior to Mendeleev's (1869) prototype for the periodic chart of the elements. The head-directionality parameter, and several others, combine, or so Baker argues, following the Principles and Parameters theory (Chomsky 1981), to produce the various language types; but linguists are still early in the process of discovering the details of that system (or at least that's what the metaphor urges us to think). Similarly, until Mendeleev's time, various patterns of chemical behavior had been noticed (references in Baker), but it wasn't easy to to put forth the overall scheme or 'big picture' for the elements, which required getting past inaccuracies in contemporary atomic mass measurements and various gaps where elements had yet to be discovered—as well as just having the idea to try to put things in such an order.

The periodic table analogy also seems very appropriate for what we are trying to do here. We would have been strongly tempted to discuss the periodic table at length, along with the work of Mendeleev and others, interleaving it with discussions of the language phenomena we are focused on, highlighting in the process the strength of the analogy—if only that didn't mean stealing half a book from Baker.[3] Yet the analogy seems just as appropriate, if not more, for our topic; we are very tempted to suggest that at some point we might actually have the sort of understanding of the semantic elements that go into the meanings of words, and of the syntactic interactions, that would allow us (perhaps) to generate the verb types with the patterns that so far have been just barely recognizable. We won't actually be producing such a chart, though—far from it, in fact. Baker mentions

[3]Of course, the periodic table is probably a fertile ground for analogies. Jackendoff (1991) brings up the table to justify doing lexical decomposition regardless of whether one knows how far to go in the decomposition. (Have we reached the atom yet? the electron, proton, or neuron? the quark?).

that he hopes that his work might be seen as the linguistic version of the work that was a precursor to Mendeleev's, rather than of Mendeleev's itself, and our work is going to be even farther from Mendeleev's (taken metaphorically) than Baker's is. Through our analysis of the 3000+ Levin verbs, the essential theoretical goal of the current work is simply to show, in an interesting and rather indirect way, that such regularities that may eventually lead to something like a 'periodic system of the verbs' do in fact exist.

Interestingly, of the authors we will cite here who have something detailed to say about our subject (patterns in polysemy and argument realization), each of them at some point feels compelled to accept certain verbal behaviors as things for which no productive mechanism can be posited—and thus, they're things that simply have to be stipulated in the lexicon. Our argument, that there is a systematicity in the lexicon that has been missed up until now, is going to put a limit on such claims of idiosyncrasy.

Part II
Mostly on the data

Chapter 3

A tangle of verbs

We will attempt now to develop one of the *idées fixes* of the previous chapters, which so far has appeared and reappeared as a mere implication: that the differences between the handful of verbs discussed there (*rob*, *steal*, *go*, *move*, *be*, *pour*, *fill*, *fax*, *put*, *insert*, *say*, *bleed*, *burp*, *cover*, *lay*, ...) were truly symptomatic of (apparent) idiosyncrasies rampant across the lexicon. This implication is consistent with the claims found in the literature; for instance, Levin (1993) asserts that if she were to attend to every distinction between the (3000-plus) verbs she investigates, she might end up with verb classes of one member each; i. e. each verb would have been uniquely defined in polysemy and argument realization. (Instead, she assigned her 3000+ verbs to just 192 classes—a very small number, as we shall see.) Researchers who have chosen not to 'smooth over' various distinctions have indeed found verbs heading in the direction of uniqueness (Saint-Dizier 1996, Gross 1975, for French).

On the other hand, in grouping her verbs into just 192 classes, Levin is explicitly following the notion, which she has continued to express more recently, that there are 'semantically identifiable classes', taken to mean distinct classes of verbs of like semantic and syntactic behavior, following Fillmore (1970). (That there are such classes is something that has long been known, say Levin and Rappaport Hovav 2005, p. 1.) And though Levin doesn't hold her classifications to be the only reasonable ones for the sort of thing she is doing ("other, equally valid classifications schemes might have been identified", Levin 1993, p. 18—and we'll present a rather different one later), she also has an appendix elsewhere (Levin and Rappaport Hovav 1991) entitled 'How many *clear* verbs are there?" in which she expressly defends putting a particular number of verbs in her *clear* class (eliminating, in fact, *drain* from her own earlier (1993) classification). Pinker (1989), too, groups verbs in classes—broad and narrow conflation classes, depending on whether they are determined by his broad, or his more narrowly-tailored criteria; if one is to associate the narrow classes with something like the Levin classes, but make them truly sensitive to Pinker's narrow criteria (which might not have been his intent) there'd be a lot of classes of size one, as we shall see; actually, it seems unlikely that he would have wanted to bother with the notion of a narrow conflation class, if so many of them were to be that small.

Goldberg (2006, p. 56) writes that

> Verbs are occasionally quite idiosyncratic in the types of argument struc-

ture patterns they appear in.

As a major proponent of Construction Grammar (Goldberg 1995, Fillmore and Kay 1995), which came into existence at least in part because of an interest in the many apparent idiosyncrasies concerning constructions in language (Fillmore *et al.* 1988), Goldberg's comment is perhaps best understood as saying things are occasionally *quite* idiosyncratic even within a formalism intended to handle such idiosyncrasies. But it's still surprising that she would say that the verbs are only 'occasionally' that.

All of this is at best easily misinterpreted. Levin also says (Levin 1993, p. 18), regarding the possibility of having classes of only one member, that it would be "a state of affairs that would not provide much insight into the overall structure of the English verbs lexicon." But that doesn't mitigate the possibility that a classification that ignores data to fit verbs into larger classes, for whatever that may be worth, might also be creating something artificial, and be missing some very essential features; in fact, Levin acknowledges that "there is a sense in which the notion of 'verb class' is an artificial construct" (p. 17).

Here, then, we will begin to back up the notion that the apparent idiosyncrasies introduced in the previous chapter are in fact widespread, with the intent of showing, in later chapters, that a strong degree of systematicity can be demonstrated even with all the apparent idiosyncrasies included in the analysis.

3.1 Diathesis alternations

One of the things that makes all of this interesting (as well as rather complicated to straighten out) is the set of theoretical traditions that shape the typical presentations of the data from the very start. When it comes to the kind of polysemy we are interested in here—i. e. of the kind that seems to put the same verb in different syntactic configurations, with different types of arguments—one of the issues we face, especially given the work that follows in some way from Chomsky (1957, 1965, etc.), concerns the ways in which those different syntactic configurations might be related to each other. There are essentially two fundamental issues here. The first problem concerns the extent to which differences in the surface forms of two expressions, using (seemingly) the same verb, might simply be due to differences in the 'online' processes building the expressions from the same lexical entries. The second problem, which like the first has many different facets, concerns the properties of those lexical entries: the ways in which they differ from one another; and the possibility that some of the things that determine the nature of the online processes might also affect the ('offline') creation, and hence the ultimate nature, of the lexical entries.

A standard example of what we are calling an online process is the formation of question forms. In English, it's possible to ask a kind of question by simply

replacing the (typically) unknown element of the concept with a kind of variable, i. e. a '*wh*-word' (*who*, *what*, *where*, *when* ...):

(137) She faxed *what* to her former employer?[1]

But while this formulation of a question (*wh-in-situ*) is the general way of asking one in some languages (e. g. the Chinese languages), in English of course the normal procedure is to place the *wh*-word to the front of the clause—i. e. to apply *wh*-movement:

(138) What$_i$ did she fax t$_i$ to her former employer?

(with t_i marking the place where ϕ_i would otherwise be expected, for some constituent ϕ; e. g., it's the place where a constituent would be found for the corresponding yes/no question—

(139) Did she fax [the form] to her former employer?

And of course it's the place where the constituent would be found in the corresponding declarative sentence:

(140) She faxed [the form] to her former employer.

I. e. ϕ = *the form* in these last two sentences.) We can also take concepts expressed by earlier examples, such as *They robbed the bank* (p. 7), and embed them in other concepts, expressed, in systematically altered form, in larger sentences like:

(141) [The bank they robbed] wasn't well-guarded

—i. e. with a relative clause formation, in which there seems to be, in this case, and looking at things in a kind of Fregean way, a function ($f(x)$ = they robbed x) which is used (in 141) to refer to the bank of which f(the bank) is true.

English certainly provides productive means of arranging similar sets of words into somewhat different arrangements depending on the type of utterance one needs (a *wh*-question, a yes/no question, a declarative sentence, etc.); as we suggested earlier, a native speaker ought to be able to form the progressive of any putative verb immediately (e. g. *to be faxing something*, p. 36) even if the meaning of the verb is still unclear. It seems natural, then, to wonder if similar mechanisms, also similarly productive, might exist for cases where a verb has different ways of expressing a single set of arguments; at this point, by a 'similar mechanism', we merely mean a way of taking a single set of lexical entries (i. e. for a verb and its arguments) and combining them in different ways depending on what is needed, or most felicitous in a given context. In a few moments, in the first couple of subsections to follow (in Tables 3.1 and 3.2, pp. 58 and 60), we will list a fairly large number of examples of cases just like this (from Levin 1993), where the difference in meaning between the different ways of realizing a verb's arguments are often quite minor, and sometimes

[1]Compare the way one runs a program in Prolog: one presents a query, a form that usually will have one or more variables: the form `fax(sue,W,employer)` would be used to ask the Prolog system to return the set of `W`s such that `fax(sue,W,employer)` is true.

seemingly nonexistent.

Even if we adopt a theory that avoids transformations on syntactic structures per se (see Culicover and Jackendoff 2005 and citations therein), we're still going to want to deal with the possibility of having different constructions arising in some way from common semantic representations; and even if we go the other way for some verbs, and posit distinct lexical entries for the different argument realizations, we'll still want to understand how one gets from the underlying semantics, seemingly close to identical, to the different representations.[2]

Given our interest here in the lexicon, a more interesting apparent transformation of a sentence form occurs with the English passive, in which the realization of the verb's arguments appears to change.

(142) An unarmed man (Agent) robbed a large downtown bank. (Source/Patient)

(143) A large downtown bank (Source/Patient) was robbed (by an unarmed man (Agent)).

The object of the active sentence (142) moves into subject position (as in 143), its subject may appear in a prepositional phrase, or not appear at all, and a different form of the verb is required—the past participle, as used in the present perfect (italicized in 144, and in the passive form of that sentence in 145).

(144) Some unknown person (Agent) has *taken* all our money. (Theme)

(145) All our money (Theme) was *taken* (by some unknown person (Agent)).

Note that since this alternation is marked by the form of the verb, it is reminiscent of the Kinyarwanda alternation in Ch. 1 (25-26).

The passive is interesting because, at least in English, it also has verb-specific properties. Some verbs don't passivize, or do so only in some senses; expanding on an example given by Culicover and Jackendoff (2005, p. 59):

(146a) We expected/needed/wanted him to do well here.
b) He was expected/*needed/*wanted to do well here.
(147a) The police expected/needed/wanted him.
b) He was expected/needed/wanted by the police.

And some verbs are found only in the passive; Levin (1993) gives *reincarnate, ru-*

[2]Arguments for the existence of lexical rules by which certain lexical entries are created from others are given by Chomsky (1970) and picked up on by Jackendoff (1975) and Oehrle (1976); recent arguments for the formation of those lexical entries by mechanisms taken from work in syntax are given in Hale and Keyser's work (2002, 1997, 1993, 1992); See Wasow (1977) for where lexical rules belong, and where syntactic transformations; also Levin and Rappaport Hovav (2005).

mor, repute. Thus the English passive is not as free in its application as processes like relative-clause formation or wh-movement, but it's not as restricted as the alternations we are about to introduce, and none of them have special requirements for the form of the verb. It's an intermediate case.

Levin (1993), as we were beginning to see in the previous chapter, presents her 3000+ verbs largely by way of pairs of constructions—i. e. diathesis alternations, by the traditional name; examples include the dative alternation used by *fax* and *give* in the previous chapter (p. 38), but not *say*. Recall that we described the verbs *rob* and *steal* as having arguments that play the roles (speaking very specifically now) of `Thief`, `Loot`, and `Victim`; generalizing again over those roles, and taking into consideration the `Victim`'s role as both the affected entity and the source of the thing being stolen, we gave *rob* and *steal* and more general θ-set {`Agent`, `Theme`, `Source`[/`Patient`]}, the `Patient` being the affected entity; we put it in square brackets so we can use the same θ-set in a moment for verbs that, unlike *rob* and *steal*, don't imply that the `Source` argument also is a `Patient`.

(148) $\underbrace{\text{The thieves}}_{\texttt{Agent}}$ robbed $\underbrace{\text{their victims}}_{\texttt{Source[/Patient]}}$ of $\underbrace{\$1{,}000{,}000}_{\texttt{Theme}}$.

(149) $\underbrace{\text{The thieves}}_{\texttt{Agent}}$ stole $\underbrace{\$1{,}000{,}000}_{\texttt{Theme}}$ from $\underbrace{\text{their victims}}_{\texttt{Source[/Patient]}}$.

From now on, we will use the term θ-set to refer to not just any set of θ-roles, but one that defines the arguments of some sense of a verb.[3] And we will typically use argument to mean an argument of the apparent Fregean predicate that might be used to represent the verb sense—which as we've seen, need not correspond to the arguments required by syntax. We can use a vector to designate the construction with which a verb realizes a θ-set; it will include all the θ-roles of the corresponding θ-set, ordered according to how they appear in the usual declarative sentence of English (i. e. subject first, indirect object if present, direct object if present), and with other required elements like prepositions included. The following table shows the way *rob* and *steal* realize their (semantically identical) arguments.

	{`Agent`, `Theme`, `Source`[/`Patient`]}
rob	<`Agent`, `Source`[/`Patient`], *of* `Theme`>
steal	<`Agent`, `Theme`, *from* `Source`[/`Patient`]>

These two constructions (one for *rob* and and one for *steal*) do in fact form an alternation—not for *rob* or *steal*, but for the verb *clear*, the only one of the three verbs that uses both constructions:

[3] We avoid the conventional name θ-grid (Williams 1981, Stowell 1981) since it is typically used to name something more structured than a set, depending on requirements of one's theory.

(150a) Sue cleared her schedule of all unnecessary meetings.
b) Sue robbed her neighbor of $1,000
c) *Sue stole her neighbor of $1,000
(151a) Sue cleared all unnecessary meetings from her schedule.
b) *Sue robbed $1,000 from her neighbor.
c) Sue stole $1,000 from her neighbor.

Levin in fact names this alternation after the verb, calling it the *clear* alternation.

At first glance, Levin (1993) enumerates 80 alternations, listing in most cases (but not all) verbs that do or do not utilize the alternation, or that utilize only one of its constructions. Not all of the 80 alternations are really alternations; some of them are just single constructions (which may or may not have another implied construction with which they can alternate); and some of her alternations are 'better cases' than others. We can argue that in a couple of different ways. First, there's the question of whether or not there really is a productive mechanism causing a set of verbs that uses one construction to use the other construction as well. Levin and Rappaport Hovav (2005) exhibit an obviously reasonable reluctance to consider a pair of constructions a true alternation unless multiple verbs utilize it; but that doesn't stop Levin (1993) from listing an alternation used by only one verb—*blame* (see below). (Better understanding of the basis of argument realization could in fact show that it is perfectly predictable that a concept with certain components of meaning will use one construction, and that a concept with other components will use another construction, and that *blame* happens to fulfill both criteria.) Second, the composition of the paired constructions relative to one another also varies quite a bit, regardless of any theoretic considerations of how the one construction might derive, in any significant sense, from the other. Levin groups her alternations essentially according to syntactic distinctions: for more than half of them, she classifies them first according to to whether they change in transitivity (i. e., in realizing an argument as a direct object in one construction but not the other; Levin's Section 1); or, where transitivity, and realization of the subject, is held constant, according to differences in the way the internal argument are realized (Levin's Section 2). For a contrast, and the sake of some references to the data that we make elsewhere, we'll present the alternations in a rather different order. We'll take as our basic difference whether or not the alternation, in both its constructions, preserves the same number of logical arguments—i. e. the same number of entities participating in the event(s) or state(s) being expressed by the two constructions. (The same contrast is adopted by Levin and Rappaport Hovav 2005 in their chapter on multiple argument realization.) Where the alternations do 'preserve their arguments', this will often be a case where the constructions express more or less the same event or state (as with *clear* in 150, 151, above). The same number of underlying participants may or may not require the same number of syntactic arguments or adjuncts, however; for instance, two logical arguments may form single argument as a simple conjunction of noun phrases (152, underlined)—or not (153):

(152) Sue and Claire met for lunch.
(153) Sue met Claire for lunch.

(Levin's alternation 1.2.4, in our Table 3.2). As a sort of mixed case according to our main distinction (between alternations that differ mostly in how a fixed number of participants are realized in the syntax, and alternations that express different events or states, with a different number of participants), there are also alternations for which the number of logical arguments remain fixed, and one of them need not be explicitly expressed—but there is a crucial distinction regarding the event or state being expressed in that case. For instance, in

(154) Sue waved (her hand/the flag/the papers/the baton/...)

—(Levin's alternation 1.2.2, in our Table 3.3)—the things being waved can be almost anything, even something abstract (compare the idiom *wave it in her face*); but if it's not expressed, the interpretation will generally be (in this example) *her hand*.

Thus there are four main cases. 1) Some alternations, like the *clear* alternation above, can reasonably be seen as a pair of constructions that realize the same θ-set. 2) Some alternations appear to express some fixed number of logical arguments, say k; but one of the constructions can do so with less than k distinct arguments (or adjuncts) in the syntax. 3) Other alternations allow an element of some potential underlying concept to remain unexpressed in one construction, but not the other—and the unexpressed argument has a special interpretation. 4) Others alternations have one construction that appears to add a logical argument to the other construction—Levin and Rappaport Hovav (2005, p. 189) refer to some of these as instances of event composition, a term we shall use quite generally. This differs from cases 2 and 3 in that the element missing in the one construction is also missing, generally, from the underlying semantics.

We'll present now Levin's alternations (both true alternations and otherwise) in several tables according to the four top-level cases we just gave, with a few special cases left over. We'll also give each alternation or construction a tentative list of θ-roles. (Levin generally gives no such analysis.) Our intent here is not to show the details of the constructions involved (see Levin for that) but to just provide a quick image of the complexity of the range of argument realization schemes that are in use in the English verb lexicon—something that is rather time-consuming to get directly from Levin, given the way the data is spread over what sometimes seems like a kind of structured, book-sized, bibliography—though with unusually rich 'annotations', of course.

3.1.1 'Argument-preserving' alternations

Since our goal is just a quick image of the data, we'll abbreviate construction information instead of listing the full construction as a vector, as we did above for the *clear* alternation. (We'll return to the vector notation in Chapter 5.) In the simplest case, there are two or more θ-roles listed for an alternation, and one of

them is preceded by a preposition in parentheses; this means that the corresponding argument may occur inside a prepositional phrase, or by itself as a noun phrase. So for instance, the conative alternation (Levin's number 1.3, in our Table 3.1, p. 58) is utilized by *swat* in these two examples:

(155) The nurse swatted the fly.
(156) The nurse swatted at the fly.

The same two arguments are there in both cases (listed below as `Agent` and `Patient`), so this is indeed a 'true' alternation, our case 1. (Note that this doesn't in any way imply the two constructions mean the same thing; usually they don't.) A slightly more complicated case (but still alternation case 1) has different θ-role s being realized differently in each construction. For example, in the *clear* alternation above (Levin's number 2.3.2), `Source` takes a preposition in one construction (*from*), and `Theme` takes one in the other (*of*). So pairs of parenthesized material are to be applied in an alternating manner. For brevity, we also don't distinguish between arguments that take on dual roles, and those that take on one role (α) or another (β), depending on the verb—both cases are shown as α/β.

Note that we have chosen θ-roles in an opportunistic way. (Perhaps that was already clear.) We refine them where a 'sharper focus' seems convenient, and generalize them when we need a softer focus. In many cases, it's hard to delineate them clearly, anyway (Dowty 1991). There is a rather special set defined with examples in Fig. 5.3.2, p. 108. But we are intentionally slightly more general there than here. (We definitely need the 'softer focus' there, as we shall see.) Also, here we effectively break up oblique arguments into preposition and prepositional argument, so sometimes it seems clearer to give a role name that is that of the preposition's argument rather than the verb's. For instance, a verb's `Path` argument may be realized as going *through* a `Location`.

We've modified the Levin's alternation names very, very lightly, mostly just by removing the word *alternation* from the titles; one or two example verbs from Levin (1993) are listed when Levin's name itself doesn't name a verb. To reconstruct an example sentence, remember that if there's an `Agent`, it can pretty reliably be put in the subject position of the sentence; if there's no `Agent`, take an argument that doesn't need a preposition. This may underdetermine the possible sentences with certain alternations, so the example verbs are there to allow one to try out the possible sentences. For the first alternation (1.1.3), for instance, there's no `Agent`, but there's a `Theme` not using a preposition, plus one other argument that has an optional preposition. This tells us to create three possible sentence types using the given verb *sprout*, of which two are in fact grammatical, thus forming the alternation.

(157) Weeds sprouted from lawn.
(158) *Weeds sprouted the lawn.
(159) The lawn sprouted weeds.

	Levin Number	Levin Name (Modified) — *example verb*	Θ-roles and Realizations
1.	1.1.3	Substance/source *sprout*	(*from-*)Source Theme
2.	1.3	Conative *shoot*	Agent (*at-*)Patient
3.	1.4.1	Locative prep. drop *jog*	Theme (*up/down/along/...-*)Path
4.	1.4.2	*with* drop *fight*	Actor (*with-*)Actor
5.	2.1	Dative — *send*	Agent (*to-*)Recipient Theme
6.	2.2	Benefactive *get*, *build*	Agent (*for-*)Beneficiary Theme/Result
7.	2.3.1	*Spray/load*	Agent (*into/onto-*)Goal (*with-*)Theme
8.	2.3.2	*Clear* (transitive)	Agent (*from-*)Source (*of-*)Theme
9.	2.3.4	*Swarm*	(*with-*)Theme (*in/...-*)Location
10.	2.4.1	Material/product (trans.) *make*	Agent (*out of-*)Patient (*into-*)Result
11.	2.4.2	Material/product (intrans.) *evolve*	(*from-*)Patient (*into-*)Result
12.	2.6	Fulfilling *supply*	Agent (*to-*)Goal (*with-*)Theme
13.	2.7	Image impression *paint*	Agent (*with-*)Theme (*on/...-*)Goal
14.	2.8	*With/against* *strike*	Agent (*against-*)Goal (*with-*)Theme
15.	2.9	*Through/with* *jab*	Agent (*through-*)Location/Patient (*with-*)Theme
16.	2.10	*Blame*	Agent (*for-*)Event (*on-*)Patient/Goal
17.	2.11	*Search*	Agent (*in-*)Location (*for-*)Theme/Goal
18.	2.13.3	Possessor and attribute *value*	Experiencer (*in-*)Possessor_i (*for* Possessor_i *'s-*)Property
19.	2.14	*As* *imagine*, *mark*	Agent/Experiencer/... Patient/... (*as-*)Property/...
20.	3.10	Source subject *benefit*	(*from-*)Cause Patient
21.	6.2	Locative inversion *hide, drift*	Theme *in/on/into/...-*Location/Goal

Table 3.1: Argument-preserving alternations from Levin (1993), our case 1 alternations. See the discussion starting on p. 56 for creating example sentences from the example words and θ-roles listed.

In this case 1, there's one alternation (6.2) whose arguments merely swap positions; for an alternation with a possessive form (2.13.3, with several more in later tables), the possessor in the possessive form will typically be pronominal—

(160) She values her next-door neighbors for their honesty.

—rather than:

(161) *She values her next-door neighbors for her next-door neighbors' honesty.

Note that there's a lot of variation hidden in this chart; alternations will differ in whether or not argument optionality also differs across the alternation. Here's one it which it does:

(162) They're blaming me (for their problems).
(163) They're blaming their problems *(on me).

I. e. the oblique is optional in the one case (162) but it's obligatory (so it can't be optionalized by putting parenthesis around it) in the other case (163). And remember, for every one of these alternations, and the ones that follow, there are verbs that only use the first of the designated constructions, or the second, or (for many of the alternations) neither of the constructions.

3.1.2 'Argument-merging' alternations

Our case 2 alternations (Table 3.2, p. 60) are the ones in which, conceptually, both constructions refer to the same entities, but one of the constructions realizes some of them as a single argument: either the argument is plural, or there's a possessive construction that effectively 'eats up' two (semantic) arguments. We also include an alternation (1.2.7) that adds a fixed surface element (*'s way*) that adds little to the semantics; and another one (6.1) that adds an expletive *there* (cf. the expletive *it* in *it's raining*, p. 32). Like the other alternations, they differ in the number of elements required by the syntax, but express the same number of underlying logical arguments. Note, too, that many verbs appear in more than one alternation: we've given *intersect* as an example for two (1.2.4 and 2.5.4; Levin actually misses the latter); thus the constructions a verb gains by participating in any one alternation do not generally define its full behavior.

3.1.3 Implied-argument alternations

Next, we have case 3 (Table 3.3, p. 62), in which some element is an argument in one construction, but unexpressed and implied in the other. There's also a special case where the verb effectively names one of it's conceptual arguments, such as in

(164) They buttered the bread before they toasted it.

where the `Theme` (i. e. the butter) is already expressed by the verb. But one can still

	Levin Number	Levin Name (Modified) — *example verb*	Θ-roles and Realizations
22.	1.2.4	Understood reciprocal object *embrace*, *intersect*	`Actor/Theme` (`Actor/Theme`)
23.	1.2.7	*Way* object *press*	`Actor/Theme` (`Actor/Theme`*'s way*) *into/along/through/...*-`Location`
24.	2.5.1	Simple reciprocal (trans.) *blend*, *separate*	`Agent Theme` (*with/from/...* `Theme/Location`)
25.	2.5.2	*Together* reciprocal (trans.) *lump*, *stir*	`Agent Theme` (*together*) (*with/into/...* `Goal/Theme`)
26.	2.5.3	*Apart* reciprocal (trans.) *rip*	`Agent Theme` (*apart*) (*off (of)/...* `Source`)
27.	2.5.4	Simple reciprocal (intrans.) *intersect*, *diverge*	`Theme` (*with/from/...*-`Theme/Location`)
28.	2.5.5	*Together* reciprocal(intrans.) *join*, *mix*	`Theme` (*together*) (*with/into/...* `Goal/Theme`)
29.	2.5.6	*Apart* reciprocal (intrans.) *slip*	`Theme` (*off of/...* `Source`) (*apart*)
30.	2.12	Body-part possessor ascension *pat*	`Agent Patient/Goal`(-*'s* `Location`) (*on* `Location`)
31.	2.13.1	Possessor object *condemn*	`Agent/Source Goal`(-*'s* `Property`) (*for* `Goal`-*'s* `Property`)
32.	2.13.2	Attribute object *enjoy*	`Experiencer` (`Property` *in* `Source`) (`Source`-*'s* `Property`)
33.	2.13.4	Possessor subject (trans.) *hurt*	`Agent`(-*'s* `Cause`) `Patient` (*with* `Cause`)
34.	2.13.5	Possessor subject (intrans.) *fluctuate*	(`Property` *of*-) `Patient` (*in* `Property`)
35.	6.1	*There*-insertion *be*	(*there*) `Theme Location/...`

Table 3.2: Our case 2 subset of the Levin (1993) alternations. For these, the number of syntactic elements varies across an alternation, but the number of underlying conceptual arguments remains constant; for most of these, in one form of the alternation the underlying arguments 'merge' into one syntactic phrase.

elaborate on it—

(165) They buttered the bread with their most expensive butter.

—which is an example of Levin's alternation 7.2 at work. For these case 3 alternations, the arguments that may be unexpressed appear as θ-roles in parentheses. At first, these may look similar to the case 2 alternations, since for some of the alternations it's possible for an expressed argument to realize an unexpressed argument (e. g. alternation 1.2.3: *Karen dressed quickly = Karen dressed herself quickly*); generally, though, when expressed, the argument will be saying something different (*Karen dressed quickly* $\neq$ *Karen dressed her children quickly*), and sometimes the expression is more-or-less obligatorily different (as in 165). The instructional imperative (1.2.8) is for examples like *Stir (the mixture) for 30 seconds*.

3.1.4 Event-composition alternations

For cases of event composition, our case 4 (Table 3.4, p. 63), the θ-roles in parentheses refer to an argument that may not even be implied when it is not expressed. Sometimes the distinction is clumsy, though; worldly facts require certain exchanges of money to be done under control of an `Agent`, thus alternation 3.9 is in Table 3.3, not 3.4, and some of the others might have gone in either chart. Sometimes, too, individual verbs behave differently: to the extent *wiping the table* may imply something was wiped from the table, alternation 2.3.3 could have gone in the previous chart; but *combing one's hair* doesn't necessarily imply that something was combed out of one's hair, and verbs like *comb* are also assigned by Levin to 2.3.3. Especially interesting syntactically is the resultative construction (7.5), in light of the unaccusative hypothesis (Perlmutter 1978, Hall[Partee] 1965, and others, see Levin and Rappaport Hovav 1995): for some verbs with intransitive senses, i. e. with a subject but not an object—

(166) The vase broke

—the subject may have actually been encoded like an object, i. e. an internal argument of the verb, at some deeper level (e. g. D-structure in Chomsky 1981, as assumed by Levin and Rappaport Hovav); thus the underlying object appears to have been moved into subject position by some sort of syntactic operation (coincidentally fulfilling the subject requirement in English, though other languages show the same kind of phenomenon, see Levin and Rappaport Hovav 1995). The resultative construction is relevant here for the way it is used by Levin-Rappaport-Hovav (1995) to try to diagnose whether an intransitive (e. g. 166) has a 'real' (i. e. 'deep') subject or not.[4,5]

[4]Although we won't have to deal with this issue directly here, eventually we'll have to contend with the possibility that, if we have a strong way of mapping from semantics to syntax, the proper target of that mapping may not be what it appears to be on the surface.

[5]The resultative is a construction that adds a word or phrase (typically an adjective) that

	Levin Number	Levin Name (Modified) — *example verb*	Θ-roles and Realizations
36.	1.1.1	Middle *scratch*	(Agent) Patient (Manner/...)
37.	1.2.1	Unspecified object *eat*, *sing*	Agent (Patient/Theme/...)
38.	1.2.2	Understood body-part object *wave*	Agent (Theme)
39.	1.2.3	Understood reflexive object *bathe*	Actor (Patient)
40.	1.2.5	PRO-arb object *entertain*	Cause (Patient)
41.	1.2.6.1	Characteristic property of agent *sting*	Agent/Cause (Patient)
42.	1.2.6.2	Characteristic prop. of instrument *slice*	(Agent *with*-)Instrument Patient
43.	1.2.8	Instructional imperative *cook*	(Agent Patient)
44.	2.3.5	*Clear* (intrans.)	(Theme *from*-)Source
45.	2.4.3	Total transformation (trans.) *convert*	Agent Patient (*from* Source) *into*-Result
46.	2.4.4	Total transformation (intrans.) *change*	Patient (*from* Source) *into*-Result
47.	3.9	Sum of money subject *buy*	(Agent) Theme (*for*-)Theme
48.	4.1	Virtual reflexive *sell*	(Cause/...) Patient/Theme/... (*itself*)
49.	7.1	Cognate object *dance*	Actor/... (Event/...)
50.	7.2	Cognate PP *oil*	Agent Source/Goal/... (*with* Theme)
51.	7.3	Reaction object *roar*	Actor/Source (Event/Theme)

Table 3.3: Our case 3 alternations from Levin (1993). Across each alternation in this set, one argument may be implied but unexpressed.

	Levin Number	Levin Name (Modified) — *example verb*	Θ-roles and Realizations
52.	1.1.2.1	Causative/inchoative *change*, *bounce*	(`Agent`) `Patient/Theme`
53.	1.1.2.2	Induced action *race*	(`Agent`) `Theme Path`
54.	1.1.2.3	Other causatives *beep*, *dangle*	(`Agent`) `Source/Theme/...`
55.	2.3.3	*Wipe*	`Agent` (`Theme` *from-*)`Source`
56.	3.1	Time subject *catch*	(`Agent/Experiencer/...` *in-*)`Time Event`
57.	3.2	Natural force subject *age*	(`Agent` *in-*)`Cause Patient`
58.	3.3	Instrument subject *crack*	(`Agent` *with-*)`Instrument Patient`
59.	3.4	Abstract cause subject *prove*	(`Agent` *with-*)`Cause Predicate`
60.	3.5	Locatum subject *cover*	(`Agent` *with-*)`Theme Goal`
61.	3.6	Location subject *house*	(`Agent` *in-*)`Location Theme`
62.	3.7	Container subject *integrate*	(`Agent` *into/...-*)`Location/...` `Theme`
63.	3.8	Raw material subject *make*	(`Agent` *from-*)`Patient/Material Result`
64.	7.4	X*'s way* *push*, *talk*	`Actor/Theme` (...) (`Actor/Theme-`*'s way througth/..* `Path`)
65.	7.5	Resultative *pound*	`Agent Patient` (`Property`)
66.	7.8	Directional phrases with nondirected motion verbs *thunder*	`Actor/Theme` (*into/out of/...* `Source/Goal`)

Table 3.4: Our case 4 of the Levin (1993) alternations. These exhibit event composition (Levin and Rappaport Hovav 2005), whereby one form of the alternation expresses conceptual material that is missing from the concept expressed by the other form.

	Levin Number	Levin Name (Modified) — *example verb*	Θ-roles and Realizations
67.	4.2	Reflexive of appearance *show*	(`Agent`) `Theme` (*itself*) ...

Table 3.5: This 'extra case' also exhibits event composition, but the syntax requires an extra reflexive argument (*itself*, *herself*, *myself*, etc.) in the conceptually more basic case, thus preserving the number of (apparent) syntactic arguments.

	Levin Number	Levin Name (Modified)
68.	8.1	Obligatory passive
69.	8.2	Obligatorily reflexive object
70.	8.3	Inalienably possessed body-part object
71.	8.4	Expletive *it* object
72.	8.5	Obligatory adverb
73.	8.6	Obligatory negative polarity element

	Levin Number	Levin Name (Modified)
74.	5.1	Verbal Passive
75.	5.2	Prepositional Passive
76.	5.3	Adjectival Passive (from trans. verbs)
77.	5.4	Adjectival Perfect Participles (from intrans. verbs)

	Levin Number	Levin Name (Modified)
78.	7.6.1	Unintentional Interpretation with Reflexive object
79.	7.6.2	Unintentional Interpretation with Body-Part object
80.	7.7	Bound Nonreflexive Anaphor as Prepositional object

Table 3.6: Additional constructions and interpretations listed in Levin (1993). We don't utilize these for various reasons (see Sect. 3.1.6, p. 65), and so we present them without further analysis or example.

3.1.5 'Hidden compositions'

Levin also lists an alternation that has an optional conceptual element (Table 3.5, p. 64), so it's compositional, but a reflexive is needed when that element is missing, so the number of syntactic argument remains unchanged. Thus, it's similar to, but a kind of negative image of, our case 2, where the concept being expressed was more or less fixed, but the syntactic expression changed.

3.1.6 Miscellanea

That leaves 13 'alternations' unaccounted for (Table 3.6, p. 64). Six concern very specific constructions that a very small number of verbs utilize, so we won't provide an analysis, though there is a chance that some verb/construction instances will become relevant later for the kind of work we present in Ch. 5. Another four concern either 1) a passive, which we will take as a construction that arises through some fairly general, widely applicable process (though with some lexeme-specific properties)—i. e. it's far more productive than the other phenomena we are studying here; and its requirements for a special form of the verb are unlike any of the other alternations; so we'll tentatively set this alternation aside; or 2) the alternations concern something that isn't really verbal (5.4). That leaves three more items, which merely concern interpretation, and concern it in a way that isn't going to appear in our processing of the data at all, so we will ignore them, too (though 7.7 also has some verbs with a specific constructional requirement).

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describes the end-state of an entity, that end-state resulting from the action expressed by the verb. Thus,

(i) The vase broke open,

adds information (to 166) about the vase; it wasn't just left broken by the event, but open. In other cases the resultative might add an entirely new component to the event:

(ii) The workers pounded the material flat.

Without the resultative component (*flat*), the material the workers were pounding on might not have been affected at all. Crucially, the resultative seems to be predicated of the direct object, i. e. the internal noun phrase argument of the verb—with some interesting complications, in which the noun phrase sometimes isn't really an argument of the verb at all (see Levin and Rappaport Hovav 1995). Moreover, if an intransitive isn't underlyingly an object, it can't be the noun phrase the resultative is to be predicated of; thus, elaborating on Levin and Rappaport Hovav's (1995, p. 35) examples, we have:

(iii) Suzy shouted hoarse (meaning Suzy was hoarse when she was shouting),

(iv) *Suzy shouted hoarse (meaning Suzy made herself hoarse by shouting),

(v) Suzy shouted herself hoarse,

The last example (v) means exactly what the previous (iv) can't mean, i. e. it's a resultative; but a reflexive pronoun (*herself*)—i. e. a direct object (in this example)—has to be added to make that possible.

3.2 Verb classes (often of one element)

Given the existence of several dozen alternations, the challenge of course is to determine what range of verb behaviors are possible with respect to those alternations—which combinations of alternations can a verb participate in; and for which alternations might a verb utilize one of the constructions but not the other. This might be restated more simply (if simplistically) by ignoring alternations completely, and just asking: what are the various possible combinations of constructions that a verb might utilize? What are the semantic determinants of a verb's behavior with respect to these constructions? (Though of course, some people are going to want to ask how those determinants are encoded syntactically (Levin and Rappaport Hovav 1995), and one reason for our presentation of both semantic and syntactic in Ch. 1, however brief, was to suggest the possibility that the syntactic structures may bear on the semantic ones.) The computer scientist, in any case, trying to implement a system that, roughly at least, captures the way people process language, has the obvious challenge of assigning each of thousands of verbs to exactly the right constructions.[6] And a deeper challenge, as we've been saying, is presented by the possibly productive way in which those assignments might be made; i. e. by the ability of a native speaker of a language to learn a novel verb and potentially have, immediately, in wide agreement with other native speakers, a set of constructions he or she will be comfortable using the new verb in—such as we discussed earlier for the verb *fax* (p. 36). Thus, simply assigning a list of legal constructions to each verb won't, computationally, fully model the native speaker's behavior; and it fails to implement, in any way, whatever it is that causes the verbs to take on a particular pattern of constructions in the first place.

We have been assuming here, of course, that the productive behavior of native speakers does in fact exhibit regularities in the way that verbs, largely depending on their semantics, are assigned to constructions. Levin actually goes farther and tries to show that there are alternation-combining, class-forming patterns (or at least semi-regular tendencies) in the second half of her (Levin 1993) presentation. But her presentation has to be interpreted 'with care', as she herself says (Levin 1993, p. 17), since in grouping verbs into classes, supposedly by shared semantic and syntactic behavior, a lot of syntactic behaviors that distinguish the verbs are effectively hidden inside each class. The first part of her book is quite precise in laying out the verb behaviors (which we summarized in tables 3.1–3.6); her second half, in comparison, needs to be seen 1) as intentionally more suggestive than precise; and/or 2) as a presentation as much about the ways in which the given classification *doesn't* completely work, as about the ways in which it does work. I. e., Levin consistently

[6]There are many kinds of language processing applications, and some of them might not need this information, of course. But applications that need to parse language as well as people do ultimately will need it (see the examples starting on p. 116); and even with some of the applications that would have no use of this information currently, such as speech recognition, the reason is not an absolute lack of utility (or *potential* utility), but a current lack of the technical means with which to make use of it.

	bash	hit	kick	pound	tap	whack	...
9.3 *Funnel* Verbs				×			
11.4 *Carry* Verbs			×				
17.1 *Throw* Verbs	×	×	×		×		
18.1 *Hit* Verbs	×	×	×	×	×	×	
18.4 Non-Agent. Impact		×					
23.2 *Split* Verbs			×				
26.1 *Build* Verbs				×			
35.4 *Investigate* Verbs					×		
40.8.2 *Tingle* Verbs				×			
47.8 Contiguous Location		×					
49 Body-Internal Motion			×				
⋮							

Table 3.7: Six of Levin's (1993) *Hit* Verbs, with the all the Levin classes they are assigned to. (Levin calls class 18.4 the Non-Agentive Verbs of Contact by Impact.)

and intentionally groups together verbs that behave alike in *some* of the ways she is interested in (and typically in contrast to other verbs), but they also *differ* in other behaviors that she is interested in.

Even in setting up the notion that there are distinct classes of verbs of like semantic and syntactic behavior (Fillmore 1970), Levins introduces a set of four of her classes (which she calls the *Break*, *Cut*, *Touch*, and *Hit* verbs) framed in terms of just three diathesis alternations (the conative: *swatted the fly* vs. *swatted at the fly*; the body-part possessor ascension alternation: *she hit his head* vs. *she hit him on the head*; and the English middle alternation: *it scratched the surface* vs. *that surface scratches easily*). And this fails to suggest the degree to which these classes, against the Levin classes as a whole, and *like* the Levin classes as a whole, are rampantly intersective (Dang *et al.* 1998). Table 3.7 lists her initial example verbs for the *Hit* class (18.1), for which we have listed the other classes Levin assigned them to, labeled on the left. Each of the six verbs appears unique—though, of course, to determine the full relevance of such multiple class assignments, one must go back to the diathesis alternations the verbs appear in, and see what additional syntactic behavior, if any, is intended to be reflected by the fact that some verb v is assigned to a class x as well as a class y. Criticisms of the notion of a verb class were already raised Mufwene (1978) in response to Zwicky's (1971) manner-of-speaking verbs, as Levin notes. The implied semantic commonalities of a class may or may not be highly relevant to the syntactic behaviors: since the syntactic behaviors usually cut across classes, the relevant semantics may cut across them as well, rendering the semantics of the class itself largely accidental, or at least secondary. Regarding Zwicky's manner-of-speaking verbs (carried over into a subclass Levin gives of her Class 37 (Verbs of Communication), see p. 81 below),

every one of the class properties may be found in verbs not in the class, as Mufwene tries to show. The semantic effect of the common property of the verbs in Levin's Class 40 (Verbs Involving the Body) might be significant, but it seems secondary to the other properties that cut across that class in different ways (p. 81–82 below).

3.2.1 Construction families

Dang *et al.* (1998) attempted get a better picture of the range of verb behaviors by untangling the cross-classifications of the Levin verbs. They discuss extracting the 'intersective Levin classes'—a re-ordering of the Levin verbs in which each verb is classified according to the set of Levin classes it is assigned to. Thus, it's a true partitioning of the verbs. It was also natural for us, in the course of our own investigations, to extract the intersective Levin classes, so we'll present some data on that. Levin's intersective classes vary (from 1 to 9) in the number of classes in the intersections, and (more importantly) in the number of verbs attached to those 'intersective classes' (from 1 to around 90—1 being the more typical size by a huge margin, as shown in the second chart).

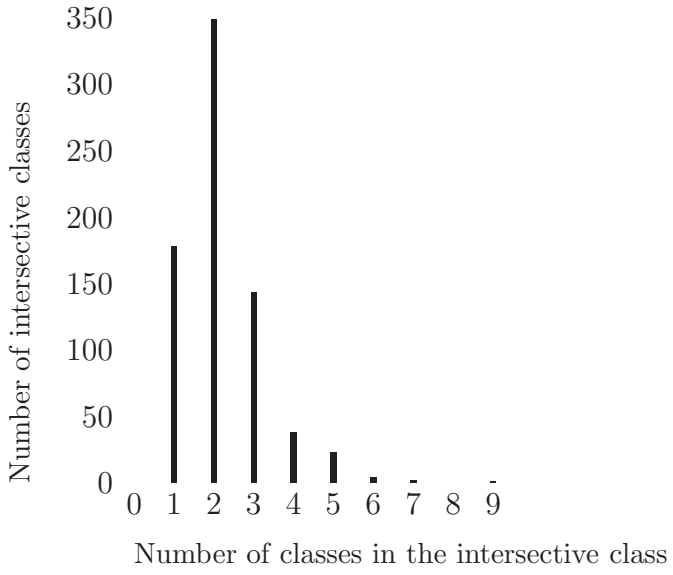


Figure 3.1: Histogram of intersective class intersection size

Curiously, Dang *et al.* (1998) did not present any empirical results for their reclassification. (They also present an algorithm for doing the reclassification that isn't tractable if taken literally.) Perhaps such results would have been too far removed from the 'real' data, anyway: what we really want is to know, for each verb, the set of constructions the verb appears in, and how those sets vary in size and make-up across the complete set of verbs. Intersective classes simply tell us that a verb is associated with certain classes whose members tend (merely tend) to

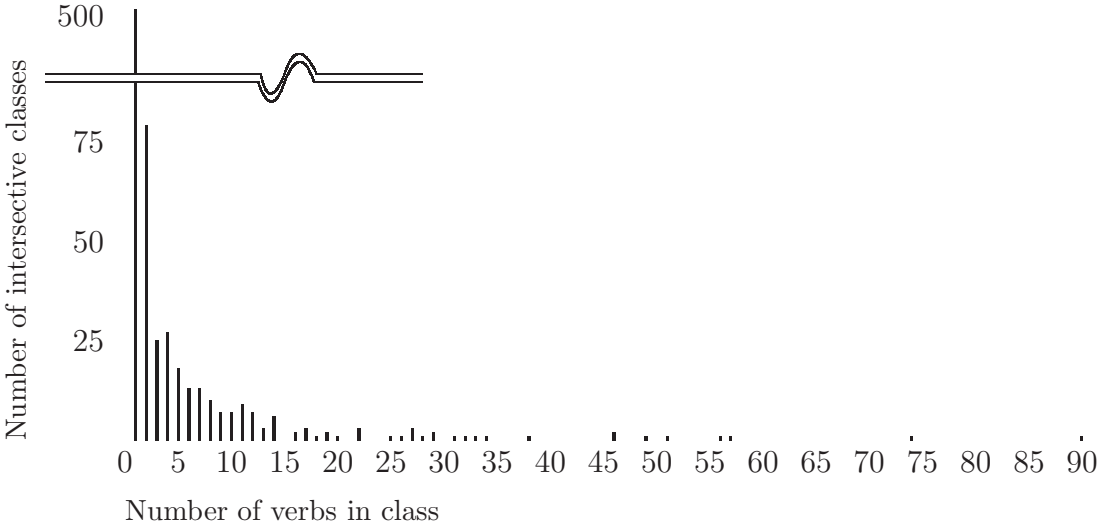


Figure 3.2: Histogram of intersective class size

utilize certain constructions. Dang *et al.* also had to worry about homonymy, since the noise it adds might create a lot of false intersective classes. Their solution was to simply throw out all classes with only one or two verbs in them—but as the chart shows, that's almost all of the Levin verbs. Dang *et al.* were in a bind because they didn't actually have representations of the constructions for each of the Levin classes. We do, for the analyses we will be presenting later; we assigned each verb the set of θ-sets it utilizes, which we call a θ-family; we call the corresponding set of constructions realizing a θ-family a construction family. Thus, a 'true' verb class, whose members show the same behavior with respect to argument realization and polysemy, is simply the set of verbs that have the same construction family. We thus can provide a histogram for that that parallels the one we just gave for the intersective classes. Note, furthermore, that qualitatively the two charts do in fact look the same, but this new graph is a much more direct measure of actual verb behavior. Perusal of our data furthermore shows that a histogram of the number of words in a construction-family, vs. the number of construction families, would also show the identical qualitative shape as the second graph above: a huge number of constructions—almost all of them, in fact—with just one or two verbs assigned, and a very small number of simple construction families at the other end of the graph—with a hundred or so verbs each. This also confirms that the bifurcation of classes is not just an artifact of Levin's largely semantic grouping.

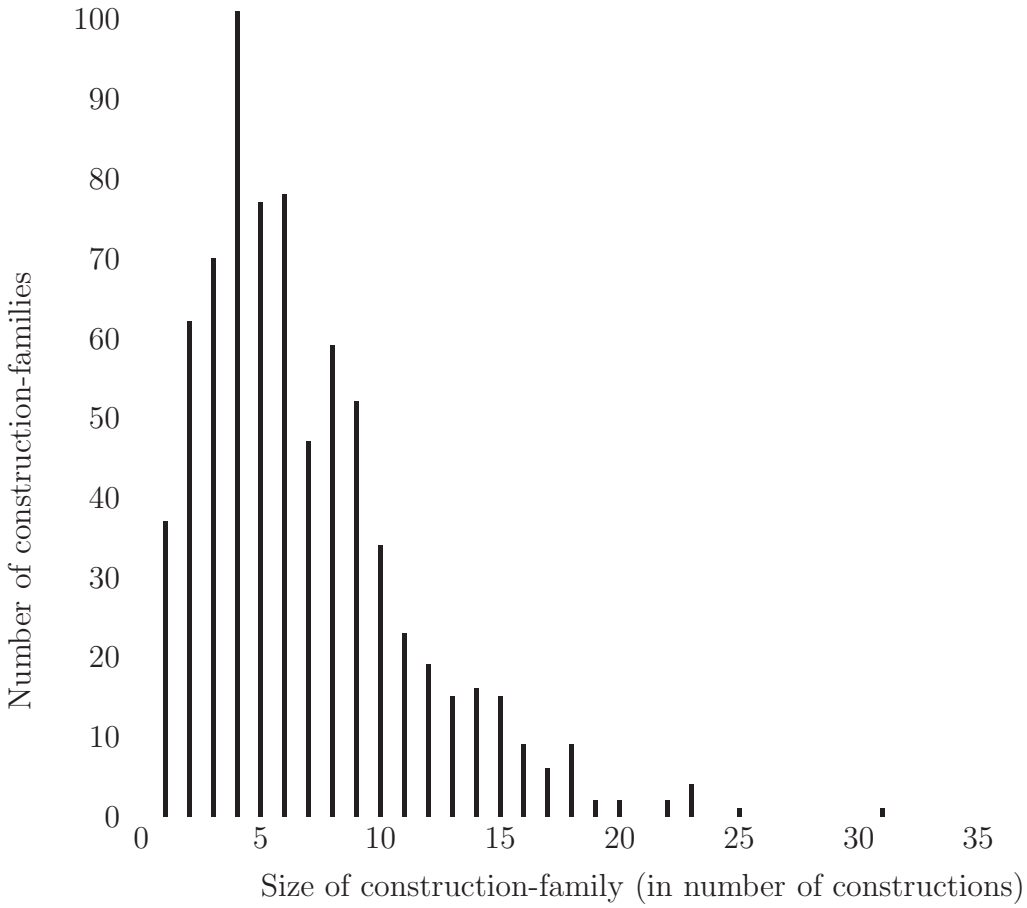


Figure 3.3: Histogram of construction-family size (in number of constructions)

3.2.2 'Linking up' the alternations

Looking at verb behaviors in terms of alternations, and defining those alternations simply as pairs of constructions, as we've done here, also suggests another way of investigating the structure of the verb lexicon. Graph-theoretically, each verb that utilizes an alternation can be thought of as building an edge between two vertices, each representing one of the constructions of that alternation. Upon starting this project, one of the first things we looked at, therefore, was the possibility of simply partitioning the network created with these edges into many different sublexicons that might then be investigated separately—for a simple kind of divide-and-conquer approach. But that was made difficult by the possibility of a situation in which constructions c_1 and c_2 are connected by verb v_1 (i.e. by virtue of forming an alternation that v_1 utilizes), and c_2 and c_3 are connected by v_2, and c_3 and c_4 by v_3, and so on, using up nearly all the verbs and nearly all the possible constructions. And at various stages in this project, that is exactly what we have found: almost all the verbs and constructions can be related to other verbs and constructions in this manner.

Even a mechanical search for a useful articulation point—a construction which, if removed from play, would leave two disconnected networks—proved fruitless; as did a search for a useful bridge—a set of verbs using the same constructions, which, if removed from play, would take one of those network edges with it, creating, again, two disconnected networks. The problem is that, although there are some verbs that are assigned just one construction by Levin, a far larger number of verbs utilize one or more constructions; and furthermore, they do so in an overlapping way. Fig. 3.3 shows that only 30-some construction families have only one construction; note that many have more than 10. The exact number and makeup of those families, and the number of verbs using the larger ones, depends on the θ-roles in use, since we defined constructions in terms of them; a fairly large set that we've used contains about 25 roles (which we later generalize down to 14; we see Ch. 5); and with them, 88% of the verbs use 2 or more constructions. (A large set of θ-roles might increase the distinct constructions a verb uses, but it should also decrease the chance of two verbs 'meeting' at a shared construction, thus forming a chain in the network.) And even with these finer-grained θ-roles, almost all (92%) of the constructions are found in one large network. Thus the title of this chapter—*A tangle of verbs*—was meant quite literally. The strong tendency of verbs to use multiple constructions, and yet to vary widely in the precise set of constructions they use, effectively connects those constructions, and the verbs, in a very tangled manner.

Chapter 4

A mass of conceptualizations

The previous chapters were intended to highlight the vast amount of variety in the verb lexicon. It might even seem that we have succeeded 'too well' in making the lexicon look like a messy place. But it seems to us that, given what is known now about the phenomena, there just isn't a way of making it look simple without oversimplifying the data. (The half of Levin (1993) that presents her verb classes, if not taken with the 'care' that she urges them to be taken with, can end up producing just that sort of oversimplification.) To return to the metaphor that we borrowed from Baker (2001), it's as if we've catalogued the great mass of behaviors of thousands of chemical compounds, but we still haven't noticed the order that lies underneath once one isolates the atomic elements and looks at their behaviors. In the present case, of course, we're still not sure what sort of elements even exist in that underlying system—or how much of a 'system' it really is.

Nonetheless, there appear be a couple of ways to filter and reorganize the data to bring out something that is simpler than one might have expected—at the risk, though, of oversimplifying things, if one fails to keep the data of the previous chapters in mind. (Especially the charts on the previous pages showing how many verbs appear unique, or nearly so.) The first way involves constructing a small set of schemata that will cover the 3000+ Levin verbs; the plan is make it easier to grasp that, though the range of basic syntactic behaviors, considered here simply as the set of constructions that each verb appears in, is in fact complex, there might nonetheless be some general semantic arrangement which, if we ignore the syntactic details, really does seem pretty simple.

4.1 Relating the θ-roles

The θ-roles we utilized we clearly not very explanatory to begin with—or at least, we made no attempt to show what it was they might be explaining. A large number of the θ-sets can be realized multiple ways, and almost all of the verbs utilize one or more of those multiply realized θ-sets. We are going to take advantage of that in two ways: this chapter presents the first way, the next chapter will present the second way. Our goal in this chapter is to simply cover the full set of θ-sets in a very direct fashion. We will construct a series of schemata and suggest a

loose ordering for them—for expository purposes only—with simple ones combining in some sense to create more complicated ones. To represent these schemata, we'll supply simple diagrams with arrows, which might call to mind Schank (1975) and Schank and Riesbeck (1981), but we're going to keep things much, much simpler, and simpler than Jackendoff's (1990) presentations, too, because our goals are very different. In effect, though, this is a version of Jackendoff's argument, which he built up from Gruber (1965), that different semantic fields 're-use' the same syntactic structures to express their arguments. (We introduced the Locational, Identificational, Possessional, and Circumstantial fields on p. 11.)

4.1.1 Generalizing to a few schemata

Actually, our first schema is almost too simple to call a schema. This is not only because of the ordering we are going to build, with the first elements effectively forming certain basic components to be included in the later elements; it also appears to be the case that there just are some verbs that are more semantically basic. For instance, there's the verb *move*: it can be used as a 'verb of putting' or a 'verb of removing'; in Jackendoff's (1983, 1990) kind of representations, it might be considered the verb that can be associated with *go*—perhaps more so that the verb *go* itself, which has some semantic restrictions on some of its uses. (E. g. it contrasts with *come*, as in *come* and *go*; recall, too, our very first examples (1–4) in Ch. 1.) *Move* can thus be quite basic, referring simply to a movement nowhere in particular, as in *it moved*.

Thus, we'll think of it (the concept of moving) as a basic schema that can be expanded to a *putting* schema or a *removing schema*, which we will come to in a moment. We'll represent the simple *movement* schema graphically as

(167) $\overset{y}{\longleftrightarrow}$

intending here that the element designated y is precisely the `Theme` of our earlier discussions; but for the sake of (graphical) simplicity, we will stick with simple letter names.

Other verbs that may 'attach' here further describe the manner of movement: verbs such as *run* and *skip*, etc.

Another simple component represents activity. A verb for this might be *do*. Essentially, the entity 'doing something' is an `Actor`, and an `Actor` doing something to something else is an `Agent`. The schema designating an x acting on some y (thus, a `Patient` now) is:

(168) $x \rightsquigarrow y$

and the mere *doing* of something by x is shown as:

(169) $\hat{x}$

Actually, if we wanted to make it explicit that the element acting on the y above

(168) was an `Agent`, i. e. typically an animate entity doing something to bring about the event, we should put a hat on it too; otherwise it's just a `Cause`.

Next comes a situation in which some x does something to cause y to go to z, which we'll put below the other two schemata, since it can be seen to include both movement and agentivity. Many constructions can be covered by this schema. We'll represent it in diagrams as

(170) $\hat{x} \rightsquigarrow \{ \xrightarrow{y} z \}$

Element z, in other words, realizes the θ-role `Goal`. All of Levin's Verbs of Putting (a large percentage of her 3000+ verbs, in fact) can be covered by this schema—as can many other Levin verbs; a lot of verbs that involve movement are put in other classes, either because their element of movement seems only potential rather than definitional, or it's abstract, or the verbs only potentially involve *putting* their `Theme` somewhere. For instance, Levin quite reasonably has a separate class for verbs of change of possession, like *give*—in keeping with our introduction of its basic θ-set earlier as {`Agent`, `Theme`, `Recipient`} rather than {`Agent`, `Theme`, `Goal`}. However, for the sake of these generalizing schemata, we will consider a `Recipient` a `Goal`, and thus treat it as a kind of movement, though in the Possessional field, following Jackendoff (1983).

When we have schemata with multiple roles to express, and roles other than `Agent` (which, remember, is realized as the subject of the clause), we can of course begin to see how the schemata will fail to predict the realization of its arguments. For this last schema, the realizations include:

(171) x put y in/on/under/around/... z
x poured y into/... z
x inserted y into z
(172) x gave y to z
(173) x gave z y
(174) x filled z with y

So there are at least 4 basic ways of realizing those 3 arguments. (We're considering the first construction (171) to have several variants, depending on the exact set of prepositions being used by a verb.) Actually, we've left out two cases in which one of the elements is encoded directly by the verb, thus leaving only two elements that need to be expressed as arguments.

(175) x y+ed z (e. g. *painted*)
(176) x z+ed y (e. g. *potted*)

(Compare *rain* as `fall(rain)` (p. 32), where there are *no* elements left to be expressed as arguments.) Note, too, that we are representing with the schema an effective simplification of the meaning of the verbs given as examples above—in spite of warnings concerning such simplifications in earlier chapters; the schema above doesn't try to show that the y of *fill* is actually *filling* the z, and not just going to it, etc.

The next schema is intended to cover a lot of ground with the y element simply made to move in the other direction, i. e. away from the z, with x doing something that causes that movement.

(177) $\hat{x} \rightsquigarrow \{ \overset{y}{\longleftarrow} z \}$

Its realizations include expressions such as

(178) x stole y from z
(179) x pulled y from/out of z
(180) x robbed z of y
(181) x swindled z out of y

(182) x y+ed z (e. g. x cored the z)
(183) x z+ed y (e. g. x mined the y)

Note the cases here, too, where one element is incorporated into the verb (as with *core* or *mine*).

A kind of variant on these last two schemata is interesting because it has four (logical) arguments, and moreover, two of them are `Agent`s, the other two `Theme`s.

(184) $x \rightsquigarrow \left\{ x \begin{array}{c} y \\ \rightleftarrows \\ w \end{array} z \right\} \leftsquigarrow z$

(185) x sold y to z for \$$w$
(186) x sold z y for \$$w$
(187) z bought y from x for \$$w$

Now, with syntax in mind the idea that there are two `Agents` might be problematic, but semantically it's quite clear that something like agenthood must be ascribed to the two arguments. (If the seller isn't acting agentively, it's theft, not a sale or purchase.) Given the linking regularity that puts `Agent`s in subject position, perhaps it isn't surprising (given that there's only room for one subject) that there are two verbs *buy* and *sell* each choosing a different `Agent` for its subject.

There's another set of verbs that express a concept that has two arguments acting in a symmetrical manner. We aren't going to try to represent this graphically, but one should imagine that the y and z are both moving away from each other in the following fragment of the earlier schema.

(188) $\overset{y}{\longleftarrow} z$

and similarly for the case of y going toward the z: imagine that they are both moving toward one another. This enables variants of the *putting* and *removing* schemata found in:

(189) x mixed y together
(190) x took y apart

We also want to represent `Instrument`: we'll imagine it as a v used by x to act on some y:

(191) $x \overset{v}{\rightsquigarrow} y$

For `Beneficiary`, we have some x acting on y for the benefit of some u:

(192) $(x \rightsquigarrow y) \rightsquigarrow u$

as in *x cooked some y for u*.

We also need to imagine relatively static locations, e. g. an y at a particular position relative to a z, rather than moving to or from that z. Again, we won't try to show it graphically, but instead will treat it as if it were a special case of y going to or from z.

Let's attempt to build all of this up again from scratch. We can have an x doing something

$\hat{x}$,

possibly acting on some other element y

$\hat{x} \rightsquigarrow y$,

possibly causing by that action the movement of y

$\hat{x} \rightsquigarrow \{ \overset{y}{\longleftrightarrow} \}$,

and furthermore, possibly, causing that y to go to or from some z

(193) $\hat{x} \rightsquigarrow \{ \overset{y}{\longleftrightarrow} z \}$,

and/or doing this action with the help of some instrument v

$\hat{x} \overset{v}{\rightsquigarrow} y$,

and/or doing this for the benefit of some u

$(\hat{x} \overset{v}{\rightsquigarrow} y) \rightsquigarrow u$.

Alternately, we can start with a y in motion

$\overset{y}{\longleftrightarrow}$,

possibly moving to or from some z

$\overset{y}{\longleftrightarrow} z$,

and/or possibly being put into that motion by some `Agent` x

$\hat{x} \rightsquigarrow \{ \overset{y}{\longleftrightarrow} \}$,

and then continue with the composition as before (i. e. with 193).

4.1.2 Application to the Levin classes

The above, we suggest, is a kind of 'quasi-locationalist' (i. e. quasi-Jackendoffian) sketch of how the syntactically relevant semantic possibilities of verbs can supposedly be conceptualized (leaving out the complication of *buy* and *sell*, which would add an additional `Agent` and `Theme`); we basically have schemata for moving, doing, and acting on something, which can be thought of as combining to produce putting or removing, with the other schematic bits further combining to include an instrument or a beneficiary. We have presumably left out a few combinations and/or complications, but those are the essential elements, according to a (quasi-)locationalist account. How well does that cover the 3000+ Levin verbs? Surprisingly well—or rather, they cover the verbs surprisingly well *given* what little may be needed of such schemata. By that we mean (in terms of argument realization, for instance): there are only a small number of ways of realizing an argument—as a subject, as a direct or indirect object, or as an oblique (with some finite range of prepositional possibilities, though that also varies with the verb), and with a small number of additional forms for verbs that take sentential arguments. There are potential complications here already, given for instance the unaccusative hypothesis (according to which some subjects are 'underlyingly' objects, p. 61), but even with that, there are still just a small number of basic ways of realizing an argument. Thus, many semantic distinctions may not need to be covered. Many of the distinctions between the verbs we grouped together earlier, like *coat*, *cover*, *encircle*, *pad*, *surround* (125, p. 42), may in fact be immaterial to their syntactic behavior; of our schemata, $\hat{x}$, representing x doing something, may seem pretty close to vacuous; but if some verbs express little else—not the movement of something somewhere, nor any kind of movement at all, nor any kind of effect from whatever is being done that could affect another entity—then 'x is doing something' may be all that is really relevant syntactically—for those verbs, that is.

Otherwise, our analysis will rely heavily on the Jackendoff (1983)-style notion that many verbs appear to 're-use' the syntactic frames for locational states or events, putting them to a non-locational use (above, Sect. 1.1, p. 11). The idea of applying this to the Levin classes is not new; Dorr *et al.* (2001) created a system for translation that has actual Jackendoff-style conceptual structures (below, p. 96), for all the Levin verbs. Unfortunately, their use of Jackendoff failed to maintain Jackendoff's own idea of what a `Theme` in the Locational field is. As a result, the vast majority of their Locational verbs are assigned at least one conceptual structure that mislabels a `Theme` as something else; and almost all of the classes below that we present as 'easily' mapping onto our schemata will in fact do so differently than Dorr *et al.* (2001) would do.

Levin's 192 classes, numbered 9.1 through 57, are grouped into 48 high-level classes, i. e. classes 9 through 57. We'll run through each of these now, class by class, to see how the 'schematization' we just gave can cover them—and perhaps even cover the full repertoire of English verbs, depending on how representative those 3000+ Levin verbs really are. We'll put off one section of classes until the end

of our discussion, since they include almost exclusively those verbs that are *not* so easily covered by our schematization. Levin, in subdividing her verbs on a number of very different semantic distinctions, often creates distinctions that align pretty well with the characteristics that distinguish our schemata—but not always, and there are problematic cases scattered throughout her classification. Starting at the 'top', then:

- Classes 9 and 10 are called the Verbs of Putting and Removing, respectively; the names clearly imply that they should be easily covered by our putting and removing schemata, and perusal of each of the subclasses therein shows that to be the case. (This is not to say that many verbs in the classes won't have senses more basic than putting or removing schemata; the basic senses might 'reduce' to mere moving in a certain manner, for instance, or to being in a certain configuration—*surrounding* something, for instance. Mere moving, in the case of *move*, is actually in the next class. In any case, each of these verbs can be extended if necessary to refer to putting or removing.) To keep a discussion that is already overly large from getting even larger, we won't typically give specific example verbs for the classes where the class name refers to a verb directly or indirectly (as the Verbs of Putting and Removing do for *put* and *remove* respectively)—unless an example sentence is needed to clarify things. The verb classification that really matters for us is listed in Appendix B, and all of that portion of the 3000+ Levin that we have classified is listed (and indexed starting on p. 231).

- The next set of verbs is in Class 11 (Verbs of Sending and Carrying), which also fits the putting or removing schemata, with certain new specializations, requiring for instance that the x accompany the y in moving to the z, in the case of verbs like *carry*. (That x is not merely accompanying y, but being carried by y, and other similar details, are, in general, only important to us if they have apparent effects on argument realization and polysemy; and as we've been saying in our references to θ-roles, for the target analysis of this work, in Chapter 5, we will need even fewer such details, given the particular structure of the lexicon that we will focusing on.) Again, some verbs, like *move*, can be used in a simpler sense that need not express the actually sending of carrying of something; they may express mere movement, or some other more basic component.

- Class 12 (Verbs of Exerting Force), as Levin's descriptive label implies, adds an element of force to the manner in which x is acting on y, optionally leading to the full putting or removing schema. (I. e., when movement is missing, the senses are 'reduced' to the mere acting upon something with force: one can *push against* something, for instance, without actually moving it.)

- Class 13 (Verbs of Change of Possession) implements, of course, what Jackendoff (1983) would call the possessional variant, involving putting or removing

or, for instance, the *buy* and *sell* variant of that. (More precisely, Jackendoff would say these cases involve the elements CAUSE and GO but in the Possessional rather than the Locational field. Compare the compositions we gave earlier using `cause` and `go` elements (34, 57, 58), or the actual forms from Jackendoff that we present later (starting on p. 96), which implicitly use the Locational field; similar structures, but with the Possessional field, could be proposed for verbs like *give*.)

- Class 14 (the *Learn* Verbs) can be thought of as the receiving of knowledge, a kind of special, `Agent`-less possessional class.

The first major complication occurs in the next classes.

- Classes 15 (the *Hold* and *Keep* verbs) and 16 (Verbs of Concealment) might be thought of as a static locational variant, i. e. for *holding* and *keeping* things, or for keeping things locationally away from another entity (and for Class 16, for *concealing* the things from others, which of course is something else in addition). For this last class, our schemata appear to be broad enough to include at least the essential components of these concepts, though it might not be obvious, pictorially for instance, how those components should be combined. One component of verbs like *keep* is easy to handle: it simply involves the location of something. Perhaps the other component is something like habitually doing something to cause the thing to remain in that location. The 'conceal from others' component is more problematic. We've implemented 'from others' as a `Source` in Appendix B, which seems wrong, since the `Theme` in this case is not something being moved from the `Source`, as the role names would otherwise suggest. On the other hand, FrameNet (Baker *et al.* 1998) names this role the 'Vantage Point', and in keeping with one reasonable way of analyzing certain perceptual verbs (see below), we might be justified as thinking of this as a `Source` of something that could be perceived, but it's being blocked. (The fact that it's not the `Source` of the designated `Theme` is something that would have to be handled with something more sophisticated than our simple θ-sets; compare our treatment of *buy* and *sell*, which has two `Agent`s—each also a `Source` and a `Goal`—and two `Theme`s, similarly unspecified with respect to the direction with which they are 'traveling' between the `Agent`s.)

- Class 17 (Verbs of Throwing), clearly involves movement, with putting and removing as extensions.

- Class 18 (Verbs of Contact by Impact) also involves movement, and adds the addition of impact to the acting-on component (as when one *bangs against* something), and Class 19 (the *Poke* Verbs) adds an effect (*y pokes through z*, etc.), but this 'effect' can be encoded as displacement (*through z*) or forceful action upon something (*jab z with y*).

- Class 20 (the *Touch* Verbs) includes the static locational variant extending towards the movement schemata. (I. e., *they touch* is perhaps most easily interpreted as refering to a state, with x *touched* y refering to the movement of x, or a part of x, into contact with y.)

- Class 21 (Verbs of Cutting) is clearly a specialization of acting-on that can go towards movement; i. e., you can *cut something* (affecting it), or *cut something apart*, or *cut* one element off of another element, etc. (Levin's alternation 2.5.6, our Table 3.2, p. 60.)

- Classes 22 (Verbs of Combining and Attaching) and 23 (Verbs of Separating and Disassembling) involve movement that is possibly symmetrical, possibly with instruments of various kinds, the latter also generally involving the movement or attachment of something (*tape*, *glue*, *nails*, etc.) onto something else. Another complication is found in the latter class: *differ* (in subclass 23.4), is often abstract; it's paired with *diverge*, which can be locational however, and in a literal sense. To force *differ* into our schemata, we'll need Jackendoff's (1983) Identificational field: to say that x differs from y is to say that x is not at the same place, identificationally, as y.

- Class 24 (Verbs of Coloring) involves the movement of coloring or other finishing substances and/or the acting upon something via colorization (as when you *tint* or *varnish* something).

- Class 25 (Image Creation Verbs) involves image movement (as when you *illustrate* something), possibly with an effect on the z acted upon (if *incised* or *etched* with something, for instance).

Here's where we'll skip over some of the more problematic classes; we'll return to them later.

- Class 35 (Verbs of Searching) clearly involves movement, though it's movement directed at a possibly mobile or hidden `Goal`, or one whose location is unknown; thus an area may need to be searched to find such a `Goal`, and that area itself shades off into something that might seem to be affected by the action, i. e. acted-upon.

- Class 36 (Verbs of Social Interaction) is made up of verbs that essentially involve two `Actor`s doing something together, perhaps acting on each other, and these can shade off into one `Agent` acting on the other entity, now more like a `Patient`; the language facilitates this with alternations like *Suzy and Marge fought* vs. *Suze fought Marge* (Levin's Simple Reciprocal Alternation, 2.5.4, our Table 3.2, p. 60.) The details of some of the verbs will have additional Locational components, such as with x *collided with* z or x *visited* z.

- Next up are Classes 37 (Verbs of Communication) and 38 (Verbs of Sounds Made by Animals), for verbs like *ask* or *read* or *scream* or *bark*. We'll think of them as having a specialized y—i. e., a sound, or a message being communicated (in one direction or the other); they appear in the expected syntactic constructions for concepts that have a `Theme` and a `Recipient` or a `Goal`, or a `Source`.

More complications occur in the next classes.

- Classes 39 (Verbs of Ingesting), 40 (Verbs Involving the Body), and 41 (Verbs of Grooming and Bodily Care) all *include* verbs involving movement of the body or of some item or substance to or from, or into or out of, the body—but some of the verbs simply involve doing something with the body, or almost anything that just happens to involve the body. As we tried to suggest above, the long-term goal here should be not to see whether our schemata can make meaningful distinctions between all these verbs, but to see whether or not there's anything 'in the verbs' but not in the schemata that is relevant for argument realization (or, later on, polysemy, though for the moment this is a concern for the future). Some of the semantic components highlighted by Levin's classifications are clearly more important than others, depending on the verb. Some of the Class 39 verbs, for instance, seem to focus more on aspects of the social activity of eating, rather than on eating in and of itself: Subclass 39.5 (the *Dine* Verbs) includes *banquet*, *feast*, *picnic*, etc. So in terms of our schemata, this is an elaboration on *doing* something that only happens to involve the taking-in of food, etc. But this is okay, and may even be useful eventually in explaining the difference between *banquet*, *feast*, *picnic*, and *eat*, the former all requiring *on*, if the thing eaten is to be expressed at all, while *eat* forbids the use of the preposition:

(194) We banqueted/feasted/picnicked *(on) roasted turkey.
(195) We ate *on roasted turkey.

These, of course, are the sorts of distinctions that Levin was thinking of in classifying her verbs in the first place.

Though Classes 40 and 41 generally concern acting on the body or doing something with the body, some of them are further problematic in having merely to do with sensing something with the body, for instance. The next big set of complications, then, is with these classes. One might expect, in retrospect, that a class that is characterized first of all simply as the verbs that happen to involve the body in some way might in fact cut across the apparent characteristics of Levin's other ways of organizing the verbs, and that appears to be the case here. As a result, our intent here to quickly characterize the Levin classes at the topmost level, viewed against our schemata, isn't going

to work. Even if we look at the next level of Levin's subdivisions, we'll find a more mixed set of verbs. Class 40.1 (Verbs of Bodily Processes) contains verbs that can optionally be used to express the movement of something from the body (*breath into the bag*, Class 40.1.2, the *Breathe* Verbs) as well as those that simply express something the human body does sometimes, typically involontarily (*So-and-so yawned*, from Class 40.1.1, the *Hiccup* Verbs).

(There's also a Class 40.1.3, the *Exhale* Verbs, whose verbs may be more finicky about expressing an explicit `Theme`:

(196) He inhaled the fumes.
(197) *He inhaled a deep breath.
(198) *He exhaled a deep breath.
(199) He breathed a deep breath.
(200) He breathed the fumes.
(adapted from Levin 1993, p. 218)

The contrasting verb *breathe*, again, is from 40.1.2.)

The other subdivisions of Class 40 include 40.2 (Verbs of Nonverbal Expression) and 40.3 (Verbs of Gestures/Signs Involving Body Parts), which involve doing something with various particular parts of the body, with the action possibly directed *at* something (201); in the case also of subclass 40.5 (the *Flinch* Verbs), it may be happening as a response to something, also realized with the preposition *at* (202); in other cases, either interpretation may be possible (203):

(201) She pointed at that.
(202) She flinched at that.
(203) She laughed at that.

The 'response-to' element is also present for other verbs, including some of those in subclass 40.6 (Verbs of Body-Internal States of Existence) and subclass 40.8 (Verbs of Bodily State and Damage to the Body), though the prepositional phrase may be headed by *from*, as in *she was still trembling from all that she had just witnessed*, or *her feet were aching from all that walking*. Verbs in subclass 40.4 (the *Snooze* Verbs) are simple intransitive verbs, merely expressing being in a certain state, though English happens to express that state in the present progressive (*so-and-so is sleeping*), making it seem like a case of x doing something, rather than x being 'in a particular state'; and this is consistent with these verbs using Jackendoff's (1983) Circumstantial field, rather than the Identificational one. (Recall our introduction of these fields in Sect. 1.1, p. 11.) The verbs in subclass 40.7 (the *Suffocate* Verbs) are quite different: they're all change of state verbs—our schema element y is a `Patient` that 'moves' to a different Identificational state, in Jackendoff's terms.

- Class 42 (Verbs of Killing) is similarly non-Locational, as one might expect, and furthermore, in this case the 'Identificational' change happens to mean going out of existence.
- Class 43 (Verbs of Emission) (for *emit*, *glow*, *sparkle*, etc.) is clearly *movement* of light, and other things, from a `Source`.
- Class 44 (the *Destroy* Verbs) (*destroy*, *demolish*, etc.), combines *acting on* and going out of existence, much like the *kill* verbs.
- Class 45 (Verbs of Change of State) is a kind of default class for all the other verbs that simply refer to an Identificational change—again, a kind of 'movement' but in a non-Locational semantic field, from a Jackendoffian viewpoint.

The next set of classes include a lot more verbs directly covered by our movement schemata—almost as easily as the Putting and Removing verbs were, in fact. But there are a few more complications first.

- The verbs in Class 46 (the *Lodge* Verbs), are slightly richer semantically, but still clearly locational, expressing variants of the notion of *staying* somewhere.
- Much of Class 47 (Verbs of Existence), in spite of the class name, involves *movement*, else mere being (as if literally) *in* existence; Levin apparently chose the class name (and chose to form the class) to draw attention to the way that English can express certain actions as if they are characteristics of the state of some locale (the state of its existence, so to speak), as in *this place is crawling with insects*, instead of *insects are crawling all over this place* (Levin's *Swarm* Alternation 2.3.4, in our Table 3.1, p. 58). Much of the class actually includes locational verbs (including *remain* and *stay*), verbs in which there is a change of state occurring (*bloom* or *grow* or *decay*), or verbs in which the `Theme` is sound (*echo*).
- Class 48 (Verbs of Appearance, Disappearance, and Occurrence) is for coming into (or going out of) existence and/or 'view', but many of the verbs are again often Locational (*gush*, *rise*, *spill*), though some of them (as in for something to *manifest itself*) may typically, or generally, *not* be Locational, in Jackendoff's terms.

The additional 'easy classes' (easily matched to our schemata, that is), whose class names themselves express their locational aspect, come next—followed immediately by more complications.

- Class 49 (Verbs of Body-Internal Motion), whose verbs lack an external `Agent`, or at least the language seems to construe things that way (for *fidget* and *squirm*, etc.); Class 50 (Verbs of Assuming a Position: *kneel*, *lie*, etc.); and Class 51 (Verbs of Motion: *tumble*, *run*, *fly* and many others) are all clearly Locational.

- Class 52 (the *Avoid* Verbs) happens to present more or less the same problems as our first real complicated case, i. e. Class 16 (Verbs of Concealment). The syntactic subject of verbs like *conceal* is doing something to keep something away from something else, or someone else, or their gaze, etc.; meanwhile the subject of verbs like *avoid* simply is the 'something' that is behaving so as to keep away from that something else, etc. (The avoided entity can also be something one is trying to avoid *doing*; the same is true of the corresponding argument of *keep* from Class 15, which we grouped with Class 16.) Thus these classes will need to be handled in a similar fashion.

- The verbs of Class 53 (Verbs of Lingering and Rushing) either involve *doing* something (possibly unspecified) in a particular manner (*hesitating*, etc.) or acting upon something else, causing it to behave in that manner (*rushing* someone in their activities, for instance).

- Class 54 (Measure Verbs) offers additional complications. Some of the verbs are clearly locational, though in a stative way (*this page contains a lot of words*) or a habitual way (*this room holds 30 people comfortably*). There are verbs like *bill*, *charge*, *fine*, or *save*, which have arguments somewhat reminiscent of *sell*'s (probably because the possible price of something is, or may be, involved), but in this case there's a `Theme` that appears to be a bill, charge, fine, or savings, and so on. Other verbs refer to the assignment of such values to an entity (*it was priced at $100*), the determination of some such value (*we measured the packaged*), or the mere expression of it (*it costs $100*).

- Class 55 (Aspectual Verbs) is for verbs like *begin* and *end*. These offer a complication present in a few verbs already encountered, though here the complication is perhaps more obvious: we have an $\hat{x}$ that is intended to be an `Actor`, i. e. a typically animate entity doing something; *begin* and *end*, however, apply to any event starting or stopping, effectively a *non-animate-doing* of something.

- Class 56 (the *Weekend* Verbs) refers to being somewhere for a period of time, specifying i. e. both a Locational and a quasi-Locational aspect, of time rather than space (a Jackendoffian Temporal semantic field).

- Class 57 (Weather Verbs) is largely for the 0-arity verbs like *rain* (or 0-arity senses of those verbs), conceived of as things like `fall(rain)`, i. e. describing movement, but with an incorporated argument. More generally, though, as a class, these verbs seem to be expressing something far less specific: something like *v-ing is happening*, where *v* is the verb, or sometimes just *v is happening*, where $v = rain$. (In fact, with this in mind, `fall(rain)` should seem redundant; `fall(rain-drops)` would be better, since `rain` itself might be conceived of as including, already, the element of falling.)

So, looking at things mostly semantically now (which seems to be Levin's intent in this half of her book), we have a large number of verb types that nonetheless can be

seen as fitting more-or-less into a Locational schema, as Jackendoff and others have long argued. But there have been half a dozen or so complications so far. Some verbs, like *conceal* or *shun*, may or may not be literally Locational, and there's more to the expressed behavior than simply being or not being in a a certain location (literal or figurative)—and more to the point, that behavior effects the interpretation and/or expression of arguments, as with *conceal*, whose `Source` argument, if that's what it is, is non-Locational, as discussed above. There are of course verbs like *differ* that seem inherently non-Locational, though they may pattern like other verbs that are often Locational (like *diverge*). It's crucial that we have a 'doing something' schema, since some verbs seem to express little more than that—or rather, whatever else it is that they express is an elaboration on 'doing', and not on anything else in our schemata. And some verbs, of course, are simply change-of-state verbs, where the change is not Locational, though Jackendoff re-uses his machinery for these cases by simply changing the semantic field label from Locational to Identificational.

And of course, we skipped over a set of Levin verbs. Here, too, we have to apply Jackendoff's notion of semantic fields rather heavily to fit things into our schemata.

- Classes 26 (Verbs of Creation and Transformation), 27 (the *Engender* Verbs), and 28 (the *Calve* Verbs) have to do with creation or coming into being (with some verbs in there that are more like doing); Jackendoff would take the phrase *coming into being* as evidence that we can think of this as being quasi-locational, as if literally traveling from non-existence to existence, and he has in fact an Existential field to handle some of these cases.

- For Class 29 (Verbs with Predicative Complements), some of its subclasses involve *doing*, or acting in a certain way (as in *so-and-so posed as as lifeguard*). But most name a `Property`, or some sort of classification, that is asserted to apply to one of the verb's arguments (as in *they labeled him a failure*). We left the θ-role `Property` out of our schemata. But of course, a `Property` like *red* or *green* is simply what Jackendoff treats as a location-like thing in the Identificational field, for a sentence like *the light went from red to green.* In spite of everything we've said so far, we're actually skeptical of the significance of this correspondence for constructions that have no obvious Locational counterpart. But we will make use of it in order to handle some of the remaining classes.

- Class 30 (Verbs of Perception), actually, is only problematic in a different sort of way: to fix in place a representation for these verbs we'll have to decide whether they involve movement of a perceived thing to the perceiver, or of the perceiver's attention to the other thing; or perhaps both. Verbs in one subclass (30.3 the *Peer* Verbs) require an oblique argument to define the path of one's gaze, etc., as in *she looked into the room*, suggesting, perhaps, that at least for those verbs the appropriate construction is $\langle$`Source`, p `Goal`$\rangle$, with some range p of prepositions, and with one's 'gaze' etc. the implicit `Theme`. (Refer back to p. 54 for the construction notation.)

- Many verbs in Class 31 (Verbs of Psychological State) are relatively unproblematic, with some entity *acting* on another in some psychological manner (*The babysitter teased the children*; for some of the verbs though the `Cause` might not be animate); for others it might be better to think of an entity coming into a certain state (*the events saddened her*)—we'll have to take that *coming into a certain state* as another quasi-Locational event, i. e. an Identificational one.

That leaves three more classes.

- Class 32 (Verbs of Desire) contains more verbs that should probably be analyzed within multiple semantic fields at the same time. These are verbs of *wanting* or *longing*, which have a quasi-locational component: some entity doesn't have something (or doesn't have enough of it); and that quasi-Locational (or Possessional) state then puts the entity itself into some sort of state, or causes that entity to be an `Experiencer` of a certain feeling. We might analyze this in two parts: first, the desired thing is not with the `Experiencer`; and then that state of things acts upon the `Experiencer` (making the `Experiencer` a special kind of `Patient`).
- And finally, Classes 33 (Judgement Verbs) and 34 (Verbs of Assessment) have an entity making a certain valuation of something (*so-and-so praised the work*), though some of the verbs can also be generic greetings (e. g. *greet* or *welcome*) or have a different sort of effect on the 'something' in question (e. g. *pardoning* it); other verbs express the process of simply making an evaluation (*analyzing*, *reviewing*, or *studying* it, etc.).

That, then, is a brief picture of how a quasi-locationalist, quasi-Jackendoffian approach fares when applied across something as broad as the set of Levin verbs. It probably appears that we have tried to grasp the complications that exist down at a more fully detailed level of semantics only to try to squeeze them through a comparatively simple space of highly general semantic relations. In a sense, though, that is also what Jackendoff has been doing, and other, very different work in linguistics is moving in a similar direction. Hale and Keyser (2002) are trying to explain the complexities of argument realization in terms of just four possible X-bar structures. Theorists like Baker (1997), considering syntactic behaviors cross-linguistically, and building partly on the work of Dowty (1991), suggest that there are really just three θ-roles (`Agent`, `Theme`, and `Goal`). It's quite possible—at least some of the authors just mentioned would consider it probable—that it's the *syntax* that is 'squeezing' the semantics through a very tight space, with room for only a few basic distinctions.

The question we want to ask now is: did the simplifications and generalizations of the above schematization cause much data to get lost? There's an interesting, highly indirect way of looking at this that we will present in the next section. It turns out that by simply viewing, in a very crude manner, the distribution of θ-roles

across the verbs, we can come up with an additional piece of evidence that the behavior of the verbs in argument realization (and perhaps polysemy, too), though apparently complex, is actually quite restricted.

4.2 Reverse-engineering the system

To appreciate a second way of filtering or reorganizing the data, which we present below, it's useful to consider the relative number of θ-roles (15 or so), θ-sets (over 200), and construction families (about 700), given the number of verbs (i. e. a little over 3000 in Levin 1993). We might also want: the size of the largest θ-set (5), and the size of the largest construction family (30-something, though about half are size 6 or smaller). What sorts of things can we discern from these numbers alone?

Well, there are about $2^{15} = 32768$ potential θ-sets, but less than 1% of those are attested here. Perhaps that makes sense: we might expect `Agent` and `Actor`, for instance, to be mutually exclusive, since we are using `Agent` to refer to (roughly) an `Actor` that is actually acting upon something, and usually having an effect on it. But given the existence of verbs like *buy* and *sell* that have two `Agent`s, it's not logically the case that they have to be mutually exclusive.

But we mentioned that the attested θ-sets are no larger than 5 in size. That still leaves the number of potential θ-sets at

(204) $\sum_{k=0}^{5} \binom{15}{k} = 4928.$

And less than 5% of them are attested.

Moving to the construction families (about 700 in number, with over 200 θ-sets), it's clear that a similar pattern will appear. The number of attested construction families is a tiny fraction of the number of potential ones, even given the small number of attested θ-sets.

Note, too, that we haven't even considered the question of the possible syntactic realizations, which we could also analyze in a similar manner, although we'd probably want to do so in a more sophisticated way in this case because with only a small number of θ-roles, we'd probably want to limit the number of ways a particular θ-role could be realized, and limit the number of ambiguities in such realizations (i. e. in order to refrain from giving each θ-role one of 2^p sets of possible realizations, where p is the number of prepositions).[1]

[1]Though it seems pretty clear what we are doing here in retrospect, it might be useful (as it was to us) to think of these calculations as a kind of 'Fermi problem' in reverse. An example of this can be found in Weisskopf (1986) (with some discussion in Walker 1977), though Weisskopf doesn't refer to Fermi problems by name. Weisskopf attempts to account for why the tallest mountains on Earth are on the order of 10 kilometers high, imagining (for the sake of the estimation) that mountains are blocks of silicon dioxide, and taking into consideration silicon dioxide's molecular weight and chemical bonds, etc. A normal Fermi problem (Morrison 1963) has the same character, but goes from basic facts to an estimation of something seemingly far less basic. For instance: Los Angelos is 3 times zones away from Washington, D. C.; there are 24 hours in the day; you can deduce from that (if you don't already know) that there are 24 time zones circling the globe. If you can estimate the distance between Washington and Los Angelos to be about 3,000 miles, then you now have an approximation of the the earth's circumference: 24 time zones × 3,000 miles / 3 time zones = 24,000 miles.

But there's one more question that we can answer in a more empirical manner. Since we are more or less given a set of θ-sets (of which we chose the θ-roles, of course, but in a way that always was dependent on the apparent semantics of the corresponding verbs), and since we are similarly given the set of construction families (using Levin's (1993) data in both cases), what does the distribution of the former over the latter look like? I. e. how are the θ-sets distributed over the construction families? Do things look even close to random? No, the following charts show that that is not the case at all. To fit the huge amount of data on a page, we've applied the union operator to each θ-family, so that each verb gets a set of θ-roles it uses in one or more constructions. We then collected together the verbs that are thus assigned to the same set of θ-roles. This is plotted on the top graph of the next page (θ-role vs. verb class). We also did something similar with the construction families; for each verb, we constructed the set of θ-role realizations; so for instance, if in one construction a verb realizes a `Goal` in a prepositional phrases headed by *to*, and in another construction realizes it as the object of the verb phrase (i. e. not inside a prepositional phrase), then the verb's set of realizations would include $\langle$*to*, `Goal`$\rangle$ and `Goal`. This is plotted in the bottom graph (θ-realization vs. verb class). Of course, the detailed information in the graphs has been obliterated due to their size, but providing that information here would have been somewhat besides the point in any case; what matters here is that the graphs are quite sparse, and on top of that, there's a strong clustering in both graphs around the θ-roles (or realizations) positioned near the center of the graph. (We used a quick-and-dirty clustering algorithm to put like verbs near like verbs, and to put similar sets of θ-roles (or realizations) near similar sets of θ-roles (or realizations).) The θ-roles that are getting all the attention are `Agent`, `Theme`, `Source`, and `Goal`, and, in the other graph, their realizations.

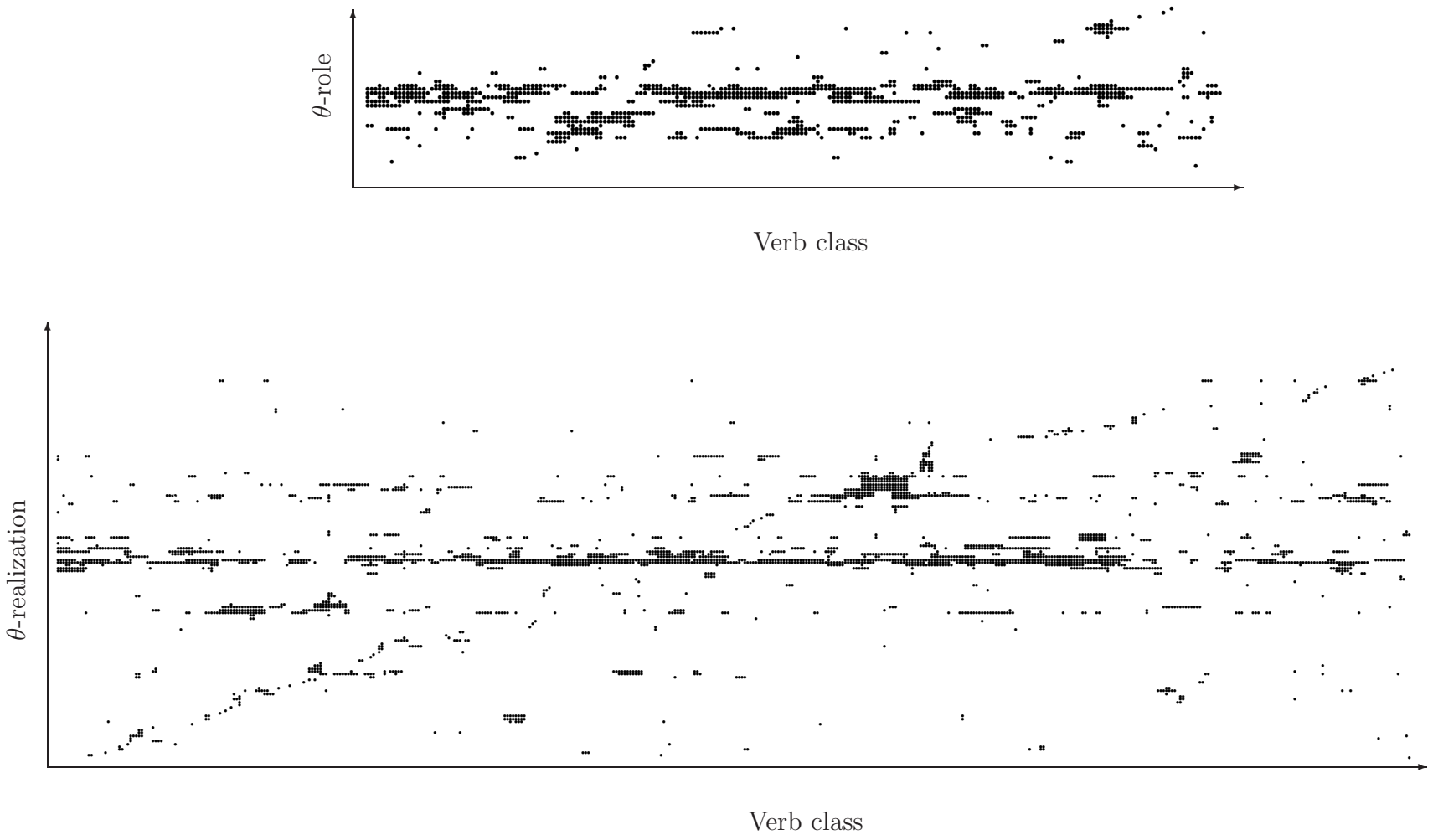


Figure 4.1: θ-roles and -realizations vs. verb class. Here, 'verb class' means the subset of the Levin (1993) verbs that uses a particular set of θ-roles (or realizations) in any of its θ-sets (or constructions).

Part III
Searching for a system

Chapter 5

Tackling idiosyncrasy

So where do we stand now with respect to verbs and their argument taking behaviors?

1) From our charts, it looks like a very small number of θ-roles (4 or 5) might 'cover' in some way most of the grouping of arguments into θ-sets and θ-families. Perhaps there's some syntactic restriction on the total number and nature of the roles (Hale and Keyser 2002, etc.); as we suggested in Sect. 4.1, underlyingly, arguments may have only a very small number of distinct syntactic positions to attach to, and perhaps it's these distinct positions that ultimately determine the patterns we see, putting a limit on the ability of semantic differences to lead to syntactic differences. Since our goal here is merely to provide evidence that there is a systematicity at work, though, we aren't going to delve into any possible mechanisms of the Hale and Keyser sort; we are simply going to show, in a completely different way (and in a much more precise way below than in Sect. 4.1), that a small number of θ-roles suffice to 'cover' the data.

2) We've known from the start, from our first contrastive pair *rob* and *steal*, that however semantically determined these phenomena may be, there will be additional complicating elements, given the existence of thematically identical verbs like *rob* and *steal* that diverge in their properties. (On the other hand, these are probably rare, and will probably remain rare even when including thematically identical verbs like *buy* and *sell*. Perhaps these form a kind of limiting case in some way, with most verbs *like* the verb *rob* or like *steal* exhibiting semantic particulars that make them a natural fit for the *rob* pattern, or for the *steal* pattern, rather than being arbitrarily assigned to one or the other, as seems to be the case with *rob* and *steal* themselves.) There are also phonological considerations, incidentally, implicit in our very brief mention earlier of the apparent limits on the dative double object construction, for instance (Pinker 1989, and citations therein).

3) Certain apparent idiosyncrasies remain largely untouched by anything we've discussed so far; for instance, the choice of prepositions, or whether or not an argument needs to appear with a preposition—and our examples here probably just scratched the surface.

4) And taking into consideration all the divergences of the type we're interested in, i. e. in the different sets of arguments a verb may use and in how they are

realized, there are a large number of 'polysemy patterns'—about 700 θ-families, for the approximately 3000 verbs we are looking at.

5) Thus the basic notion of a verb class (Fillmore 1970) needs to be firmly separated from the particular classes Levin (1993) posited, and other classes of that sort that attempt merely a kind of holistic grouping of verbs. There are a large number (470, or 67% of 700) of the 'true' or 'narrow' verb classes with only one member in them. Levin's classes are at best family relations (Wittgenstein 1953, Rosch and Mervis 1975, Lakoff 1987), which in this case, as a simple matter of fact, have no single set of constructions available to define the class, and in the worst case might even lack a significant, common set of semantic components.

In fact, it's probably worse than that. The notion of a family relation can be convenient because in some cases it is simply an (apparent) empirical fact that people categorize things in that way; if Lakoff (1987) is right, a word might be used in a number of different ways, and those senses may lack a common, core semantic notion that would cover them all—and yet somehow all of them seem inter-related anyway. (They might seem, in fact, to present themselves as an instance of polysemy, not homonymy). Wittgenstein used the various kinds of activities known as *games* as an example of a family relation; Lakoff (1987) (building apparently on Brugman 1981) argues something similar for the ways of using *over*

(205) Climb over the wall.
(206) Drive right over curb.
(207) Hang it over the window.
(208) Smear it all over the wall.
(209) Flip over the disk.
⋮

Goldberg and Jackendoff (2004) also suggest that the resultative constructions (p. 61) form a family relation.

But there appears to be no similar empirical fact for grouping the Levin verbs as she chose to do so—and thus, possibly no fact about language that we should look for to say anything about the grouping Levin created, because it is indeed an artificial thing (an 'artificial construct' as she herself says, in the quote we gave earlier, p. 51); it's not a natural thing that calls out for an explanation (as Lakoff evidently thinks the uses of *over* do).

So yes, returning to Fillmore and Levin, there is a cluster of verbs of change of possession which share the property of expressing their `Goal` argument in a PP headed by *to*, or alternately in the double object construction—to return to just one example. But the verbs in that class also widely differ from one another with respect to the other constructions. And so on for all of the other alternations that Levin (1993) lists that are used by more than just a couple of verbs.

As a result, a fully meaningful notion of a verb class might be nothing more that a set of verbs that truly do behave the same in respect to some small number of

criteria, but in other ways (generally) will diverge. This is in keeping with our charts at the end of Ch. 3. Interesting things might be discovered by looking at the cases where multiple verbs do seem to be indistinguishable by their θ-sets or argument realization patterns, but these cases are somewhat in the minority (numbering about 230, or 33% of the 700 verb classes), and will probably grow smaller in number as they are looked at more closely.

5.1 Words and Rules

We'll review now some of the positions one might try to take with respect to the data and analyses we've given so far. We mentioned the first and weakest positions earlier. There's the 'less-than-associative account': these apparent idiosyncrasies are in fact idiosyncratic, part of the mass of things (the listemes) that simply must be learned one-by-one (and, i. e., listed in the lexicon). Thus a natural language processing system must concentrate on acquiring somehow, for each word in the language (especially the verbs), enough data to determine all the idiosyncrasies governing the proper use of that word. The vast bulk of recent work in computational linguistics, taking advantage of the amount of language data now available in digital form to try to glean, from that data, what the idiosyncrasies a language's words are, are falling by default into a kind of less-than-associative approach.

We've already seen in a number of places, though, that this positions is certainly too weak, because it fails to account for the fact that a least some productivity (found in its full form with the +ing suffix, for instance, and found with less-than-full productivity with +ed) can also take hold with verb argument realization and polysemy patterns. Thus there is an 'associative account' that one might attempt to make. At the very least, there appears to be a tendency for verbs that realize their arguments in a certain way to group with other verbs of like meaning, with all of them realizing their arguments in a similar way. (Compare the patterns one finds with irregular verbs—should one use the regular form *sneaked*, or *snuck*, patterning it like *shrink*, *shrank*, *shrunk* (Pinker 1999)?) It also fails to explain regularities such as the occurrence of `Agent`s as subjects, etc. Let's suppose, in spite of the last-mentioned flaw, that a position that seems to handle certain vague patterns (such as the irregular verbs) might be taken by some as a reasonably safe, first approximation of what we are certain about in language. We'll call this the 'purely associative' account. We'll call an account enhanced with additional 'linguistic particulars' (the linking of `Agent`s to subject positions, etc.) a 'linguistically associative' account (or perhaps a 'language-based associative' account, understood not to mean specific to a particular language, but to natural language in general).

Note that, with everything we've presented so far, it would be very reasonable to think that a 'linguistically associative' mechanism is all there is behind polysemy and argument realization. The verb *steal* happens to realize its arguments in a certain way—reflecting, of course, certain broad patterns of argument realization,

such as the realization of `Agent` as subject; other verbs that mean something similar to *steal* may tend to realize their arguments similarly—but there might be other models available, as is in fact the case: the verb *rob* exists, so some of the verbs may behave like *steal*, others like *rob*. (And generally they would do so according to which of the verbs they are most similar to, of course.)

Similarly, some of Levin's Verbs of Putting will behave like *put*, with theme realized as object, but with only certain broad patterns of argument realization, giving for instance `Agent`s as subjects, there are still other possibilities for the realization of the other arguments of Verbs of Putting (i. e. the `Theme` and `Goal`; especially if the `Goal` is `Patient`-like); so some verbs will behave like *fill* rather than *put*, and others (*spray*, *load*, etc.) will behave like *put* sometimes and other times like *fill*.

Adding those 'linguistic particulars' is quite a challenge in itself. And yet the purpose of this research has been to consider the possibility that this 'linguistically associative' account is still too weak.

Consider Pinker's (1998) claim that necessary and sufficient conditions are a hallmark of rule-based rather than associative systems. This may be a kind of off-hand remark by Pinker, something not necessarily crucial to his argument. (Namely, that there are in fact distinct subsystems involved here; whether or not they can be accurately characterized as associative and rule-based is another matter. Then again, the very title Pinker chose, for his original article, and his book, and for the theory, is 'Words and Rules'.) It seems fair to point out, however, that a system may have certain hallmarks of necessary and sufficient conditions but still be so big and complicated that it might go beyond what (for practical reasons) one want to handle with a 'good old-fashioned AI' rule-based mechanism. Also, the rules of a system may themselves accrue or fade in a complicated way, depending on the lexical items acquired by the system. What if we uncover evidence of sufficient conditions at work with argument realization and patterns of polysemy? (Well, that's already been done in at least some areas, as with `Agent`s appearing as subjects.) What if we uncover evidence that, in spite of cases like *rob* and *steal*, the correct semantic encodings of verbs lead to the appearance of full productivity?

5.2 Limits to (ir)regularity?

With the above in mind, we should note first that there is a degree of pessimism with regard to the possible systematicity of the lexicon that is found in varying degrees in all the work we cite here that deals with the lexicon extensively. For instance, earlier discussions might have left the reader with the impression that at this point there are quite a number of potentially idiosyncratic decisions that have to made almost verb by verb to come to a reasonable Jackendoff-style decomposition of a semantic structure. This is more or less correct.

Jackendoff (1990), as we mentioned, attempts to produce what he calls a kind

of 'minimalist' lexicon—a 'minimalist' lexicon being, in this context, one whose entries would specify phonological structure (i. e. what the word sounds like), part of speech information (i. e. whether a words is a noun or verb or adjective, etc.), conceptual structure (the semantic representation), and nothing else.[1] But Jackendoff backs off from the 'minimalist' goal quite a bit, in the face of (what he sees as) seemingly unsurmountable challenges. The first problem is linking: the lexicon can be minimal only if argument realization can be fully predicted from the semantic forms. And the second problem, naturally enough, is polysemy: for a truly minimal lexicon, there should be a minimal number of semantic forms for each word, with others created automatically as necessary according to the procedures that define the patterns of polysemy. Both of these are real problems. Jackendoff does have some success at minimalization, succeeding, via use of a θ-hierarchy, to systematize at least the gross aspects of linking regularities (eliminating as a possible word **benter*, the 'backwards *enter*' used in *the room bentered her*, meaning *she entered the room*—Jackendoff's adaption of Carter's (1988) examples).

But he needs to use $\langle\rangle$-brackets on argument markers (designating optionality) to distinguish *devour* from *eat*—as in

(210) He ate his meal.
(211) He devoured his meal.
(212) He ate.
(213) *He devoured.

—the argument markers being the letters 'A' that he uses to the mark the elements of the conceptual structures to which a θ-hierarchy can be applied:

(214) $\left[\begin{array}{l}\text{eat}\\ [\text{CAUSE}([_{\text{Thing}}\,]^{\alpha}_{\text{A}}, [\text{GO}([_{\text{Thing}}\,]_{\langle\text{A}\rangle}, [\text{TO}\ [\text{IN}\ [\text{MOUTH-OF}\ [\,]^{\alpha}]]]\underline{)}\underline{)}\underline{)}]\end{array}\right]$

(215) $\left[\begin{array}{l}\text{devour}\\ [\text{CAUSE}([_{\text{Thing}}\,]^{\alpha}_{\text{A}}, [\text{GO}([_{\text{Thing}}\,]_{\text{A}}, [\text{TO}\ [\text{IN}\ [\text{MOUTH-OF}\ [\,]^{\alpha}]]]\underline{)}\underline{)}\underline{)}]\end{array}\right]$

Note the $\langle\rangle$ around only the 'A' marking the entity devoured; the superscripts are co-indices, showing in this case, that the `Agent` (the first argument of CAUSE) is also the `Goal` of the `Theme`, both being marked with an α.

Underlining stipulates optional pieces of semantic structure to distinguish e. g. senses of *open*:

(216) The door opened.
(217) She opened the door.

(218) $\left[\begin{array}{l}\text{open}\\ \underline{[\text{CAUSE}([_{\text{Thing}}\,]_{\text{A}}, [\text{GO}([_{\text{Thing}}\,]_{\text{A}}, [\text{TO}\ [\text{OPEN}]]\underline{)}\underline{)}\underline{)}]}\end{array}\right]$

[1] Jackendoff, of course, is playing off Chomsky's use of the term *minimalist*, as in Chomsky's Minimalist Program (1995).

$$\left[\begin{array}{l} \textbf{float into } \ldots \\ \ldots \\ \text{QUALIA} = \left[\begin{array}{l} \text{FORMAL} = \textbf{at}(\mathbf{e}_3, \boxed{1}, \ldots) \\ \text{AGENTIVE} = \textbf{move}(\mathbf{e}_2, \boxed{1}), \textbf{float}(\mathbf{e}_1, \boxed{1}) \end{array}\right] \end{array}\right]$$

Figure 5.1: Pustejovsky's (1995) entry for *float* has only the qualia element **float**(), gaining **move**(), and **at**(), as here, when it combines with *into*. But we lack a system for actually generating the full set of such lexical entries, or even predicting in full which ones might compose.

I. e. Jackendoff has no theoretical explanation for why the intransitive concept of *open* (216) can be expressed by the same word as the transitive concept (217), but simply marks the pieces of meaning that are added with the transitive version (the specific causer-of-the-action, i. e. the `Agent` or `Cause` component) as optional.

Pustejovsky (1995) appears to have an even more open-ended set of conceptual elements (he refers to them as qualia), combining them through co-composition: the figure below shows his structure for *float into*, derived from *float* and *into*, naturally enough. But whereas Jackendoff (1990) constrains things (in theory, at least) through adjunct correspondence rules and explicitly stipulated combinations of conceptual structure (stipulative though they may be), Pustejovsky's presentation of the material lacks even a notational device for doing the stipulations.

Levin's own variant of conceptual structure (intentionally much simpler than Jackendoff's) also leaves many possible regularities unexplained; Levin and Rappaport Hovav (1998) propose structures with slots for verb-specific semantic roots and conclude that much depends on which semantic roots fit in which structures. Here are some of their structures, and example roots (Levin and Rappaport Hovav 2005). <STATE>, <PLACE>, and <MANNER> become <DRY>, <BOTTLE>, and <JOG>, respectively, giving verbs *dry*, *bottle*, and *jog*.

(219) [[x ACT] CAUSE [y BECOME <STATE>]]
(220) [[x ACT] CAUSE [y BECOME IN <PLACE>]]
(221) [x $\text{ACT}_{\text{<MANNER>}}$]

They suggest that there exist lexical rules that cause a root of a certain type that appears in certain structures to appear in other structures as well. And they introduce some rules of argument realization to govern which arguments appear as subject or object. Unfortunately, beyond some discussion of the existence of different types of roots (e. g. of states, places, and manners, Levin and Rappaport Hovav 2005), their nature and distribution is—and they stress this—essentially uninvestigated.

We mentioned Levin and Rappaport Hovav (1995)'s pessimistic statement about *bleed* and *burp*, namely, that the causative uses

(222=105) The doctor bled the patient.
(223=106) The father burped the baby.

are simply idiosyncratic—not the result of some regular process. They even go so far as to suggest that they could be seen as something akin to the ungrammaticalities that are common in real speech (Pinker 1989), violations, according to Pinker, of the criteria that govern the make-up of his narrow conflation classes, but not the broad classes. Pinker suggests, though, as we mentioned early on, that those committing such errors recognize them as errors in retrospect. I. e., they're genuine performance errors. And if there are no other verbs behaving like *bleed* and *burp*, that could be because there's something about the concepts that those verbs express (in their causative use) that is not easily duplicated.

We'll go a bit deeper into Jackendoff's representations in section 5.4. We won't go any deeper than this because we only want to point out the degree to which these accounts fall short of (in Jackendoff's words) a 'minimalist' account of the phenomena—which is something each of the authors are very much aware of. As we've been saying, it may seem that the language data really is just messy: messy enough that it might in fact be reasonable to think the regularities really don't go much deeper than whatever is allowed already, as it happens, by these systems.

In fact, we know of only a couple of general approaches that might lead one to try to counter the 'linguistically associative' account. One is to take very seriously the notion that any learning device has to have a built-in bias of some sort (Mitchell 1990), and hypothesize biases that would affect the kinds of argument realizations and polysemy patterns that are available in a very specific way. One such approach, speaking very generally now, is the theoretical one that attempts to draw on work in syntax, trying to extend apparent regularities in syntax to matters of argument realization and polysemy, i. e. work such as Hale and Keyser's (Hale and Keyser 2002, etc.): if they're right, there's a unity to syntactic structure and argument structure, and an associative model has the extra burden of not just accounting for the 'easy stuff' (the nominally non-rule-governed stuff of Pinker's words-and-rules approach) but all the syntactic regularities that would (following Hale and Keyser) be related and would (following Pinker) be rule-governed. (Specifically, Hale and Keyser attempt to link argument realization regularities to, among other things, and barely scratching the surface here, the X-bar structures we very briefly introduced in Sect. 1.2.2.) Of course, other researchers are trying to embed rule-governed stuff inside a connectionist model (Smolensky 1988, Smolensky 2006); even if that ends up being successful, though, the details of the regularities will still need to be worked out—from a Mitchell (1990)-like viewpoint, it could be argued that this is really all that the generative approach to language (implicit in the 'rules half' of Pinker's dichotomy) is trying to do.

The other general way we know of for approaching these matters is to simply

look in a much more general way for signs of broad regularities. And that's the approach we are taking here. What follows are the initial results of a conceptually simple investigation, applied to Levin's (1993) alternation data; the results suggest that, notwithstanding the complications we've introduced throughout this work, there is in fact a strong and general regularity in the lexicon—one that isn't, in fact, reflected yet in a system like Jackendoff's, or Pustejovsky's, nor that of Levin and Rappaport Hovav.

5.3 'Linking' linking and polysemy

So what can we do to show that there is more systematicity here than the above authors have been willing to commit to?

The most straightforward approach, when confronted with the divergences in verb behavior that we have presented in the preceding chapters, is to try to refine the components of one's semantics, such as the θ-roles, until the divergent behaviors are all accounted for—or written off as mere accidents. In our terms, this would amount to a gradual enlargement of the set of θ-roles until each legitimate θ-set has only one way of being realized by any verb that utilizes it—except for those that are 'written off' as idiosyncratic.

Obviously, a simple mapping from θ-sets to their realizations (i. e. constructions) is not going to be achieved with the rather general θ-roles we've been using. There will tend to be realization divergences for each of the alternations we grouped together in Table 3.1 (p. 58), for instance. In fact, we'll have a one-to-many mapping from the full set of θ-sets (left, Fig. 5.2) to the set of constructions that realize those θ-sets (right, same Figure) for almost every verb in the lexicon—given that almost all of them (98% in fact) use at least one θ-set that has multiple realizations, given the set of 14 θ-roles we are going to use below. The example in Fig. 5.2 shows a divergence for *fill* and *put*.

Getting rid of this one-to-many mapping has thus seemed much too hard—so many different θ-roles seem to be needed. This has been used as an argument against the use of θ-roles (Pustejovsky 1991, and others) and/or as evidence that there just are a lot of idiosyncrasies that have to be stipulated by other means (as with Jackendoff, perhaps). Such complexities are one reason that Jackendoff works with conceptual structures, and their seemingly richer, more potentially useful formal properties; argument realization derives from those structures, not semantic roles labels attached to positions in those structures. (Though Jackendoff would allow you to produce a set of such roles defined in terms of the structures, if you wanted to do so.)

And in any case, we've seen that thematically identical verbs such as *rob* and *steal* can't really be distinguished by θ-roles anyway: no matter how specific the

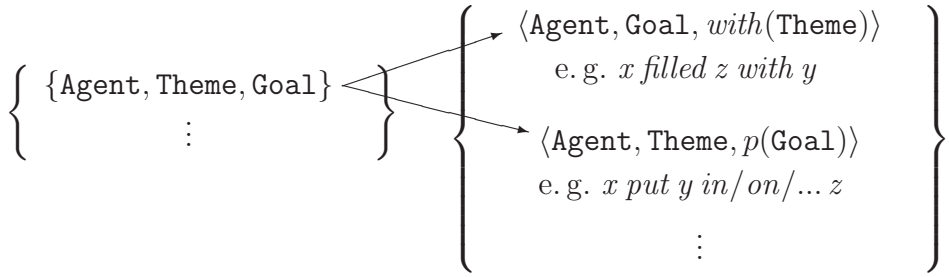


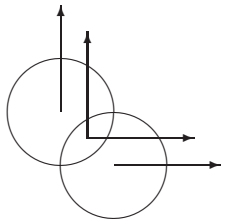
Figure 5.2: The one-to-many mapping from θ-sets to constructions, here showing a divergence for *put* and *fill*.

role names are, the two verbs will get the same θ-set. (Or at least, they ought to, if they reflect all and only the role semantics.) And of course there are at least a few other pairs of thematically identical verbs, like *buy* and *sell*.

But what if one goes ahead and partitions the verbs by θ-families anyway, using general θ-roles, and without a concern for the size of the partition? (Large, compared to Levin's set of a mere 190 or so classes.) We show here that this is exactly what one should do; that there is a kind of indirect 'way in' with this approach, a 'way in' to seeing that there are indeed systematicities here; this basically involves *ignoring* certain divergences while attending to others. It's an approach that in a way is complementary to the one that attempts to tackle divergences by refining θ-roles, or by concentrating strictly on purely syntactic regularities.

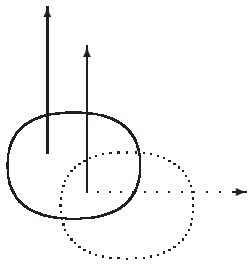
5.3.1 A complementary approach

What is this complementary approach? No one seems to have noticed that there even is one, in fact; or if they noticed it, apparently it didn't seem to be worth looking at. Pictorially, the conventional approach can be seen as an attempt to fix the problems that arise when one's analysis of verbal syntax and semantics leaves two different sets of verbs intersecting in some sort of syntactico-semantic 'space', even though they diverge in their behavior in that space, even inside the intersection—the facts showing distinct classes 'pointing' in different directions on one plane, so to speak, while intersecting in another.



(Put θ-sets, like {`Agent`, `Theme`, `Goal`}, inside the ovals; each oval has all the θ-sets some verb utilizes, but the frames in the intersections are realized differently by verbs attached to different ovals.)

A simple picture; but it suggest to us another way of going at these things. The conventional course concerns itself, so to speak, with those arrows in the intersections pointing in different directions—e. g. with the fact that *rob* goes one way, and *steal* another, on the θ-set {`Agent`[/`Thief`], `Source`/`Patient`[/`Victim`], `Theme`[/`Loot`]}. And this, of course, is considered a problem, if one wants to explain argument realization in terms of semantics (e. g. the θ-set). But the picture makes it quite clear (to us at least) that looking to see if the elements in the intersections go in different directions isn't the only question; instead, one could look to see if the elements that go in different directions always belong to different families (i. e. different ovals). In other words, for each divergent realization (say, the one represented by the dotted arrow below), is there also a distinct θ-family (i. e. the dotted oval)?



(Seeing argument realization as a problem of linking—seeing it, i. e., as a linking of verb arguments to particular positions in syntactic structure—and seeing θ-sets, enclosed within the circles above, as a representation roughly of the different senses of the verb—we'll see why that's a rough characterization in a moment—then if we can show 'diverging circles' for each pair of 'divering arrows', we'd be suggesting a link, so to speak, between linking and polysemy.)

Here again, then, are the examples of this pairing of divergences that we presented seen earlier; this time we'll include the rest of our formal apparatus. In in Fig. 1.1 (p. 6), we contrasted the behavior of *fill* and *pour* with children, marbles, and a bowl as arguments; here's the same example with workers, gravel, and bins:

(224a) The workers poured/*filled gravel into the bins.
b) The workers filled/*poured the bins with gravel.

(225) Gravel completely fills/*pours the bins.

We saw the pattern again with *fill* and *insert* (ps. 38-39). Those verbs, too, realize a shared θ-set {Agent, Theme, Goal} in different ways; but only *fill* can realize {`Theme`, `Location`}.

(226≈112)	They filled the space with air.	{`Agent`, `Goal`, `Theme`}
(227=113)	They inserted the cards into the slots.	{`Agent`, `Theme`, `Goal`}
(228≈115)	Air fills this space.	{`Theme`, `Location`}
(229=117)	*The card inserts this slot.	{`Theme`, `Location`}

Thus, we have another divergence in argument realization (here, on {`Agent`, `Theme`, `Goal`}) accompanied by a divergence in θ-family membership. (*Insert*'s family, but not *fill*'s, lacking {`Theme`, `Location`}.)

So what about *rob* and *steal*? Here, too, we get paired divergences: *steal* seems to use two θ-sets that *rob* doesn't use; thus *rob* and *steal* do in fact belong to distinct θ-families.

(230)	They stole/*robbed $1000.	{`Agent`, `Theme`}
(231)	They stole/*robbed away from the party.	{`Actor/Theme`, `Source`}

So we have divergences in argument realization co-occurring with divergences in what we will loosely call patterns of polysemy (*fill*, but not *insert* having a stative sense, as in *air fills this space*). Formally, we have in each case, first: at least one θ-set in the intersection of the θ-families for two verbs; and those verbs have divergent realizations for that θ-set. In symbols, let Θ_v be the θ-family of verb v, and let $\mathrm{C}_{m\in\Theta_v}$ be the set of realizations of $m \in \Theta_v$. (We're thinking of m as loosely representing a 'meaning' of v.) Note that $\mathrm{C}_{m\in\Theta_v}$ is a set: in general, a verb may realize a θ-set in multiple ways. Here, for instance, are the ways that *give* might be said to realize the set {`Agent`, `Theme`, `Recipient`}:

(232) They gave that money to the charity.
(233) They gave the charity that money.

(Another instance of the dative alternation, Levin's alternation 2.1, our Table 3.1, p. 58.)

To distinguish two sets S and T formally, let $\mathrm{S} \ominus \mathrm{T}$ be $(\mathrm{S} - \mathrm{T}) \cup (\mathrm{T} - \mathrm{S})$, i. e. the symmetric difference of sets S and T, containing all the elements in S but not in T, and in T but not in S. We will also override the meaning of C and apply it to θ-families (via their verbs) as well as θ-sets: C_v is the realization of Θ_v, i. e. the set of constructions realizing each of the θ-sets in Θ_v. To allow a one-to-one mapping from Θ_v to C_v, in spite of the existence of multiple realizations for some θ-sets, we'll require that Θ_v be a multiset where necessary: according to the example above (232, 233), Θ_{give} has two copies of {`Agent`, `Theme`, `Recipient`}, each realized a different

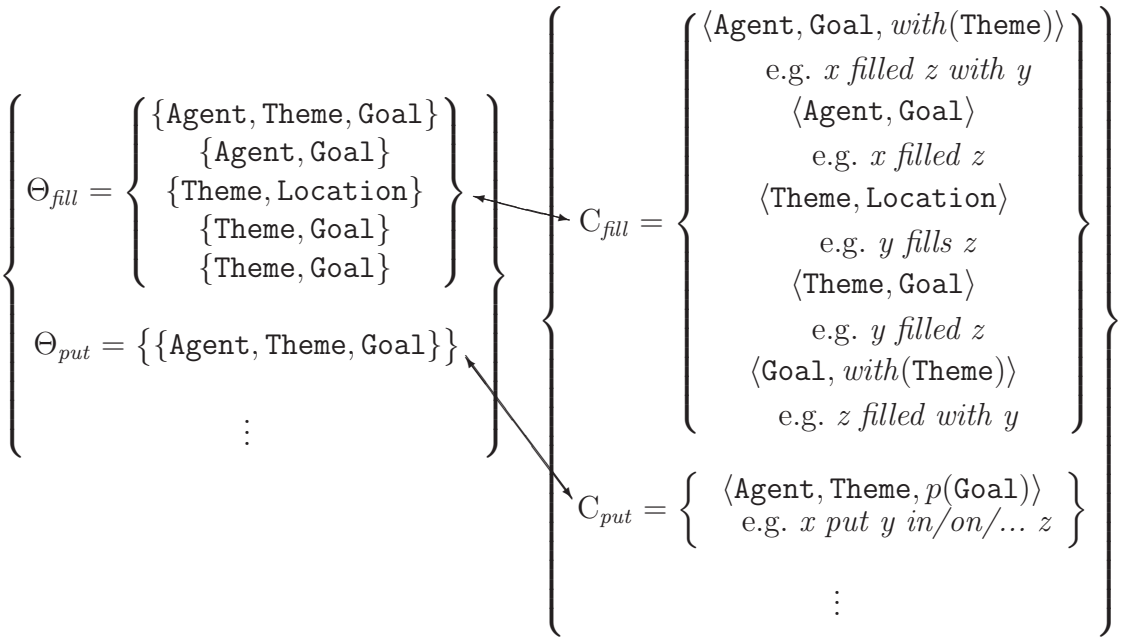


Figure 5.3: A diagram representing a one-to-one mapping from all valid θ-families to their construction families. Shown are, left, θ-families $\Theta_{\textit{fill}}$ and $\Theta_{\textit{put}}$; right, their corresponding construction families $\mathrm{C}_{\textit{fill}}$ and $\mathrm{C}_{\textit{put}}$, plus example skeletal sentences (for *put*, with some range p of prepositions). (For other reasons, we also require a one-to-one mapping from each θ-family to its realization; hence the multiset for $\Theta_{\textit{fill}}$.)

way. (Similarly, the multiset $\Theta_{\textit{fill}}$ in Fig. 5.3, which we'll describe in a moment, has two copies of {Theme, Goal}; we'll also see in a moment that we use these multisets to handle a particular feature of certain multiply-realized θ-sets.)

With these definitions, the pattern of paired divergences we saw above (224–233) can be formalized as follows:

The Rule of Co-occurrences:

(234) $\exists(m \in \Theta_u \cap \Theta_v)[\mathrm{C}_{m\in\Theta_u} \ominus \mathrm{C}_{m\in\Theta_v} \neq \emptyset] \;\Rightarrow\; \Theta_u \ominus \Theta_v \neq \emptyset \;\Rightarrow\; \Theta_u \neq \Theta_v$

I. e. the existence of diverging realizations on θ-set m for verbs u and v ($\mathrm{C}_{m\in\Theta_u} \ominus \mathrm{C}_{m\in\Theta_v} \neq \emptyset$) implies (according to the examples seen so far at least) that u and v have different (though overlapping) θ-sets: $\Theta_u \neq \Theta_v$. We hypothesize, in fact—as we've already shown by calling this a 'Rule of Co-occurrences'—that this a *general* rule, and not just a tendency, and that it applies in a non-trivial way, given an appropriate assignment of θ-roles. Most of the rest of this chapter, then, and much of the one that follows, will be concerned with supporting that claim and clarifying exactly what it means.

We said that we think of Θ_v as a rough way of representing the senses of verb v. This makes it useful to approach our hypothesis by way of a corollary; the

justification of its label ('Isomorphism') will appear in a moment.

(Corollary) Isomorphism:
(235) Each θ-family has only one possible realization.

(Proof: by way of a contradiction, suppose instead that $\Theta_u = \Theta_v$ for verbs u and v, but $\mathrm{C}_u \neq \mathrm{C}_v$. Then

(236) $\exists(m \in \Theta_u \cap \Theta_v)[\mathrm{C}_{m\in\Theta_u} \ominus \mathrm{C}_{m\in\Theta_v} \neq \emptyset]$

—i. e., there must be at least one θ-set m which u and v realize with different constructions. But then the Rule of Co-occurrences (234) applies immediately, leading to $\Theta_u \neq \Theta_v$, a contradiction. (Thus 234 $\Rightarrow$ 235.))

Thus, though the mapping from θ-sets to constructions is one-to-many (as diagrammed on p. 100), the mapping from θ-families to construction families may be one-to-one, even with general θ-roles—see Figure 5.3. (Construction families map many-to-one to θ-families by definition, since the former are just versions of the latter that have been ordered and decorated (e. g. with prepositional information). The above proof shows that the inverse mapping is also many-to-one; thus the mapping is really one-to-one.) To get the isomorphism, though, we'll have to assign the 'right' set of θ-roles—and they'll have to be the 'right' ones in two different ways. First, they need to make all the distinctions that appear to be necessary to create the isomorphism; but we also will insist that they be faithful to the concepts being expressed by the verbs, of course. Suppose, for instance, we were to assign {`Agent`, `Theme`, `Source`} to *remove* and *swindle*, as in:

(237) They removed the money from the vault.
(238) They swindled their clients out of $1,000,000.

Suppose further, for the sake of the argument, that *remove* and *swindle* happened to have the same θ-families, but—contrary to isomorphism—different construction families as well, as this divergence on {`Agent`, `Theme`, `Source`} suggests would indeed be the case. But only *swindle* specifically implies that the `Source` argument is also victimized by the expressed event (or tricked, or cheated, or something like that); thus we'd be fully justified in changing the role of that argument from `Source` to `Source/Patient`—i. e. the more general of the names we've given the corresponding arguments for *rob* and *steal*. Then the divergence above (237, 238) would disappear—different θ-sets are now involved, so there's no longer anything to diverge—and, unless there are divergences elsewhere, the isomorphism would no longer be threatened.

Note that in a purely formal way—that is, without any concern over the number or meaningfulness of the θ-roles—this same process could be applied to all problematic divergences, guaranteeing that an isomorphism is always formally possible. But we noted earlier that there exist (what we defined as) thematically identical verb pairs, like *rob* and *steal* or *buy* and *sell* (p. 45); as we argued there, for these verbs we won't be able to refine the θ-roles in a way that will distinguish the apparent

realization divergences, except by adding non-thematic material to the θ-roles. For instance, we could start by giving *buy* and *sell* highly specific θ-roles, like `Buyer`, `Seller`, `Goods`, `Money`; and since that still doesn't distinguish the verbs, we could 'cheat' and give *buy* the roles `Buyer/Topic`, `Seller`, `Goods`, `Money`, with *sell* taking the roles `Buyer`, `Seller/Topic`, `Goods`, `Money`. But in calling one argument or the other '`Topic`' we are merely labeling it with what is more or less the default discourse role of grammatical subjects (Mithun 1991); we might as well mark it '`Subject`' and do away with the semantic components entirely. So with these thematically identical verbs, realization divergences ought to be maintained, and isomorphism, then, will exist only if the Rule of Co-occurrences applies to these verbs too.

There are two more important complications to discuss. We use the term divergence co-occurrents to refer to divergences in one realm that are accompanied by divergences in the other. The first realm is argument realization, and the divergences are just different constructions realizing a particular θ-set. Given that we loosely equate θ-sets with the senses of a verb, one can guess that in the other realm, the most important type of divergence co-occurrent (for us) is: i) a difference in polysemy (here, existence of a stative sense for *fill* but not *put*):

(239) Air completely fills/*puts this space {theme, location}

But in this second realm a divergence co-occurrent may also be seen as merely ii) a difference in argument optionality:

(240) He filled the glass {`Agent`, `Goal`}
(241) *He put into the glass {`Agent`, `Goal`}

Thus, in less formal, but still precise terms, our rule of co-occurrences says that divergences in argument realization are accompanied by divergences in polysemy, or argument optionality. (Thus, for thematically identical verbs: if they diverge in argument realization, they *must* have divergence co-occurrences.)

There is one more important caveat, though. We stated that the θ-sets are multisets in general, but the formalisms above rather hide the consequences of that. First of all, given multisets Θ_u and Θ_v, with $m \in \Theta_u \cap \Theta_v$, we must take care to define $\Theta_u - \Theta_v$ so that if the multiplicities of m in Θ_u and Θ_v are j and k, respectively, then the multiplicity of $m \in \Theta_u - \Theta_v$ is the maximum of $j - k$ and 0. Consider the following situation for hypothetical verbs u and v:

(242) $\Theta_u = \{\{\alpha, \beta\}, \{\alpha, \beta\}\}, \quad \mathrm{C}_u = \{\langle\alpha, \beta\rangle, \langle\beta, \alpha\rangle\}$
(243) $\Theta_v = \{\{\alpha, \beta\}\}, \quad \mathrm{C}_v = \{\langle\alpha, \beta\rangle\}$

Common-sense suggests we should probably want to say that u and v realize $\{\alpha, \beta\}$ differently (only u does so as $\langle\beta, \alpha\rangle$), and indeed, according to our formalization of the Rule of Co-occurrences, this is the case, since $\mathrm{C}_u \ominus \mathrm{C}_v = \{\langle\beta, \alpha\rangle\} \neq \emptyset$. And as the rule predicts, $\Theta_u \neq \Theta_v$. But is this a difference in polysemy or argument optionality? Clearly, it isn't a case of argument optionality: both verbs realize the same arguments in the same combination (α and β). And on the surface there

doesn't seem to be a difference in polysemy here either, since both lexemes have only the one (generalized) verb sense, encoded as $\{\alpha, \beta\}$; u just happens to have 'two copies of it'.

In fact, we'll argue in a moment that, contrary to the current line of argument, it is still possible to interpret the Rule of Co-occurrences as non-vacuous even over elements of multiplicities > 1, for many of the affected verbs, at least. But first we want to present some of the data that caused us to set things up this way to begin with.

We saw a moment ago (232, 233) that *give* participates in the dative alteration; other semantically similar verbs, as one can guess by now, don't:

(244) They gave/donated that money to the charity.
(245) They gave/*donated the charity that money.

This, in fact, in the essentials, is just like our hypothetical case of verbs with multiset θ-families (242, 243); here, we have something like:

(246) $\Theta_{give} = \{\{\texttt{Agent}, \texttt{Theme}, \texttt{Recipient}\}, \{\texttt{Agent}, \texttt{Theme}, \texttt{Recipient}\}, ...\}$
$\mathrm{C}_{give} = \{\langle \texttt{Agent}, \texttt{Theme}, \textit{to}\ \texttt{Recipient}\rangle, \langle \texttt{Agent}, \texttt{Recipient}, \texttt{Theme}\rangle, ...\}$

(247) $\Theta_{donate} = \{\{\texttt{Agent}, \texttt{Theme}, \texttt{Recipient}\}, ...\}$
$\mathrm{C}_{donate} = \{\langle \texttt{Agent}, \texttt{Theme}, \textit{to}\ \texttt{Recipient}\rangle, ...\}$

This alternation (between 244 and 245), which *give*, but not *donate*, participates in, is the one considered more dependent on certain sound characteristics of the verb than anything else (see for instance Pinker 1989): verbs that sound like they come from Latin, as *donate* does, are much less likely to participate in it. There doesn't seem to be a semantic basis for the difference, so trying to connect syntax, semantics and polysemy becomes more problematic. Multisets, then, are a way of setting aside these problematic cases.

On the other hand, just because our general θ-roles give the same θ-set to two constructions that a verb appears in, thus failing to signal any meaning-differences with which to distinguish those senses of the verb, it doesn't mean that those constructions really do express a single sense of the verb. Though we argued that the differences within our 'argument preserving alternations' (Table 3.1, p. 58) are often quite minor (or even non-existent, p. 52), in fact for many of them the two constructions can clearly express something different, depending on the verb. The conative (Levin's 1.3) is one such case:

(248) They swatted (at) the flies.
(249) They shot (at) the fleeing suspect.

With some instances of the oblique form of the alternation (with *at*), the entity being *swatted* or *shot* at, etc., isn't necessarily hit or touched, etc., during that event. This is especially true with a verb like *shoot*: there's a big difference between being *shot at* and being *shot*. Hence there are two things being expressed here—at least with that verb.

Similarly, in one variant of the locative alternations (Levin's *Spray/Load* alternation, her 2.3.1)—

(250) They loaded the boxes onto the truck.
(251) They loaded the truck with the boxes.

—a 'holistic' effect has been suggested (references in Levin 1993): certain effects of the event described by the verb may be predicated more of a direct objectthan a oblique, again depending on the verb. In the examples above, all else being equal, the loading of the truck to completion is more likely to be expressed as in the second case (251); in the first example (250), at least, it's the loading of the boxes, not the truck, that should be considered complete.

Similarly, with the *Through/With* alternation (Levin's 2.9), the meaning of the expression strongly differs depending on the preposition used:

(252) They poked/pierced/jabbed the stick through the material.
(253) They poked/pierced/jabbed the material with the stick.

Used with the preposition *with*, only *pierce* implies that the instrument used went *through* the material (as in 252).

Thus, though the primary reason to use multisets was to accommodate alternation sensitivities that seem to have little if any semantic basis, nonetheless, there are also many cases in which there are real semantic distinctions that just happen to be masked by the highly general θ-roles we use—offering justification, at least in those cases, for the multiple elements in the θ-families.

5.3.2 Constructing the isomorphism

Since the isomorphism is formally always possible given enough θ-roles, what matters here is their number, their generality, and the number of θ-families. Is there a general (and small enough) set of θ-roles (relative to the number of verbs), such that many θ-sets are realized in multiple ways? Perhaps there are also a significant number of θ-families with multiple verbs, which might then theoretically have required different realizations, thus destroying the isomorphism? Our rule of co-occurrences is fairly straightforward to check, as it happens, given that isomorphism is a corollary. From Levin's (1993) data, which we presented, as she does, in terms of her alternations (Chapter 3), we can extract, in our terms, a θ-family for each 3000+ verbs of English. For each alternation, Levin lists a set of verbs that participate in the alternation; thus, each of those verbs gets both the θ-sets, and the corresponding construction, designated in the Section 3.1 tables. Since, in our terms, an alternation is typically a pair of constructions, Levin also lists, for each construction in that pair, the verbs that appear only in that one construction (of the two). This gives us other θ-sets and constructions to assign to the verbs. The end result is a θ-family and a construction family assigned to each of the 3000+ verbs; it was the result of this process that allowed us to construct Fig. 3.3 (the histogram of construction-family size, p. 70).

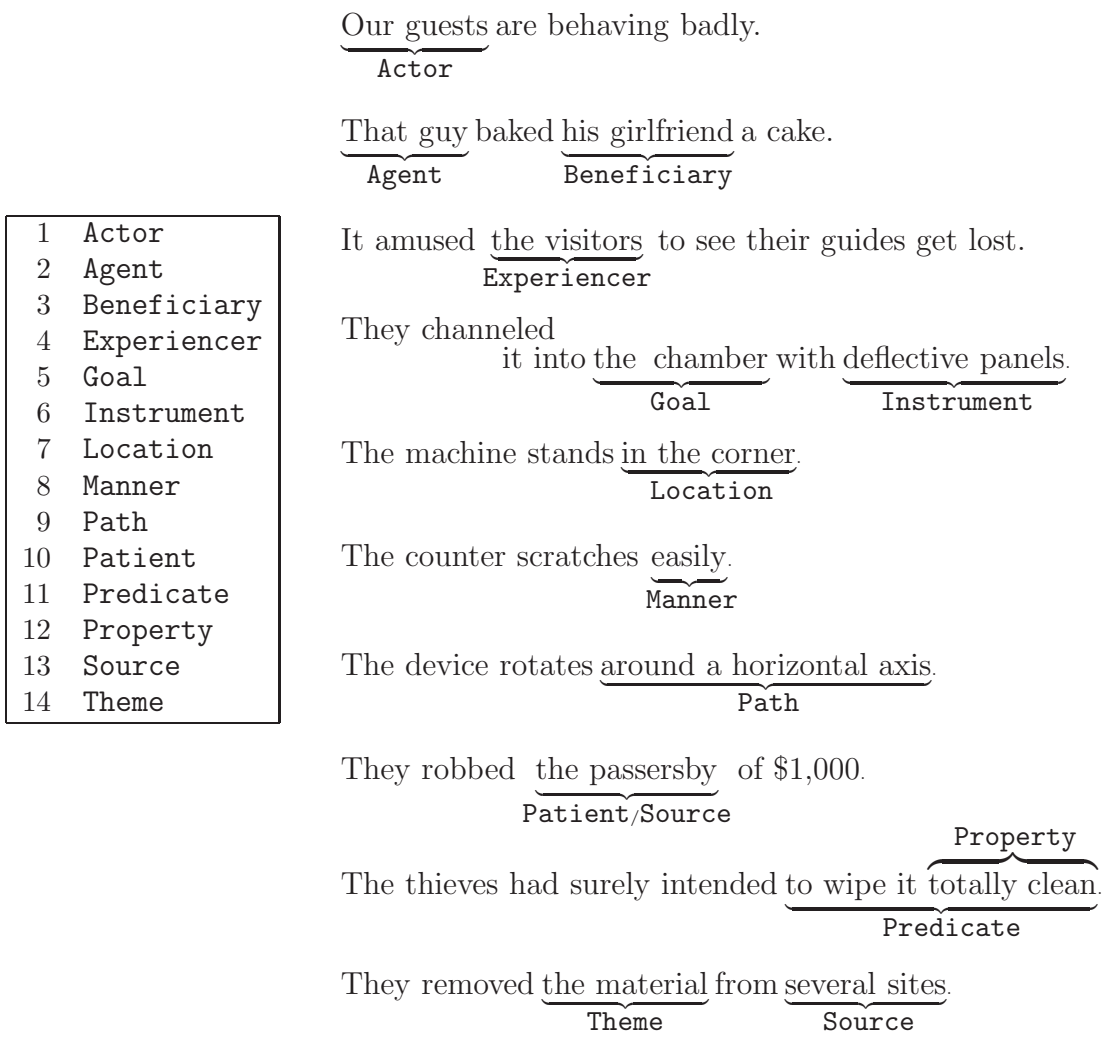


Figure 5.4: θ-roles used in the isomorphism; we've dropped some traditional role names (like `Recipient`) for some broader terms (like `Goal`, which we also use for other reasonable names we presented earlier, like `Result`). The role name `Predicate` is intentionally general: for verbs that take sentential arguments, those arguments can sometimes vary widely in their type. The internal argument for *know*, for instance, can name a state (*She knows the door is locked*) or an event (*She knows her friend is driving across the bridge right this moment*) or an embedded question (*She knows what to do in that situation*) among other things. For better or worse, we aren't distingishing these at this moment.

Each Levin verb, then, effectively induces a pairing between a θ-family and a construction family, and we can quickly iterate over the θ-families and count how many of them, contrary to our hypothesis, are paired with more than one construction family. Of course, since Levin did not actually give θ-roles to the constructions suggested by her alternations, we had to provide those ourselves; the θ-roles in Tables 3.1–3.5 (p. 58–64) were supplied by us by hand, in fact. Such θ-role assignments, given a smallish, general set of them (see Fig. 5.3.2), and given substantial familiarity with them, is fairly straightforward for *most* of the verbs and *most* of the roles. We gained that familiarity in previous work (Dorr *et al.* 2001), and the θ-role assignments used here were probably influenced in many ways by that work; many systematic changes, though, are necessary to do what we are doing here. We mentioned the problem briefly earlier, but in a way that may have suggested that it was merely a deviation from Jackendoff's concept of thematic relations, specifically for the assignment of the `Theme` role. In fact, the primary θ-roles from that earlier work are highly inappropriate for the current task, because they are effectively tied to syntax rather than semantics; the `Source`/`Victim` argument of *rob*, for instance, is given as `Theme`, since it is realized as an object, and since `Theme`s also stand for `Patient`s in that system. The `Victim` argument of *rob* is thus equated with the `Loot` argument of *steal*, and the actual semantic roles of the arguments are thus obscured. (There are some alternate θ-role assignments listed in Dorr *et al.* 2001; these in fact come from our initial steps toward the present task.) Some additional work that we've done, and other work that we are preparing to do, to check that we haven't achieved an isomorphism only by assigning unusual roles to verb arguments, is discussed in Section 6.1.

Levin, as we saw, fit 3000-plus verbs into 192 overlapping classes. To form our θ-sets, the assignment of θ-families to verbs initially used about 25 different θ-roles (partly inherited as a set from Dorr *et al.* 2001); this produced about 750 θ-families, hence 750 disjoint verb classes. (By comparison, Saint-Dizier's (1996) classifications for French produced 953 classes for 1700 verbs.) We could have kept the initial 25 θ-roles, but we noticed that we could collapse roles that weren't crucial to the isomorphism; for instance, we originally had a 5-way distinction between elements 'changing hands' in change-of-possession verbs, information being expressed by verbs of communication, sounds being emitted by various verbs of sound, items being perceived by certain perceptional verbs, and ordinary locational `Theme`s; in our final isomorphism, each of these is just given as `Theme`.

Thus in the end, far fewer than 25 θ-roles were needed for the re-classification: we created an isomorphism with 89% of the apparent construction families, using 14 θ-roles (`Actor`, `Agent`, `Beneficiary`, `Experiencer`, `Goal`, `Instrument`, `Location`, `Manner`, `Patient`, `Path`, `Predicate`, `Property`, `Source`, `Theme`; see again Fig. 5.3.2). The 14 roles give rise to 342 θ-sets ({`Agent`, `Theme`, `Goal`}, {`Theme`, `Location`}, etc., all of them in use in our isomorphism), 33% of which, as we mentioned, have more than one realization. For the full set of construction families, 553 (68%) have only 1 verb; 1 family has 198 verbs. As for the distribution of θ-families according to the number of θ-sets in the family, the most common size is 4—i.e. 4 θ-sets in a

θ-family. (Which can be predicted, given isomorphism and the histogram in Fig. 3.3, p. 70.) The complete list of construction-families, for the entire isomorphism, with the assigned Levin verbs, and some notes on the more questionable θ-roles assignments, is given in Appendix B.

So, though the classes have splintered into very small sets, the small number of θ-roles and the significant number of divergent realizations (existing i. e. for 33% of the θ-sets, but for practically all ofthe verbs) suggests that the isomorphism is non-trivial, reflecting a link between patterns of argument realization and polysemy that wasn't as visible before. And we think there's more. For the construction families we set aside (11%) thematically identical verbs therein potentially threaten the isomorphism, as *rob* and *steal*, and *buy* and *sell*, would if each pair didn't have a divergence co-occurrent. But investigation of that 11% of the verbs showed that there are no verbs even close to being thematically identical. Thus, we will in principle always be able to find semantic distinctions with which to enlarge the set of θ-roles, eliminating any apparently problematic divergences—i. e. ones that lack a divergence co-occurrent, thus breaking the isomorphism. (Interesting, though, it doesn't look like we'll really need many more roles to build a complete isomorphism; we'll discuss this briefly in the next chapter.)[5]

Thus, a difference in argument realization is a sufficient condition for a difference in polysemy, or in argument optionality. Recall that (Pinker 1998) associated sufficient conditions with systems more rule-governed than associative. On the one hand, it seems to us that the words vs. rules paradigm probably oversimplifies the possible distinctions between the two. On the hand, if the notion of a 'rule' is to have any meaning, it seems to us that a fully productive mechanism ought to be treated as following a rule; so in that way Pinker is right to make the distinction. Interestingly, Pinker's earlier work (Pinker 1989) was in the formation of lexical rules for exactly the kind of phenomena we have been looking at here. But it was Rumelhart and McClelland's (1986) work on connectionist accounts of past tense verb forms that motivated Pinker's later work on the existence of distinct rule-governed behaviors in that area (contra Rumelhart and McClelland); thus Pinker's focus shifted to suffixation, etc.

5.4 Idiosyncrasy's last stand?

So what is the status now of the apparent idiosyncrasies that Jackendoff and Levin and Rappaport Hovav each thought would simply have to be stipulated in the lexical entries for each of the affected verbs? It turns out that much of their claims of idiosyncrasy are safe, at least for now—but not entirely. And we should note just why this happens to be the case, and what it is that is in common between each of

[5]Note that for this use of θ-roles, we needn't be too concerned about the potential difficulties of producing a fixed, all-purpose set of them. Since the verbs form an open set, the θ-roles can also form an open set, as long as their number remains small with respect to the number of verbs.

those authors' claims: namely, and possibly contrary to first appearances, the idiosyncrasy they each refer to is in what we are loosely calling 'patterns of polysemy', and not in argument realization per se, for which our claim of isomorphism would come into play and assert the existence of a co-occurring difference in polysemy, thus undermining their claims of idiosyncrasy. For the particular example of Levin and Rappaport Hovav that we looked at, it is easy to see why their claim gets to escape our potential criticism: they merely suggest that causative constructions exist for some verbs idiosyncratically, given its nonexistence for other similar verbs.

(254=222) The doctor bled the patient.
(255=223) The father burped the baby.
(256) *The pollen sneezed the asthma patient.
(257) *The nurse sneezed the asthma patient as a test,
using a variety of dusts and pollen.

Thus, it's a divergence in θ-families: *burp*'s, but not *sneeze*'s, includes `Agent`. Since our rule of co-occurrences goes from argument realization divergences to θ-family divergences, not the other way around, nothing follows from Levin and Rappaport Hovav's example.

For Jackendoff, things are more complicated, and potentially more problematic, because of the ground he intends to cover with his mechanisms, which govern linking as well as (what we have been referring to as) divergences in polysemy. For his examples of optional conceptual structure, such as in

(258=218) $\underset{\cdots\cdots\cdots\cdots\cdots}{[\text{CAUSE}([_{\text{Thing}}\,]_{\text{A}},\ [\text{GO}([_{\text{Thing}}\,]_{\text{A}},\ [\text{TO}\ [\text{OPEN}]])]}\underset{\cdots}{)]},$

the additional pieces of conceptual structure are likely to correspond to an additional argument, and thus an additional θ-role, and an additional θ-set in the θ-family—again, a difference in 'polysemy' (or argument optionality), not argument realization per se, according to our formalism.

His optional argument markers, by themselves, have a similar effect: when the element isn't realized, it is implied; in our simple way of distinguishing things by θ-families, the difference between a piece of conceptual structure implied or simply missing is ignored, so this looks just like another case of divergent polysemy.

Something similar is arrived at with Jackendoff's stipulation of argument markers in general, combined with his adjunct rules. Jackendoff presents the following conceptual structure as a representation for *fill*:

(259) INCH[BE([ ]$_{\langle \text{A} \rangle}$, IN([ ]$_{\text{A}}$))]]
(from Jackendoff 1990, p. 253)

INCH is short for inchoative; it's Jackendoff's operator for turning statives (260) into events (261) (leaving out the representations of *completely* and *slowly*). (In Jackendoff 1983 the eventive INCH[BE] would have been realized as some instance of CAUSE[[GO[TO]]].)

(260a≈83) Pure oxygen completely fills this space.
b) BE([PURE-OXYGEN], IN([THIS-SPACE]))
(261a) Pure oxygen slowly filled this space.
b) INCH[BE([PURE-OXYGEN], IN([THIS-SPACE]))]

With the optional argument (of 259) unexpressed, this gives sentences like:

(262) This space filled slowly.

Jackendoff also has adjunct rules for realizing non-arguments, and specifically sanctions their use on optionalized arguments as if they were non-arguments; there's a rule that applies specifically to the INCH[BE] form, sanctioning sentences like:

(263) This space slowly filled with pure oxygen.

This has the same arguments as before (261), but with a different realization. (That's one of the things Jackendoff's adjunct rules are for.) There doesn't appear to be anything to prevent a structure that has the first argument of the INCH[BE] form as a non-argument only; let's assume it has the θ-set {`Theme`, `Goal`}, and underline the roles that are marked as arguments in Jackendoff's structures. For the hypothetical INCH[BE] with a non-argument first element, this would result in the first of the following representations (264a):

(264a) {`Theme`, <u>`Goal`</u>}
b) {<u>`Theme`</u>, <u>`Goal`</u>}

—whereas Jackendoff's actual structure (259) effectively says that both representations (264a, 264b) are valid, each for different realizations of the arguments. To repeat, Jackendoff's general argument realization rules, applied to the first variant (264a), can only produce the intransitive form (262); his adjunct rule, applied to the same variant, realizes the `Theme` as an oblique (263); the general realization rules applied to the second variant (264b) produce the earlier transitive form (261a). The hypothetical verb with only the first variant (264a) and another verb with only the second (264b) would diverge in their realization of {`Theme`, `Goal`} (263 vs. 261a); but because the adjunct rules are optional, the hypothetical verb would also realize {`Goal`} (i. e. as in 262), as our rule of co-occurrences requires.

But what might happen when Jackendoff's markings of optional structure are combined with his markings of argumenthood (or non-argumenthood)? Here's where Jackendoff's system starts to break down, given our Rule of Co-occurrences. Let's mark optional pieces of structure by underscoring with a dotted line; theoretically, we could have two verbs u and v with strictly distinct markups of θ-set $\{\alpha, \beta\}$, as in

(265a) u: $\{\alpha, \underline{\beta}\}$
b) v: $\{\underset{\cdots}{\alpha}, \underline{\beta}\}$

Both verbs realize $\{\alpha, \beta\}$, but differently (just as {`Theme`, `Goal`} is realized differently in 261a and 263). Here, one verb (v) realizes $\{\alpha, \beta\}$ as two arguments, while the other does so as an argument plus an adjunct. But v's piece of concep-

tual structural for α is optional, and u's α may be unexpressed because it isn't a syntactic argument; thus both verbs also have a realization for $\{\beta\}$. (It will be the same realization in both cases, according to Jackendoff's general realization rules for arguments; compare {`Goal`}, which can be realized as in 262). Thus the divergence of u and v on $\{\alpha, \beta\}$ is not met by another divergence—both u and v would have θ-family $\{\{\alpha, \beta\}, \{\beta\}\}$, but realize it with different construction families—and our rule of co-occurrences is violated, and there is no isomorphism.

So Jackendoff's mechanisms *almost* obey our rule, but not quite. He comes close, but by accident: he effectively encodes realization divergences via the combination of productive adjunct rules and argument optionality, or the optionality of pieces of conceptual structure; he gets the co-occurring divergences, *when* he gets them, because whenever the adjunct rules apply, their optionality also allows (in our terms) an alternate θ-set to be realized, in which the adjunct rules are not utilized. We suspect that the problem is that Jackendoff's structures are the same, in their semantic form, regardless of whether an adjunct rule is used, or isn't used, or doesn't apply in the first place (because all the relevant elements of the structure are marked as arguments). Our co-occurrence rule, however, suggests that the divergence in argument realization is due to some actual difference in the encoding (semantically or otherwise), and that some other productive process working off of the same encoding gives rise to the co-occurring divergence in polysemy or argument optionality.

Chapter 6

Toward a reappraisal

Thus the apparent idiosyncrasies in argument realization and polysemy have a suspicious character: if the ones that concern realization divergences really are idiosyncratic, then they are echoed at each point with an 'idiosyncrasy' in polysemy (or argument optionality). So on the one hand, certain things in language clearly are arbitrary—starting with the historically contingent names we give to concepts. In some cases, the language we happen to be acquiring may also give us radically different ways of encoding similar concepts, and in the extreme case give us thematically identical concepts that can be expressed in different ways, possibly utilizing different names, as appears to be the case with *rob* and *steal*. Then we have an encoding of the concept that can be expressed with *rob* in one construction, or with *steal* in a different construction.

On the other hand, from that choice of encoding, it appears that we can expect a difference in the set of senses that will get the same label (i. e. either *rob* or *steal*). We propose that this occurs because the encoding is a fairly deep one, at an effectively semantic level (rather than, say, a shallow one that simply designates argument order and prepositional requirements, as i. e. the traditional subcategorization frame does.) Argument realization then follows from the semantics via some set of more-or-less general rules, and polysemy follows from the same semantics via its own rules, thus creating the patterns that have long been noticed in both areas. The catch, of course, is: what are the semantics precisely, and what are the rules? Our co-occurrence rule merely suggests, following the argument we just gave, that such rules and semantics exist; it doesn't, of course, really tell us what they are. (Though our θ-sets may in fact suggest something important about the semantics, though only at a general level, since they are fairly general θ-roles.)

But perhaps we are getting ahead of ourselves. It is a rather curious thing that our co-occurrence rule hasn't been formulated by other researchers much earlier, given our earlier discussion (p. 37) of the degree of interest in recent years in lexical semantics and the syntax/semantics interface. But none of these researchers appear to have *really* looked to see how extensive such interactions might be—or at least, not in a quantitative way. In the next sections we will consider the possibility that we, going the other way, might have been looking *too* hard, and only really seeing just what we wanted to see.

6.1 Prospects for completing the isomorphism

Let's start by emphasizing that the rule of co-occurrences is in fact falsifiable. In fact, logically, it is highly falsifiable. It is certainly possible, logically, that a language might have many, many thematically identical verb pairs (like *rob* and *steal*, or *buy* and *sell*), and that many of these pairs could have distinct construction families; and they could also have—contrary to all the cases we have looked at—identical θ-families under any semantically faithful set of θ-roles. (Even a few such pairs violating isomorphism would force us to qualify our results by saying an isomorphism *tends* to form; and we wouldn't necessarily be surprised to find a few such violations—though we haven't yet.)

Linguists seem to tend not to believe that much real synonymy exists, though, and might also extend that belief toward the existence of thematically identical verbs. That may be partly because they haven't considered that apparent opposites like *buy* and *sell* are similar to *rob* and *steal* (i.e. thematically identical); but in any case, the number of cases of both real synonymy and thematic identity does in fact seem to be small. We had to do a partial check of this, as we mentioned in the last chapter: before we could put much value in our isomorphism, we had to search carefully for potential thematically identical verbs in the section was left out (the 11% that lies outside the isomorphism)—since the existence of such pairs outside the isomorphism would signal exceptions to the rule of co-occurrences, unless we could find new senses for them that were missing from our database, in which case they might cease to be thematically identical. But this was one case where the data seemed to go easy on us, since we didn't find any verbs that even came close to being thematically identical.

Again, for the verbs that seem to diverge in argument realization, but are merely similar in meaning, we will always be able to assign θ-roles in such a way to make their θ-families different (enlarging the set of θ-roles if necessary), thus preserving the isomorphism. Interestingly, though, very few new θ-roles seem to be needed. This was a surprise. We had conjectured (Thomas 2007) that we might need quite a few more roles, given the number of verbs left outside the isomorphism. We envisioned getting less and less 'mileage' out of every new θ-role, inventing narrowly-tailored roles to handle just one or two verbs as we painstakingly enlarged the size of the isomorphism, for all the Levin verbs, and for verbs beyond Levin. But a closer look at the verbs we left out of the isomorphism covered by those thirteen θ-roles we used (Fig. 5.3.2) suggests that that is not the case at all. We apparently need one more role to distinguish senses of *for*. (Jackendoff 1990 discusses several senses of *for* but still misses some found in Levin 1993.) But it appears like we would only need 2 or 3 more roles for other cases like that.

Can we provide other evidence that we didn't miss senses that might break the isomorphism, or evidence that we didn't skew the semantic analysis in some way, creating perhaps θ-families whose words' semantic similarity was either under- or over-estimated? As it happens, there are a couple of large-scale lexical resources

being constructed that can help us test this in the future. Here's some data on some preliminary comparisons.

The PropBank project (Palmer *et al.* 2005) supplies argument realization information (subcategorization frames) for verbs. They characterize the specifications given, in fact, as semantic roles. Unfortunately, this is misleading. Propbank is trying to close gaps in the analyses found in the Penn Treebank (Marcus *et al.* 1993), the collection of parses that is the gold standard against which to test current parsing systems. The Penn Treebank parses are surprisingly shallow when it comes to argument structure. To se this, we've given three sentences below that, on the surface, only differ in whether the verb in use is *put*, *read*, or *move*. But the possible bracketing of the sentences also differs depending on the verb. To make things somewhat easier to interpret, we've supplied some θ-roles, based on the interpretations available for *move*. (For the sake of the argument, imagine, in the case of *read*, that a reference to a book one is reading is primarily a reference to an abstract thing, a `Theme`, that one is absorbing, in a quasi-literal way. See Pustejovsky 1995 for a way of handling the interpretations of *book*—shelving a book, reading a book, writing a book, etc.) We'll use a modifier that we'll call a `Location` to refer to the spot where the *moving*, *putting*, or *reading* event takes place—which is distinct from the `Goal` onto which the `Theme` of the event might be *put*, etc.

(266a) Sue moved the book on the table.

b) Sue [moved [$\underbrace{\text{the book}}_{\texttt{Theme}}$] [on(to) $\underbrace{\text{the table}}_{\texttt{Goal}}$]]

c) Sue [read [$\underbrace{\text{the book on the table}}_{\texttt{Theme}}$]]

d) Sue [[moved $\underbrace{\text{the book}}_{\texttt{Theme}}$] [$\underbrace{\text{on the table}}_{\texttt{Location}}$]]

(267a) Sue put the book on the table.

b) Sue [put [$\underbrace{\text{the book}}_{\texttt{Theme}}$] [on $\underbrace{\text{the table}}_{\texttt{Goal}}$]]

c) *Sue [put [$\underbrace{\text{the book on the table}}_{\texttt{Theme}}$]]

d) *Sue [[put $\underbrace{\text{the book}}_{\texttt{Theme}}$] [$\underbrace{\text{on the table}}_{\texttt{Location}}$]]

(268a) Sue read the book on the table.

b) *Sue [read [$\underbrace{\text{the book}}_{\texttt{Theme}}$] [on(to) $\underbrace{\text{the table}}_{\texttt{Goal}}$]]

c) Sue [read [$\underbrace{\text{the book on the table}}_{\texttt{Theme}}$]]

d) Sue [[read $\underbrace{\text{the book}}_{\texttt{Theme}}$] [$\underbrace{\text{on the table}}_{\texttt{Location}}$]]

Thus there are three possible parses with *move* (266b–d), only one of them possible with *put*, the other two possible with *read*. But to choose the correct analysis, the argument realization requirements of the verb in use needs to be known. (The verb *put* requires three arguments, thus eliminating as possible parses the parses with only two arguments; *read* doesn't allow three arguments here, eliminating the parse that has three arguments; *move* accepts but doesn't require three arguments, leaving all three parses as possibilities.) But the builders of the Penn Treebank decided that it was too hard to make a large treebank that handled these distinctions, and thus chose to ignore them.

And that creates a gap in the Penn Treebank's utility as a source of linguistic data; and this is the gap that PropBank is working to close. Unfortunately, while choosing to do this—and in spite of the name 'Propbank', suggesting proposition, in turn suggesting something to do with semantics—PropBank's creators also chose not to make any general, lexicon-wide decisions about the actual conceptual roles of the arguments they are listing, believing that that is still too difficult a question to deal with at this time.

Thus arguments, in fact, are labeled first and foremost according to syntactic position. For *fill*, they give:

Arg0: agent, causer

Arg1: container

Arg2: substance

For *put* the roles are:

Arg0: putter

Arg1: thing put

Arg2-LOC: where put

Note that *fill*'s Arg1 is really the `Goal`, with Arg2 the `Theme`, while *put*'s Arg1 is the `Theme`, and Arg2 is (a kind of) `Goal`. So the `Theme` is a 'substance' in one case, a 'thing put' in the other, and the `Goal`s are either a 'container' or simply a 'where put'. Even the `Agent` of *put* is given the verb-specific name 'putter'.

Furthermore, there is often just one entry for what we would call a verb's θ-family; so one can't tell whether an argument is obligatory (as *put*'s Arg2 more or less is) or optional (as *fill*'s Arg2 most certainly is—when the `Agent` is present). Thus all that PropBank directly gives us is, perhaps, the size of the largest θ-set in a verb's θ-family.

So there isn't much we can test here directly. But we can see how often our largest θ-set in a θ-family matches in size the number of arguments specified by PropBank. First of all, only 2009 (66%) of the Levin verbs are in PropBank. This is one of the challenges of a corpus-based approach. (PropBank is trying to supply analyses for precisely the corpus for which the Penn Treebank trees were constructed.) One can process tens of millions of sentences and not come close to capturing the lexical knowledge of a literate adult, such as the one who put together the database (i. e. Levin 1993) that we built our isomorphism with. (And very, very few of the Levin verbs—probably less than a dozen—seem rare to us; the overwhelming majority of the Levin verbs not in PropBank would certainly be instantly recognizable to any reasonably literate speaker of English.) For 866 (43%) of those 2009 verbs in the intersection of Levin (1993) and PropBank, the number of arguments listed in Probank was the same as the size of the largest θ-set we had assigned to the verb based on the data in Levin. We gave 781 (39% of 2009) a θ-set that is larger than the set of arguments listed in PropBank. Thinking of the θ-sets as loosely representing a 'sense' of a verb—which, again, is exactly how we've been thinking of them—PropBank thus seems to be missing senses for those 781 verbs. We confirmed this to be more-or-less true fairly quickly, by looking at some of the θ-sets we created that PropBank couldn't account for. Though Levin lists a few things that seem ungrammatical in our idiolect, and thus we would expect to find a few cases in which we would agree with PropBank over Levin, this didn't happen at all with the spot-checking we did of the θ-sets in question, convincing us that the results of any thorough test would go overwhelmingly in Levin's direction—showing i. e. that in these cases it's generally PropBank that ought to be changed to conform with Levin's data, and not the other way around. That leaves 362 verbs (18%) whose PropBank data implies that a corresponding θ-family in our database might be missing a sense, and future work will concentrate on those verbs to look for possible exceptions to our rule of co-occurrences.

Another important resource is FrameNet (Baker *et al.* 1998). It has proved more promising so far. On the one hand, it puts *rob* and *steal* in different semantic frames, potentially obscuring the fact that they really should be treated as thematically identical. On the other hand, their arguments get semantically consistent, if overly specific, role names: in our notation, their θ-family would include the set {`Perpetrator`, `Goods`, `Victim`}.[1]

Going back to those overly specific role names themselves, one can see another problem: there are no less than 391 different role names in FrameNet—or possibly a bit over 350, if we take into consideration that some of the names are 'compositional':

[1]But the `Goods` is not considered a 'core' role of Robbery (which is *rob*'s semantic frame), while a `Source` distinct from the `Victim` is considered part of the core—another case of the syntactic facts affecting the semantic judgements. (Rob a bank, you are taking from a `Source`; rob a person to take from a `Victim`. Actually, in neither case does the syntax require you to name the `Goods` taken.) On the other hand, `Goods` is a core role of Theft (*steal*'s semantic frame), as is `Victim`; so already one can see the problem that we are about to introduce in another way: we'll have to figure out which FrameNet roles map to our roles.

impactor is one name, as well as impactee, so they may break up into impact, +or, and +ee. It seems likely that there will be, from our perspective, many overly specialized distinctions between verbs that will make our co-occurrence rule harder to break: fine-grained roles mean fewer shareable 'θ-sets', hence fewer possible co-occurrence rule violations. It also makes it much harder to directly compare the FrameNet argument semantics with our θ-roles; the starting numbers are a little worse here, too: only 1478 (48%) of the Levin verbs have analyzed arguments in FrameNet (vs. 66% in PropBank). But we can do a preliminary check of our basic idea of isomorphism using just the FrameNet data. And 'right out of the box', i. e. using the semantic roles assigned by FrameNet, we can build an isomorphism with 91% of the verbs—which is not surprising, given, the large number of those roles. However, 89% of the verbs still diverge from one another on at least one realization, and the co-occurrence rule holds for 88% of them. (By comparison, 98% of the 3000+ Levin verbs diverge from one another in realizing some θ-set, and the co-occurrence rule holding for 82% of them.) This is evidence, then, of the genuineness of our isomorphism for the Levin verbs, though additional work ought to be done to systematically replace those FrameNet roles with more general ones—hopefully not much more than a dozen or so in number—so that the isomorphism, if it still exists, will be less trivial. Note, though, that the most direct approach here—just going through all the cases and deciding, for instance, that `Perpetrator` is really just a special case of `Agent`—isn't much different from what we did in assigning `Agent` to the corresponding Levin verb arguments in the first place (i. e. looking at the set of verbs Levin grouped together with *rob* and *steal* and deciding that the argument naming an entity harming another entity in some way was an `Agent`). The main interest in doing this, obviously, will be in seeing how often, if ever, the FrameNet role names seem to be something other than specializations of the role names we picked.

6.2 Prospects for generating the lexicon

But tests like the above—though they have the additional benefit of aligning the present work with other resources—are not the only way to strengthen the work already done. To fully evaluate our rule of co-occurrences, and to more completely test it against whatever data we can find, our hunch is that we need, just as strongly, and probably more so, a deeper theory of why those co-occurrences occur.

We should emphasize something that we did *not* claim above, when we suggested that it appears that we might need very few θ-roles even to build an isomorphism for all the verbs of English. This is *not* to suggest that only 14 or so θ-roles are needed to explain *how* the isomorphism comes into being. In fact, we've assumed all along that each realization divergence, though met with a divergence in polysemy or argument optionality once the 'right' θ-roles are assigned, has a deeper explanation that is dependent on semantic distinctions not captured by those θ-roles. Thus we fully expect—though maybe we'll be surprised here as well—that

the θ-roles will rampantly bifurcate as soon as one attempts this deeper explanation of the isomorphism.

Thus, even during attempts to unify and test our data with whatever has been captured in PropBank or FrameNet, future work here also will need, we believe, to try to make that refinement of the semantics that (we hope) will eventually explain why the isomorphism exists in the first place. And here is a sketch of our initial efforts in that direction. First, we're going to assert that this semantic refinement should in fact proceed by way of θ-roles, conceiving them broadly as we have been all along, as simply the semantic roles played by the (logical) arguments of verbs. We have also attempted to do something with semantic structures, i. e. predicate decompositions roughly comparable to Jackendoff's (1990) conceptual structures. As a practical matter, this proves unwieldy: like a programming language that just won't let you do what you want to do easily, predicate decompositions, we have found, are not easily adjusted as attempts are made to refine the semantics. (We attempted to implement the forms in a Prolog-style manner, with representations for the core senses of verbs receiving additional structure in order to represent other senses.) Thus, we argue, a return to θ-roles is required; and we believe this even though at first it seems like it will be quite awkward to refine them in the appropriate manner—after all, many of the finer distinctions between verbs seem to be fall, so to speak, strictly on the verbs themselves, and not on the roles played by any of their arguments.

Chapter 7

Conclusion

When Jackendoff published his (1990) refinement of conceptual structures, culminating in his attempt to give a more regular account of argument realization—which we discussed earlier (i. e. end of Ch. 5)—at least one computational linguist appears to have been underwhelmed. Wilks (1992) refers specifically to a certain set of workers in artificial intelligence (AI) and computational linguistics (CL) and suggests:

> Those in AI and CL who used to make a living 20 years ago writing down these kinds of fantasy codings and making the parentheses match will feel a strong pang of nostalgia if they open this book ... There is no mention of those hundreds of Schank's students, and his student's students, slaving over such codings (e. g., the systems described by Schank (1975), Schank and Riesbeck (1981); or compare Wilks (1973)) ... [A]utomatic construction is now the name of the game, of course ...

His reference to 'automatic construction' is interesting: he means the automatic acquisition of lexical entries, by trolling over large amounts of corpora, or by attempting to extract them from gold-standard analyses like those of the Penn Treebank. With natural language processing systems needing information on thousands of words, this is a natural way to go; and if the link between semantics and syntactic structures is as strong as our work here suggests it is, one might even be able to infer a lot of important semantic information from the bare text (or the derived tree structures).

And Wilks is right about Jackendoff ignoring Schank. (Jackendoff skipped over Pustejovsky, too, though he fixed that later (Jackendoff 2002).) But Wilks himself appears to be ignoring (or rather, minimizing) the very different goals that Jackendoff has: Jackendoff is trying to explain why language is the way it is, and has been continually refining his conceptual structures accordingly (which were originally built on the ideas of Gruber 1965, 1976) in order to better reflect the way that language expresses them. Jackendoff would probably find it pointless to engage in the 'simple' act of linking together all the conceptual dependencies that are suggested by the thoughts expressed by language, if this is done independent of the potentially peculiar constraints a particular language (or languages in general) may

put on those expressions—i. e. the sort of things most linguists are conventionally interested in. Wilks does allude to this:

> But Jackendoff seems to have done a lot more work ... particularly on the explicit relationship of the lexical codings to related syntactic structures ...

Wilks might have been mostly just lamenting the gaps that often exist between the linguist and AI researcher trying to specialize in natural language, as with any cross-disciplinary field. We happen to think that Jackendoff's focus on the specifics of language is a crucial one, even for AI, because without the additional theorizing of the sort we have tried to do here, systems just aren't going to be using natural language naturally; at best, they will sound like an unusually studious non-native speaker, who has figured out what the words mean, knows more or less how to pronounce them, and even manages to get the argument realizations right most of the time—as long as no extrapolation is needed from the things that have already been heard and analyzed properly. At worst, assuming every other aspect of natural language processing has been solved, the system may sound like the non-native speaker who *hasn't* been able to memorize many of the seemingly verb-specific requirements for argument realization, and is thus likely to swap *rob* for *steal*, or swap the corresponding constructions for any of the thousands of pairs of words of similar meaning that happen to diverge in argument realization; we'll understand what the person means, usually, but it may be challenging, because the speaker effectively gives us the arguments of the verb—if we're lucky—but leaves it up to us to put them together, without the help of syntax, which normally makes such things automatic. Actual systems will fall somewhere in between these cases, of course, since, though the mechanism for getting the system to extrapolate naturally is still unknown, recall of the verb-specific information itself isn't a problem, so—as many computational linguists are effectively doing today—one can always try to hide the system's shallowness by increasing the size of the database.

Within linguistics itself, there's an interesting gap. The usual breakdown of the parts of the study of language includes syntax (concerning how words group together to form phrases and sentences), morphology (on how stems and affixes group together to form words), phonology (on how the sounds of the language combine), semantics (on the meaning of words, phrases, and sentences), and pragmatics or discourse (which are concerned, roughly speaking, with the way sentences are used in conversation and other types of speech). This makes the study of things like argument realization and polysemy look cross-disciplinary even within the field.[1] That could change, though, if our rule of co-occurrences holds up, because if we are right, it should eventually lead to the discovery of more fundamental elements in the generation of language, and, hopefully, open up additional fields of inquiry.

[1]Fromkin and Rodman (1993), in fact, give only a brief remark on polysemy (mentioning that it is hard to distinguish sometimes from homonymy).

Appendix A

Homonymy in Levin 1993

A recurring issue in the relation between words and their meanings is the nature of the distinction between polysemy and homonymy. Levin (1993) made no attempt, in her categorization of 3000-plus verbs, to distinguish between the two phenomena: verbs are found in multiple classes, and it's up to the readers to decide (if and when it matters to them) whether a potential instance of a verb in two classes is really a single verb, or two very different verbs that just happen to be spelled the same. In fact, that's why we've been saying there are '3000-plus' Levin verbs, rather than giving a precise number—it's not immediately obvious just how many verbs really are there, until one makes the choice between polysemy and homonymy for every multiple listing of a verb.

Our assignment of θ-roles, and the establishment of an isomorphism between argument realization and polysemy, effectively forced us to make just those kinds of decisions; as we said earlier, we wanted to allow for the existence of polysemy in as many cases as possible; otherwise we might oversimplify the task by treating things as accidental that really weren't. And as it happens, our results suggest that very, very little of the verb-class overlap should be attributed to homonymy. Here was our initial list, with quick-and-dirty glosses, of the verbs we felt compelled to treat as homonyms—because the semantics implied by our θ-role assignments seemed to rule out treating them as being truly related.

1. *bark1* — to make a particular kind of sound
   bark2 — to scrape (e. g. one's skin)
2. *belt1* — to hit
   belt2 — to secure with a belt
3. *board1* — to stay
   board2 — to attach boards to
4. *bolt1* — to secure with a bolt
   bolt2 — to run away
   bolt3 — to swallow
5. *bore1* — to drill
   bore2 — to cause boredom
6. *bound1* — to form bounds
   bound2 — to move e. g. in leaps and bounds
7. *box1* — to put in a box
   box2 — to fight in a particular manner

8. *charge1* — to bill
   charge2 — to move forcefully toward
9. *cling1* — to adhere
   cling2 — to make a clinging noise
10. *clip1* — to cut off
    clip2 — to attach with a clip
11. *clog1* — to hinder flow
    clog2 — to walk about wearing clogs
12. *coach1* — to instruct, acting as a coach
    coach2 — to travel by coach
13. *file1* — to put away e. g. in a filing cabinet
    file2 — to abrasively shape etc., with a file
    file3 — to move in a line
14. *flush1* — to remove in a certain manner
    flush2 — to turn red
15. *hail1* — to greet with praise, etc.
    hail2 — for hail to be falling
16. *jar1* — to irritate
    jar2 — to put in a jar
17. *pad1* — to add e. g. padding
    pad2 — to move on foot
18. *peep1* — to give a brief look
    peep2 — to make a peeping sound
19. *pitch1* — to throw
    pitch2 — to cover with pitch
20. *poach1* — to steal
    poach2 — to cook
21. *punt1* — to propel by kicking
    punt2 — to move via a small boat (e. g. a punt)
22. *ring1* — to put or to be around, e. g. forming a ring
    ring2 — to make a ringing sound
23. *seal1* — to close up or secure
    seal2 — to hunt for seals
24. *spit1* — to expectorate
    spit2 — to put on a spit
25. *spot1* — to sight, perceive, etc.
    spot2 — to become soiled or marked with spots
26. *stalk1* — to trail after
    stalk2 — to remove a stalk
27. *tack1* — to attach e. g. using a tack
    tack2 — to zigzag
28. *tilt1* — to lean
    tilt2 — to joust
29. *tip1* — to propel with a tap
    tip2 — to leave a gratuity

30. *toast1* — to bake the surface of
    toast2 — to acclaim
31. *wax1* — to cover with wax
    wax2 — to increase (rather than wane)

One more pair is only spelled, not pronounced, the same:

32. *wind1* — to twist or curl
    wind2 — to 'take the wind out'

With these verbs distinguished we can give an initial count of the Levin verbs: there are 3063 of them. In fact, there are probably a handfull of others, too: we found additional probable homonyms much later, when refining our θ-role assignments. We point them out as they occur in Appendix B.

In any case, the exact number of homonyms remain small, and this appears to confirm that Dang *et al.* (1998) threw out a huge amount of data, thinking it more likely that the behaviors characterizing classes of a few members would be the results of homonymy than of regular polysemy. An incorrect assumption, judging from the combination of the data above, our analyses of the distribution of verbs in Ch. 3, and our isomorphism.

Appendix B

Θ-families in the isomorphism

Here are the 700+ θ-families that have a unique realization (i. e. a unique construction family). Recall that we are using only a very general set of 14 θ-roles (abbreviated as below). Some of them then must be taken quite broadly. Some cases of `Agent` would be better described as `Cause` if that role-name were added to the set, for instance; in other cases we're not even sure yet what role name we would give an argument, if we were to enlarge the set for that argument in particular. Overall, the assignment of θ-roles is a lot like our quick discussion of the Levin verb classes in Sect. 4.1: for verbs that clearly involve movement (literally or figuratively)—or don't involve movement, but have one entity acting on another—the assignments are usually straightforward; for the other cases there often just isn't any easily accepted way of doing things yet. (Recall the decision made in the PropBank project (Sect. 6.1) not to even try to give general θ-role names to verb arguments.) Our focus, then, has been on making sure that the existence of true `Theme`s—the entities whose motion or position is being referred to by the expression—is always reflected faithfully in the assignment of role names; for the other cases, we want to look out for any arguments that seem better `Agent`s, `Theme`s, `Source`s or `Goal`s than any of the other arguments, and try to make sure they get the `Agent`, `Theme`, `Source`, or `Goal` role, respectively. (Compare Dowty 1991). Unfortunately, this itself isn't unproblematic, since there may be more than one plausible way of trying to force an event onto a rather restricted set of θ-roles. Deciding whether or not one should think there's a `Theme` in play can be problematic, too, if the potential thing 'in motion' is merely a gaze or a thought or someone's attention, for instance.

The reader should also keep in mind that the data from Levin includes relatively precise listings of verb behavior with respect to pairs of constructions (i. e. as found in alternations) and very imprecise, highly smoothed-over information that may or may not be implicated for a verb given its membership in a Levin verb class. In an important way, the partitioning given below, of verbs into verb families, is the end point of this first phase of the research, but the starting point of another phase that clearly hasn't begun yet. The θ-assignments will be the starting point of future research to refine the semantics, for the task of explaining why the isomorphism occurs, rather than just signaling, as here, its existence. Most θ-role assignments were done originally to a set of verbs that appear in a Levin class, or appear listed as utilizing an alternation. Thus the extraction of the verbs that use the same θ-family, and the same construction family, came second, creating a new set of verb

classes (the ones listed here); this quite often pulls out the finer-grained semantic classes that Levin chose to not to focus on, and often the semantics assigned to the larger class (via the θ-roles) is no longer appropriate to the smaller class. (It was probably never really appropriate to all members of the larger class to begin with.) This is especially true for things like argument optionality; optionality may vary to different degrees among members of a class, making it much harder to decide things on a verb-by-verb basis. We've made additional passes over all the classes listed below in order to try to 'fix up' the semantics of these finer-grained classes, but that's really something that will be much more rewarding in the future phases of this research, i. e. on the possible causes of the isomorphism. Until then it's just too hard to decide what θ-sets to give in some cases—there aren't enough constraints in place at this point to guide our decisions. (Something like that is partly responsible for the lack of consensus so far on what a complete set of θ-roles might look like.)

Many of the θ-role assignments below, then, can certainly be improved upon, and there are undoubtedly some things that still need to be 'fixed up'. The line between `Agent` and `Actor` is especially fuzzy at the moment, since it is not always clear whether we should consider the `Actor` to be acting on something (making it an `Agent`) or not; so we have not attempted to draw the line here in a completely robust fashion. Even normally distinct roles turn out to be not-so-distinct in some cases. Should an argument be construed as something 'coming out' of a certain process? (That makes it sound like a `Theme`.) Or is it the result of the process? (That makes it a `Goal`, since we're listing `Result`s as `Goal`s here.)

The big issue, of course, is that in theory these changes can drastically affect the formation of the isomorphism; in practise, though, none of our late-in-the-process 'fixing up' activities have ever altered the isomorphism in a big way, though our alterations probably changed at least half of the families below. Apparently, variations in polysemy and argument optionality among the verbs is great enough to protect the isomorphism from such tinkerings.

We've ordered things alphabetically here, so the 'easy' and 'hard' cases come intermixed. (Just as they did in our discussion of the Levin classes in Sect. 4.1). Homonyms are numbered as in Appendix A. Complex verbs tagged with numbers might not be listed there directly; they'll be related to the stem verb with the same tag. The (possibly non-homonymous) verb *unbolt1* for intance is related to homonym *bolt1*.

Actr = Actor

Ag = Agent

Bn = Beneficiary

Ex = Experiencer

G = Goal

Ins = Instrument

Lc = Location

Mnr = Manner

Pth = Path

Ptn = Patient

Prd = Predicate

Prpr = Property

Sr = Source

Th = Theme

1. {*abash*, *affect*, *afflict*, *affront*, *alienate*, *amaze*, *antagonize*, *appal*, *appease*, *astound*, *awe*, *beguile*, *bewitch*, *bug*, *chagrin*, *charm*, *concern*, *confound*, *convince*, *cow*, *daunt*, *dazzle*, *deject*, *demoralize*, *discombobulate*, *discomfit*, *discompose*, *disconcert*, *disgruntle*, *disgust*, *dissatisfy*, *distress*, *disturb*, *dumbfound*, *elate*, *electrify*, *embolden*, *encourage*, *enlighten*, *enliven*, *enrage*, *enrapture*, *entertain*, *enthrall*, *exhilarate*, *flatter*, *floor*, *gall*, *galvanize*, *gratify*, *harass*, *haunt*, *horrify*, *humiliate*, *impress*, *incense*, *infuriate*, *inspire*, *interest*, *mollify*, *mystify*, *offend*, *outrage*, *overawe*, *overwhelm*, *pain*, *peeve*, *perplex*, *pique*, *plague*, *preoccupy*, *provoke*, *reassure*, *refresh*, *repel*, *repulse*, *revolt*, *rile*, *satisfy*, *scandalize*, *spellbind*, *stimulate*, *stun*, *tantalize*, *terrorize*, *threaten*, *titillate*, *try*, *unnerve*, *unsettle*, *uplift*, *upset*, *vex*}

⟨Ag, Ex⟩, ⟨Ag, Ex, *with* Ins⟩, ⟨*that* Prd, Ex⟩

Agent here is often just Cause, and Instrument might be Cause too.

2. {*abate*, *accelerate*, *acetify*, *acidify*, *age*, *agglomerate*, *air*, *alkalify*, *ameliorate*, *americanize*, *atrophy*, *attenuate*, *blacken*, *blunt*, *blur*, *brighten*, *broaden*, *calcify*, *capsize*, *caramelize*, *carbonify*, *carbonize*, *char*, *cheapen*, *coagulate*, *coarsen*, *collapse*, *condense*, *contract*, *cool*, *crimson*, *crumble*, *crystallize*, *dampen*, *darken*, *decelerate*, *decentralize*, *decrease*, *deepen*, *deescalate*, *deflate*, *degenerate*, *degrade*, *dehumidify*, *demagnetize*, *democratize*, *depressurize*, *desiccate*, *destabilize*, *detonate*, *dim*, *diminish*, *disintegrate*, *dissipate*, *dissolve*, *distend*, *double*, *dry*, *dull*, *emulsify*, *energize*, *enlarge*, *equalize*, *evaporate*, *even*, *expand*, *fade*, *fatten*, *federate*, *firm*, *flatten*, *fossilize*, *fray*, *freshen*, *frost*, *fructify*, *gasify*, *gelatinize*, *glutenize*, *granulate*, *gray*, *green*, *harden*, *heal*, *heighten*, *humidify*, *hush*, *hybridize*, *ignite*, *improve*, *increase*, *incubate*, *inflate*, *intensify*, *iodize*, *ionize*, *kindle*, *lengthen*, *lessen*, *level*, *levitate*, *lighten*, *lignify*, *liquefy*, *loose*, *loosen*, *macerate*, *magnetize*, *magnify*, *mellow*, *moisten*, *muddy*, *multiply*, *narrow*, *neaten*, *neutralize*, *nitrify*, *operate*, *ossify*, *overturn*, *oxidize*, *pale*, *petrify*, *polarize*, *proliferate*, *purple*, *putrefy*, *quadruple*, *quicken*, *quiet*, *quieten*, *redden*, *regularize*, *rekindle*, *reopen*, *reproduce*, *ripen*, *roughen*, *round*, *scorch*, *sear*, *sharpen*, *short*, *short-circuit*, *shorten*, *shrivel*, *shut*, *silicify*, *singe*, *sink*, *slack*, *slacken*, *slim*, *slow*, *smarten*, *soften*, *solidify*, *sour*, *splay*, *stabilize*, *steady*, *steep*, *steepen*, *stiffen*, *straighten*, *stratify*, *strengthen*, *submerge*, *subside*, *sweeten*, *tame*, *tan*, *taper*, *tauten*, *tense*, *thaw*, *thicken*, *thin*, *tighten*, *topple*, *toughen*, *triple*, *ulcerate*, *unfold*, *unionize*, *vaporize*, *vary*, *vitrify*, *volatilize*, *waken*, *warm*, *warp*, *weaken*, *westernize*, *whiten*, *widen*, *worsen*, *yellow*}

⟨Ag, Th⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ins, Th⟩, ⟨Th⟩

Most of these Themes are really Patients, and could be changed to that.

3. {*abduct*, *acquire*, *appropriate*, *borrow*, *cadge*, *capture*, *confiscate*, *cop*, *emancipate*, *exact*, *exorcise*, *grab*, *impound*, *kidnap*, *liberate*, *nab*, *obtain*, *reclaim*, *recover*, *redeem*, *regain*, *repossess*, *rescue*, *retrieve*, *seize*, *snatch*, *weasel*, *wrest*}

⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Ag, Th, *from* Sr, *for* Bn⟩

4. {*abhor*, *deplore*, *despise*, *detest*, *dislike*, *distrust*, *dread*, *envy*, *execrate*, *hate*, *lament*, *loathe*, *pity*, *regret*, *resent*, *rue*}

⟨Ag/Sr, G⟩, ⟨Ag/Sr, G/Th, *in* Lc⟩, ⟨Ag/Sr, G/Th, *as* Prpr⟩, ⟨Ag/Sr, G/Th, *for* G⟩, ⟨Ag/Sr, G/Th, *for* G, *as* Prpr⟩, ⟨Ex, *that* Prd⟩

5. {*abound*, *bustle*, *swarm*, *throng*}

⟨Lc, *with* Th⟩, ⟨Th⟩, ⟨Th, *p* Lc⟩

6. {*absolve*, *acquit*, *bereave*, *bilk*, *cleanse*, *cure*, *defraud*, *denude*, *deplete*, *depopulate*, *deprive*, *despoil*, *disabuse*, *disencumber*, *dispossess*, *divest*, *exonerate*, *fleece*, *free*, *gull*, *milk*, *plunder*, *rid*, *rob*, *sap*, *unburden*, *void*, *wean*}

⟨Ag, Sr⟩, ⟨Ag, Sr, *of* Th⟩

7. {*abstract*, *delete*, *discharge*, *disengage*, *disgorge*, *dislodge*, *dismiss*, *eject*, *eradicate*, *evict*, *excise*, *excommunicate*, *extrude*, *lop*, *omit*, *ostracize*, *oust*, *reap*, *shoo*, *subtract*, *uproot*, *wrench*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* Sr⟩

8. {*abuse*, *backbite*, *calumniate*, *castigate*, *censure*, *chasten*, *chastise*, *chide*, *condemn*, *criticize*, *decry*, *defame*, *denigrate*, *denounce*, *deprecate*, *deride*, *disparage*, *fault*, *impeach*, *lambaste*, *malign*, *mock*, *penalize*, *persecute*, *prosecute*, *punish*, *rebuke*, *reprimand*, *reproach*, *reprove*, *revile*, *ridicule*, *scold*, *scorn*, *snub*, *upbraid*, *victimize*, *vilify*}

⟨Ag/Sr, G/Th, *as* Prpr⟩, ⟨Ag/Sr, G, *for* G⟩, ⟨Ag/Sr, G, *for* G, *as* Prpr⟩

9. {*abut*, *adjoin*, *intersect*}

⟨Th⟩, ⟨Th, Th⟩

10. {*accept*}

⟨Ag/G, Th⟩, ⟨Ag/G, Th, *for* Bn⟩, ⟨Ag/G, Th, *as* Prpr⟩, ⟨Ag/G, Th, *from* Sr⟩,
⟨Ag/G, Th, *from* Sr, *for* Bn⟩

11. {*acclaim*, *applaud*, *bless*, *celebrate*, *commend*, *compliment*, *congratulate*, *eulogize*, *extol*, *felicitate*, *greet*, *laud*, *thank*, *toast2*}

⟨Ag, G, *for* G⟩, ⟨Ag, G, *for* G, *as* Prpr⟩

12. {*accompany*, *conduct*, *escort*, *guide*, *lead*, *shepherd*}

⟨Ag/Th, Th⟩, ⟨Ag/Th, Th, *p* G⟩

13. {*accumulate*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* Lc⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Th⟩, ⟨Th, *p* Lc⟩

14. {*ache*}

⟨Ex⟩, ⟨Ex, *from* Ag⟩, ⟨Ex, *for* G⟩, ⟨Ptn, Ex⟩

15. {*act*, *behave*}

⟨Actr, *as* Prpr⟩, ⟨Actr, Prpr⟩

16. {*add*, *append*, *attach*, *baste*, *bond*, *fasten*, *graft*, *network*, *weld*}

⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *together*⟩, ⟨Th⟩, ⟨Th, *to* G⟩, ⟨Th, *together*⟩

17. {*address*}

⟨Ag, G⟩, ⟨Ag, G, *as* Prpr⟩, ⟨Ag, G, *to* Prd⟩, ⟨Ag, G, *with* Th⟩

18. {*adhere*, *cleave*, *cling1*}

⟨Th, *to* G⟩, ⟨Th, *together*⟩

19. {*adjudge*}

⟨Ag/Sr, G/Th, Prpr⟩, ⟨Ag/Sr, *that* Prd⟩

20. {*admire*, *adore*, *enjoy*, *favor*, *like*, *love*, *respect*, *savor*, *tolerate*, *treasure*}

⟨Ex, Th⟩, ⟨Ex, Th, *in* Th⟩, ⟨Ex, Th, *as* Prpr⟩, ⟨Ex, Th, *for* G⟩,
⟨Ex, Th, *for* G, *as* Prpr⟩, ⟨Ex, *that* Prd⟩

Theme looks like it's being used as a default here, which we wouldn't normally want to do (reserving it instead for things 'in movement', literally or figuratively). Perhaps it could be construed as a Source (of the qualities going to and affecting Experiencer) or Goal (of the valuation applied by the Experiencer); the Experiencer has in cases like this that dual quality.

21. {*admit*, *allow*, *conjecture*, *deny*, *figure*, *guess*, *repute*}

⟨Ag/Sr, G/Th, *to* Prd⟩, ⟨Ag/Sr, *that* Prd⟩

22. {*adopt*, *appoint*, *elect*, *nominate*, *ordain*}

⟨Ag, Th⟩, ⟨Ag, Th, *as* Prpr⟩, ⟨Ag, Th, Prpr⟩, ⟨Ag, Th, *to* Prd⟩

23. {*adorn*, *bestrew*, *blot*, *bombard*, *cap*, *carpet*, *contaminate*, *dapple*, *decorate*, *deluge*, *dot*, *douse*, *drench*, *embellish*, *emblazon*, *encircle*, *encrust*, *endow*, *enrich*, *face*, *fence*, *fleck*, *frame*, *garnish*, *imbue*, *impregnate*, *infect*, *inlay*, *interlard*, *interleave*, *inundate*, *lard*, *mask*, *mottle*, *ornament*, *pave*, *plate*, *plug*, *pollute*, *replenish*, *repopulate*, *riddle*, *ring1*, *saturate*, *season*, *soil*, *speckle*, *splotch*, *staff*, *stipple*, *stud*, *suffuse*, *surround*, *taint*, *tile*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Th, Lc⟩

24. {*advance*}

⟨Ag, G, Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ins, Th⟩, ⟨Th⟩,
⟨Th, *to* G⟩, ⟨Th, *up* Lc⟩, ⟨Th, *from* Sr⟩, ⟨Th, *from* Sr, *to* G⟩

25. {*advertise*, *dive*, *dredge*, *excavate*, *patrol*, *plumb*, *probe*, *prospect*, *scavenge*, *scout*, *search*, *shop*, *trawl*, *troll*, *watch*}

⟨Actr, *p* Lc, *for* G⟩, ⟨Actr, Lc, *for* G⟩, ⟨Actr, *for* G⟩, ⟨Actr, *for* G, *p* Lc⟩

Actor was used here to stress that the Agent is doing something in addition to being the Cause of something; Agent/Theme might have been a better choice. *Advertise* clearly seems out of place, but its presence here merely reflects Levin's own grouping of the verbs, so we've let it be for now.

26. {*affiliate*, *alternate*, *amalgamate*, *associate*, *coalesce*, *coincide*, *compare*, *confederate*, *conjoin*, *consolidate*, *contrast*, *correlate*, *criss-cross*, *entwine*, *integrate*, *interchange*, *interconnect*, *interlink*, *interlock*, *intermingle*, *interrelate*, *intertwine*, *rhyme*, *team*, *unify*, *unite*}

⟨Ag, Th⟩, ⟨Ag, Th, *with* Th⟩, ⟨Th⟩

27. {*aggravate*, *agitate*, *agonize*, *alarm*, *amuse*, *annoy*, *arouse*, *assuage*, *astonish*, *baffle*, *bewilder*, *boggle*, *bore2*, *calm*, *captivate*, *comfort*, *console*, *content*, *daze*, *depress*, *disappoint*, *discourage*, *disgrace*, *dishearten*, *disillusion*, *dismay*, *dispirit*, *displease*, *disquiet*, *distract*, *enchant*, *engross*, *entice*, *entrance*, *exasperate*, *excite*, *exhaust*, *fascinate*, *faze*, *flabbergast*, *fluster*, *frighten*, *frustrate*, *hearten*, *humble*, *hypnotize*, *intimidate*, *intoxicate*, *intrigue*, *invigorate*, *irk*, *irritate*, *jollify*, *jolt*, *lull*, *mesmerize*, *miff*, *mortify*, *nauseate*, *nettle*, *numb*, *pacify*, *perturb*, *placate*, *please*, *rankle*, *relax*, *revitalize*, *ruffle*, *scare*, *shock*, *solace*, *soothe*, *spook*, *startle*, *stupefy*, *surprise*, *tempt*, *terrify*, *torment*, *trouble*, *wound*, *wow*}

⟨Ag, Ex⟩, ⟨Ag, Ex, *with* Ins⟩, ⟨*that* Prd, Ex⟩, ⟨Th, Mnr⟩

As in other families, some of the Agents may be more a mere Cause than an Agent.

28. {*agree*, *banter*, *bargain*, *bicker*, *brawl*, *collaborate*, *collide*, *combat*, *commiserate*, *communicate*, *compete*, *concur*, *confabulate*, *conflict*, *consort*, *cooperate*, *correspond*, *dicker*, *disagree*, *dispute*, *dissent*, *duel*, *elope*, *feud*, *flirt*, *haggle*, *hobnob*, *jest*, *joke*, *joust*, *neck*, *negotiate*, *quarrel*, *quibble*, *rendezvous*, *scuffle*, *skirmish*, *spar*, *spat*, *squabble*, *struggle*, *tussle*, *vie*, *war*, *wrangle*, *wrestle*}

⟨Ag⟩, ⟨Ag, *with* Th⟩

These should have Actors. In a few cases, though—for *agree*, for instance—the arguments are just objects, and in those cases Theme seems the best choice.

29. {*allocate*, *allot*, *assign*, *award*, *bequeath*, *bunt*, *catapult*, *cede*, *chuck*, *concede*, *fire*, *fling*, *flip*, *hurl*, *lob*, *loft*, *owe*, *pitch1*, *promise*, *punt1*, *tip1*, *will*, *yield*}

⟨Ag, G, Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩

30. {*alter*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ag, Th, *from* Sr⟩,
⟨Ag, Th, *from* Sr, *p* G⟩, ⟨Ins, Th⟩, ⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, *from* Sr⟩, ⟨Th, *from* Sr, *p* G⟩

This is another case where Theme seems an affected entity, thus ought to be a Patient; but here Levin specifically notes constructions in which the argument is transformed from one thing to another—going from one thing to another, so to speak—thus a clear example of an Identificational Theme.

31. {*analyze*, *audit*, *evaluate*, *review*}

⟨Ag/Sr, G⟩, ⟨Ag/Sr, G, *for* G⟩

32. {*anchor*, *belt1*, *bolt1*, *buckle*, *button*, *cement*, *chain*, *clamp*, *clip2*, *epoxy*, *fetter*, *glue*, *gum*, *handcuff*, *hinge*, *hitch*, *hook*, *knot*, *lace*, *lasso*, *latch*, *lock*, *manacle*, *nail*, *padlock*, *paste*, *pin*, *rivet*, *rope*, *screw*, *seal1*, *shackle*, *solder*, *staple*, *tack1*, *tether*, *thumbtack*, *tie*, *trammel*, *zip*}

⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* G, *with* Ins⟩, ⟨Ag, Th, *together*⟩,
⟨Ag, Th, *together*, *with* Ins⟩

33. {*annihilate*, *blitz*, *decimate*, *destroy*, *exterminate*, *obliterate*, *ravage*, *raze*, *ruin*, *waste*, *wreck*}

⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ins⟩

34. {*announce*, *articulate*, *blab*, *blurt*, *claim*, *confide*, *demonstrate*, *explain*, *explicate*, *mention*, *narrate*, *propose*, *recount*, *reiterate*, *relate*, *remark*, *say*, *state*}

⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *to* G⟩, ⟨Ag, *to* G, *that* Th⟩, ⟨Ag, *that* Th⟩

35. {*anoint*}

⟨Ag, G⟩, ⟨Ag, G, Prpr⟩, ⟨Ag, G, *with* Th⟩, ⟨Th, Lc⟩

36. {*antique*, *banquet*, *berry*, *birdnest*, *blackberry*, *brunch*, *catnap*, *clam*, *doze*, *drowse*, *fowl*, *hay*, *into*, *log*, *luncheon*, *nap*, *nest*, *nosh*, *nut*, *oyster*, *pearl*, *picnic*, *prawn*, *rabbit*, *seal2*, *shark*, *shrimp*, *slumber*, *snipe*, *snooze*, *whale*, *whelk*}

⟨Actr⟩

37. {*appear*, *arise*, *dawn*, *emerge*, *erupt*, *flow*, *materialize*, *result*, *supervene*, *surge*, *wax2*}

⟨Th⟩, ⟨Th, *p* Lc⟩, ⟨Th, *from* Sr⟩, ⟨Th, *from* Sr, *p* Lc⟩

38. {*appraise*, *estimate*, *price*}

⟨Ag, Th, *at* Lc⟩

39. {*appreciate*}

⟨Ex, Th⟩, ⟨Ex, Th, *in* Th⟩, ⟨Ex, Th, *as* Prpr⟩, ⟨Ex, Th, *for* G⟩,
⟨Ex, Th, *for* G, *as* Prpr⟩, ⟨Ex, *that* Prd⟩, ⟨Th⟩

40. {*apprentice*, *archive*, *bag*, *bank*, *beach*, *bed*, *beget*, *bench*, *berth*, *billet*, *bin*, *bottle*, *box1*, *braid*, *cage*, *can*, *canonize*, *case*, *cause*, *cellar*, *condition*, *consume*, *coop*, *corral*, *crate*, *crimp*, *cripple*, *cuckold*, *curry*, *devour*, *dock*, *drydock*, *engender*, *file1*, *film*, *fork*, *garage*, *generate*, *groom*, *ground*, *hangar*, *imbibe*, *ingest*, *jail*, *jar1*, *jug*, *kennel*, *knight*, *land*, *lather*, *manicure*, *martyr*, *microfilm*, *orphan*, *outlaw*, *pasture*, *pauper*, *pen*, *perm*, *photocopy*, *photograph*, *pillory*, *plait*, *pocket*, *pot*, *record*, *recruit*, *sheathe*, *shelve*, *shoulder*, *snare*, *spindle*, *spit2*, *spool*, *stable*, *swill*, *televise*, *tin*, *transcribe*, *trap*, *tree*, *warehouse*, *widow*}

⟨Ag, Th⟩

41. {*argue*, *chat*, *chitchat*, *confer*, *converse*, *gab*, *gossip*, *schmooze*, *yak*}

⟨Actr⟩, ⟨Actr, *with* Actr⟩, ⟨Actr, *with* Actr, *about* Prd⟩, ⟨Actr, *about* Prd⟩

42. {*arm*, *asphalt*, *autograph*, *bait*, *blindfold*, *board2*, *bread*, *brick*, *bridle*, *bronze*, *buffet*, *burden*, *butter*, *buttonhole*, *caulk*, *chrome*, *cork*, *diaper*, *drug*, *endorse*, *equip*, *feather*, *flour*, *forest*, *fuel*, *gag*, *glove*, *graffiti*, *gravel*, *halter*, *heel*, *illuminate*, *illustrate*, *initial*, *invest*, *leaven*, *letter*, *lipstick*, *mantle*, *monogram*, *mulch*, *nickel*, *oil*, *panel*, *paper*, *parquet*, *patch*, *pepper*, *perfume*, *pitch2*, *ply*, *pomade*, *poster*, *postmark*, *putty*, *regale*, *roof*, *rosin*, *rouge*, *rut*, *saddle*, *salt*, *salve*, *sequin*, *shawl*, *shingle*, *shoe*, *shutter*, *slate*, *slipcover*, *sod*, *sole*, *spice*, *starch*, *stopper*, *stress*, *stucco*, *sugar*, *sulphur*, *tag*, *tar*, *tarmac*, *thatch*, *ticket*, *turf*, *veneer*, *wallpaper*, *whitewash*, *zipcode*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩

43. {*arrange*}

⟨Ag, Bn, Th⟩, ⟨Ag, Bn, Th, *p* Ins⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *p* G⟩,
⟨Ag, Th, *into* G⟩, ⟨Ag, Th, *into* G, *for* Bn⟩, ⟨Ag, Th, *p* Ins⟩, ⟨Ag, Th, *p* Ins, *for* Bn⟩

44. {*asphyxiate*, *drown*, *suffocate*}

⟨Ag, Ptn⟩, ⟨Ptn⟩, ⟨Ptn, Mnr⟩

45. {*assassinate*, *crucify*, *electrocute*, *execute*, *garrotte*, *immolate*, *injure*, *liquidate*, *massacre*, *murder*, *slay*, *sprain*, *strangle*, *stub*}

⟨Ag, Ptn⟩

46. {*assemble*}

⟨Ag, Bn, G⟩, ⟨Ag, Bn, G, *p* Sr⟩, ⟨Ag, G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* Sr⟩,
⟨Ag, G, *p* Sr, *for* Bn⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *into* G⟩, ⟨Ag, Th, *into* G, *for* Bn⟩,
⟨Ag, Th, *p* Lc⟩, ⟨Th⟩, ⟨Th, *p* Lc⟩

47. {*assert*}

⟨Ag, Th⟩, ⟨Ag, *that* Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *to* Prd⟩

48. {*assess*}

⟨Ag/Sr, G⟩, ⟨Ag/Sr, G, *for* G⟩, ⟨Ag, Th, *at* Lc⟩

Theme here refers to the entity begin assessed at such-and-such a value, as if being 'put' at that position (figuratively).

49. {*avoid*, *dodge*, *duck*, *elude*, *evade*, *shun*, *sidestep*}

⟨Th, Lc⟩, ⟨Th, Prd⟩

50. {*awake*, *awaken*}

⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨Ins, Ptn⟩, ⟨Ptn⟩, ⟨Ptn, *p* Lc⟩, ⟨Ptn, *from* Sr⟩,
⟨Ptn, *from* Sr, *p* Lc⟩

51. {*babble*, *rumble*, *splutter*}

⟨Actr/Sr⟩, ⟨Actr/Sr, *p* Lc⟩, ⟨Ag/Sr, *at/toward* G⟩, ⟨Ag/Sr, *to* G⟩,
⟨Ag/Sr, *to* G, *that/about* Th⟩, ⟨Ag/Sr, *that/about* Th⟩, ⟨Ag/Sr, Th, *to* G⟩,
⟨Ag/Sr, *for* G⟩, ⟨Lc/Sr, *with* Th⟩, ⟨Th/Sr, *through* Lc⟩

52. {*bail*, *buff*, *flush1*, *leach*, *rinse*, *suction*, *winnow*}

⟨Ag, Sr, Prpr, *of* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* Sr⟩

53. {*bake*, *cook*}

⟨Ag, Bn, G⟩, ⟨Ag, Bn, G, *p* Sr⟩, ⟨Ag, G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* Sr⟩,
⟨Ag, G, *p* Sr, *for* Bn⟩, ⟨Ag, Ptn⟩, ⟨Ag, Th/Ptn, *into* G⟩,
⟨Ag, Th/Ptn, *into* G, *for* Bn⟩, ⟨Ptn⟩

Goal here refers to the result of what is being prepared.

54. {*balk*}

⟨Ag, Sr⟩, ⟨Ag, Sr, *of* Th⟩, ⟨Ex, *at* Ag⟩

55. {*balloon*, *rocket*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *p* G⟩, ⟨Th⟩, ⟨Th, Lc⟩

56. {*band*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* G, *with* Ins⟩, ⟨Ag, Th, *together*⟩,
⟨Ag, Th, *together*, *with* Ins⟩, ⟨Ag, Th, *with* Th⟩, ⟨Th⟩, ⟨Th, *together*⟩, ⟨Th, *with* Th⟩

57. {*bandage*, *clutter*, *dam*, *pad1*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, *up*, G⟩, ⟨Ag, *up*, G, *with* Th⟩, ⟨Th, Lc⟩

58. {*bang*}

⟨Ag, *at* G/Ptn⟩, ⟨Ag, *at* G/Ptn, *with* Th⟩, ⟨Ag, Sr/Ptn⟩, ⟨Ag, Th/Ptn, *into* G⟩,
⟨Ag, Th/Ptn, *together*⟩, ⟨Ag, Th/Ptn, *against* G/Ptn⟩, ⟨Ag, Th, *p* Lc⟩,
⟨Ag, Th, *p* Lc, *with* Ins⟩, ⟨Th/Ptn, *together*⟩, ⟨Th/Sr, *through* Lc⟩, ⟨Th/Sr, *p* Lc⟩,
⟨Th, *p* G/Ptn⟩

⟨Agent, Source/Patient⟩ is for something like *bang the drum*, i. e., cause a sound to be emitted.

59. {*banish*, *deport*, *evacuate*, *extradite*, *recall*}

⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *from* Sr⟩

60. {*baptize*, *christen*, *consecrate*, *decree*, *dub*, *name*, *nickname*, *pronounce*, *rule*, *term*}

⟨Ag, G/Th, Prpr⟩

61. {*barbecue*, *braise*, *broil*, *charbroil*, *charcoal-broil*, *coddle*, *deep-fry*, *french fry*, *microwave*, *oven-fry*, *oven-poach*, *overcook*, *pan-broil*, *pan-fry*, *parboil*, *parch*, *percolate*, *perk*, *pot-roast*, *rissole*, *saute*, *scald*, *scallop*, *shirr*, *simmer*, *steam-bake*, *stew*, *stir-fry*}

⟨Ag, Ptn⟩, ⟨Ptn⟩

62. {*bark2*, *skin*}

⟨Ag, Sr/Ptn⟩

63. {*barter*, *exchange*, *substitute*, *swap*}

⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *for* Th⟩, ⟨Ag, Th, *for* Th, *for* Bn⟩

Agent is also Source or Goal (or both if plural).

64. {*bash*, *slap*, *tap*}

⟨Ag, G/Ptn⟩, ⟨Ag, *at* G/Ptn⟩, ⟨Ag, *at* G/Ptn, *with* Th⟩, ⟨Ag, G/Ptn, *p* Lc⟩,
⟨Ag, G/Ptn, *p* Lc, *with* Th⟩, ⟨Ag, G/Ptn, *with* Th⟩, ⟨Ag, G, Th⟩, ⟨Ag, Th⟩,
⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *together*⟩, ⟨Ag, Th/Ptn, *against* G/Ptn⟩, ⟨Ag, Th, *to* G⟩,
⟨Th, G/Ptn⟩, ⟨Th, G/Ptn, *p* Lc⟩

65. {*bathe*}

⟨Actr⟩, ⟨Ag, G⟩, ⟨Ag, G, *in* Th⟩, ⟨Ag, G, *with* Th⟩, ⟨Th, Lc⟩

66. {*batter*, *butt*, *tamp*, *thwack*, *whack*}

⟨Ag, G/Ptn⟩, ⟨Ag, *at* G/Ptn⟩, ⟨Ag, *at* G/Ptn, *with* Th⟩, ⟨Ag, G/Ptn, *p* Lc⟩,
⟨Ag, G/Ptn, *p* Lc, *with* Th⟩, ⟨Ag, G/Ptn, *with* Th⟩, ⟨Ag, Th/Ptn⟩,
⟨Ag, Th/Ptn, *together*⟩, ⟨Ag, Th/Ptn, *against* G/Ptn⟩, ⟨Th, G/Ptn⟩,
⟨Th, G/Ptn, *p* Lc⟩

67. {*battle*, *box2*, *consult*, *debate*, *fight*}

⟨Actr⟩, ⟨Actr, Actr⟩, ⟨Actr, *with* Actr⟩

68. {*bawl*, *carol*, *croon*, *drawl*, *gabble*, *gibber*, *holler*, *jabber*, *lisp*, *mumble*, *mutter*, *shout*, *squall*, *stammer*, *stutter*, *tisk*, *whisper*, *whoop*, *yammer*, *yodel*}

⟨Ag/Sr, *at/toward* G⟩, ⟨Ag/Sr, *to* G⟩, ⟨Ag/Sr, *to* G, *that/about* Th⟩,
⟨Ag/Sr, *that/about* Th⟩, ⟨Ag/Sr, Th, *to* G⟩, ⟨Ag/Sr, *for* G⟩

69. {*beam*}

⟨Ag, Th⟩, ⟨Ag, Th, *at* G⟩, ⟨Lc/Sr, *with* Th⟩, ⟨Sr⟩, ⟨Sr, *at* G⟩, ⟨Sr, *p* Lc⟩

70. {*beat*}

⟨Ag, G/Ptn⟩, ⟨Ag, *at* G/Ptn⟩, ⟨Ag, *at* G/Ptn, *with* Th⟩, ⟨Ag, G/Ptn, *p* Lc⟩,
⟨Ag, G/Ptn, *p* Lc, *with* Th⟩, ⟨Ag, G/Ptn, *with* Th⟩, ⟨Ag, Sr/Ptn⟩, ⟨Ag, Th/Ptn⟩,
⟨Ag, Th/Ptn, *for* Bn⟩, ⟨Ag, Th/Ptn, *at* G⟩, ⟨Ag, Th/Ptn, *into* G⟩,
⟨Ag, Th/Ptn, *into* G, *for* Bn⟩, ⟨Ag, Th/Ptn, *together*⟩, ⟨Ag, Th/Ptn, *against* G/Ptn⟩,
⟨Ag, Th/Ptn, *with* Th⟩, ⟨Th/Ptn⟩, ⟨Th/Ptn, *into* G⟩, ⟨Th/Ptn, *into* G, *for* Bn⟩,
⟨Th/Ptn, *together*⟩, ⟨Th/Ptn, *with* Th⟩, ⟨Th⟩, ⟨Th, *through* G⟩, ⟨Th, G/Ptn⟩,
⟨Th, G/Ptn, *p* Lc⟩, ⟨Th, *p* Lc⟩

71. {*beep*, *blare*, *ding*, *jangle*, *jingle*, *ping*, *tinkle*, *toll*, *toot*, *whish*}

⟨Actr/Sr⟩, ⟨Actr/Sr, *p* Lc⟩, ⟨Ag, Sr⟩, ⟨Th/Sr, *through* Lc⟩

72. {*begin*, *cease*, *commence*, *continue*, *proceed*, *start*}

⟨Th⟩, ⟨Th, Prd⟩, ⟨Th, *to* Prd⟩

The Theme here should be taken as something extended through time.

73. {*belch*}

⟨Sr, Th⟩, ⟨Th⟩, ⟨Th, *through* Lc⟩, ⟨Th, *from* Sr⟩

74. {*believe*}

⟨Ag/Sr, G⟩, ⟨Ag/Sr, G/Th, Prpr⟩, ⟨Ag/Sr, G/Th, *as* Prpr⟩, ⟨Ag/Sr, G/Th, *to* Prd⟩, ⟨Ag/Sr, G/Th, *for* G⟩, ⟨Ag/Sr, G/Th, *for* G, *as* Prpr⟩, ⟨Ag/Sr, *in* Prd⟩, ⟨Ag/Sr, *that* Prd⟩

75. {*bellow*, *hiss*, *purr*, *squawk*, *squeak*}

⟨Actr/Sr⟩, ⟨Actr/Sr, *p* Lc⟩, ⟨Ag/Sr⟩, ⟨Ag/Sr, *at* G⟩, ⟨Ag/Sr, *at/toward* G⟩, ⟨Ag/Sr, *to* G⟩, ⟨Ag/Sr, *to* G, *that/about* Th⟩, ⟨Ag/Sr, *that/about* Th⟩, ⟨Ag/Sr, Th, *to* G⟩, ⟨Ag/Sr, *for* G⟩, ⟨Lc/Sr, *with* Th⟩, ⟨Th/Sr, *through* Lc⟩

76. {*belt2*, *birch*, *bludgeon*, *bonk*, *brain*, *cane*, *clobber*, *club*, *conk*, *cosh*, *cudgel*, *cuff*, *knife*, *paddywhack*, *pummel*, *sock*, *spank*, *thrash*, *truncheon*, *wallop*}

⟨Ag, G/Ptn⟩, ⟨Ag, G/Ptn, *p* Lc⟩, ⟨Ag, G/Ptn, *p* Lc, *with* Th⟩, ⟨Ag, G/Ptn, *with* Th⟩

77. {*bend*}

⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *for* Bn⟩, ⟨Ag, Th/Ptn, *into* G⟩, ⟨Ag, Th/Ptn, *into* G, *for* Bn⟩, ⟨Ag, Th/Ptn, *with* Ins⟩, ⟨Th/Ptn⟩, ⟨Th/Ptn, *into* G⟩, ⟨Th/Ptn, *into* G, *for* Bn⟩, ⟨Th/Ptn, *p* Lc⟩

78. {*bet*}

⟨Ag, G, Prd⟩, ⟨Ag, G, *that* Prd⟩, ⟨Ag, G, Th⟩, ⟨Ag, G, Th, Prd⟩, ⟨Ag, G, Th, *that* Prd⟩, ⟨Ag, G, Th, *for* G⟩, ⟨Ag, Prd⟩, ⟨Ag, *that* Prd⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* G⟩

79. {*bicycle*, *bike*, *boat*, *bobsled*, *cab*, *canoe*, *caravan*, *chariot*, *coach2*, *cycle*, *dogsled*, *gondola*, *helicopter*, *jeep*, *jet*, *kayak*, *moped*, *motor*, *motorbike*, *motorcycle*, *parachute*, *punt2*, *raft*, *rickshaw*, *skate*, *skateboard*, *ski*, *sled*, *sledge*, *sleigh*, *taxi*, *toboggan*, *tram*, *trolley*, *yacht*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *p* G⟩, ⟨Th, Lc⟩

80. {*bill*}

⟨Ag, G⟩, ⟨Ag, G, *as* Prpr⟩, ⟨Ag, G, *to* Prd⟩

81. {*bind*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, *up*, G⟩, ⟨Ag, *up*, G, *with* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *together*⟩, ⟨Th⟩, ⟨Th, *to* G⟩, ⟨Th, *together*⟩, ⟨Th, Lc⟩

82. {*bite*, *claw*, *slug*, *stab*, *swat*}

⟨Ag, *at* G⟩, ⟨Ag, G/Ptn⟩, ⟨Ag, G/Ptn, *p* Lc⟩

83. {*blanch*}

⟨Ag, Ptn⟩, ⟨Ptn⟩, ⟨Th⟩, ⟨Th, *at/from* G⟩

84. {*blanket*, *cloak*, *coat*, *deck*, *festoon*, *garland*, *line*, *shroud*, *swaddle*, *swathe*, *veil*, *wreathe*}

⟨Ag, G⟩, ⟨Ag, G, *in* Th⟩, ⟨Ag, G, *with* Th⟩, ⟨Th, Lc⟩

85. {*blast*}

⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨Ag, Sr⟩, ⟨Ins, Ptn⟩, ⟨Sr⟩, ⟨Th/Sr, *through* Lc⟩, ⟨Th/Sr, *p* Lc⟩

86. {*blat*, *chitter*, *pipe*}

⟨Actr/Sr⟩, ⟨Actr/Sr, *p* Lc⟩, ⟨Ag/Sr⟩, ⟨Ag/Sr, *at* G⟩, ⟨Th/Sr, *through* Lc⟩

87. {*blaze*, *flame*, *flare*, *flicker*, *gleam*, *glimmer*, *glint*, *glisten*, *glitter*, *glow*, *incandesce*, *scintillate*, *shimmer*, *sparkle*, *twinkle*}

⟨Lc/Sr, *with* Th⟩, ⟨Sr⟩, ⟨Sr, *p* Lc⟩

88. {*bleed*}

⟨Ag, Sr⟩, ⟨Ag, Sr, *of* Th⟩, ⟨Sr⟩, ⟨Sr, *on* G⟩, ⟨Sr, Th⟩, ⟨Th, *through* Lc⟩, ⟨Th, *from* Sr⟩

89. {*blend*, *mix*}

⟨Ag, Bn, Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *into* G⟩, ⟨Ag, Th, *together*⟩, ⟨Ag, Th, *with* Th⟩, ⟨Th⟩, ⟨Th, *into* G⟩, ⟨Th, *together*⟩, ⟨Th, *with* Th⟩

90. {*blink*}

⟨Actr⟩, ⟨Actr/Sr⟩, ⟨Actr/Sr, *p* Lc⟩, ⟨Actr, *at* G⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *at* G⟩, ⟨Lc/Sr, *with* Th⟩

Source is specifically for the case where lights are blinking (i. e. emitting light).

91. {*blister*, *deteriorate*, *molder*, *molt*, *swell*}

⟨Ptn⟩

92. {*block*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, *up*, G⟩, ⟨Ag, *up*, G, *with* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* Lc⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Ag, Th, *from* Sr, *p* Lc⟩, ⟨Th, Lc⟩

93. {*bloom*, *blossom*, *decay*, *ferment*, *fester*, *flower*, *rust*, *tarnish*}

⟨Ptn⟩, ⟨Ptn, *p* Lc⟩, ⟨Ptn, *with* Th⟩

94. {*blow*}

⟨Ag, Bn, G⟩, ⟨Ag, Bn, G, *p* Sr⟩, ⟨Ag, G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* Sr⟩, ⟨Ag, G, *p* Sr, *for* Bn⟩, ⟨Ag, Th⟩, ⟨Ag, Th/Ptn, *into* G⟩, ⟨Ag, Th/Ptn, *into* G, *for* Bn⟩, ⟨Ag, Th, *at* G⟩, ⟨Ag, Th, *apart*⟩, ⟨Ag, Th, *off-of/off* Sr⟩, ⟨Lc, *with* Th⟩, ⟨Th⟩, ⟨*with* Th⟩, ⟨Th, *p* Lc⟩, ⟨Th, *apart*⟩, ⟨Th, *off-of/off* Sr⟩

95. {*boast*, *brag*, *complain*, *kvetch*, *object*}

⟨Ag/Sr⟩, ⟨Ag/Sr, *to* G⟩, ⟨Ag/Sr, *to* G, *about* Th⟩, ⟨Ag/Sr, *that* Prd⟩, ⟨Ag/Sr, *that* Prd, *to* G⟩, ⟨Ag/Sr, *about* Th⟩, ⟨Ag/Sr, *about* Th, *to* G⟩

96. {*bob*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* Lc⟩, ⟨Th⟩, ⟨Th, *p* Lc⟩, ⟨Th, *before* Lc⟩

97. {*boil*, *fry*, *grill*, *hardboil*, *poach1*, *roast*, *softboil*, *toast1*}

⟨Ag, Bn, G/Ptn⟩, ⟨Ag, G/Ptn⟩, ⟨Ag, G/Ptn, *for* Bn⟩, ⟨Ag, Ptn⟩, ⟨Ptn⟩

98. {*bolt2*, *gulp*, *guzzle*, *quaff*, *swig*, *wolf*}

⟨Ag/G, *down*, Th⟩, ⟨Ag, Th⟩

99. {*boogie*, *bop*, *cancan*, *clog2*, *conga*, *foxtrot*, *jig*, *jitterbug*, *jive*, *pirouette*, *polka*, *quickstep*, *rumba*, *samba*, *squaredance*, *tango*, *tapdance*, *waltz*}

⟨Actr/Th⟩, ⟨Actr/Th, *p* G⟩, ⟨Actr/Th, *along* Lc⟩, ⟨Actr/Th, *p* Sr⟩,
⟨Actr/Th, *p* Sr, *p* G⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *along* Lc⟩, ⟨Ag, Th, *p* Sr⟩,
⟨Ag, Th, *p* Sr, *p* G⟩

100. {*book*, *cash*, *catch*, *charter*, *fetch*, *get*, *order*, *reach*, *reserve*}

⟨Ag, Bn, Th⟩, ⟨Ag, Bn, Th, *p* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *p* Sr⟩,
⟨Ag, Th, *p* Sr, *for* Bn⟩

101. {*boom*, *burble*, *lilt*, *murmur*, *rasp*, *shriek*, *trumpet*, *wheeze*, *whine*}

⟨Actr/Sr⟩, ⟨Actr/Sr, *p* Lc⟩, ⟨Ag/Sr, *at/toward* G⟩, ⟨Ag/Sr, *to* G⟩,
⟨Ag/Sr, *to* G, *that/about* Th⟩, ⟨Ag/Sr, *that/about* Th⟩, ⟨Ag/Sr, Th, *to* G⟩,
⟨Ag/Sr, *for* G⟩, ⟨Th/Sr, *through* Lc⟩

102. {*bore1*}

⟨Actr, *p* Lc⟩, ⟨Actr, *p* Lc, *for* G⟩, ⟨Actr, *for* G⟩, ⟨Actr, *for* G, *p* Lc⟩, ⟨Ag, Ptn⟩,
⟨Ag, Ptn, *with* Ins⟩, ⟨Ins, Mnr⟩, ⟨Ins, Ptn⟩

103. {*bother*}

⟨Ag, Ex⟩, ⟨Ag, Ex, *with* Ins⟩, ⟨Ex, *about* Th⟩, ⟨*that* Prd, Ex⟩

104. {*bounce*, *slide*}

⟨Ag, G, Th⟩, ⟨Ag, G, Th, *p* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *to* G⟩,
⟨Ag, Th, *to* G, *p* Sr⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *p* G⟩, ⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, *to* G⟩,
⟨Th, *to* G, *p* Sr⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩

105. {*bow*, *kneel*}

⟨Th⟩, ⟨Th/Ptn⟩, ⟨Th/Ptn, *p* Lc⟩, ⟨Th, *before* Lc⟩

106. {*bracket*}

⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* G, *with* Ins⟩, ⟨Ag, Th, *together*⟩,
⟨Ag, Th, *together*, *with* Ins⟩, ⟨Th, Lc⟩

107. {*brand*, *label*}

⟨Ag, G⟩, ⟨Ag, G, Prpr⟩, ⟨Ag, G, *with* Th⟩

108. {*break*}

⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨Ag, Sr, *of* Th⟩, ⟨Ag, Th, *apart*⟩,
⟨Ag, Th, *off-of/off* Sr⟩, ⟨Ins, Ptn⟩, ⟨Ptn, Mnr⟩, ⟨Th, *p* G⟩, ⟨Th, *apart*⟩,
⟨Th, *from* Sr⟩, ⟨Th, *from* Sr, *p* Lc⟩, ⟨Th, *off-of/off* Sr⟩

109. {*breakfast*, *dine*, *feast*, *lunch*, *snack*, *sup*}

⟨Actr⟩, ⟨Actr/G, *on* Lc/Th⟩

110. {*breathe*}

⟨Sr⟩, ⟨Sr, *on* G⟩, ⟨Th⟩, ⟨Th, *p* Lc⟩

111. {*brown*, *crisp*, *heat*}

⟨Ag, Ptn⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ins, Th⟩, ⟨Ptn⟩, ⟨Th⟩

112. {*bruise*, *nick*}

⟨Ag, Ptn⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ins, Th⟩

113. {*brush*}

⟨Ag, Ptn⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *at* G⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *with* Ins⟩,
⟨Th, *on/onto* G⟩, ⟨Th, *p* G/Ptn⟩

114. {*bubble*}

⟨Lc, *with* Th⟩, ⟨Sr, Th⟩, ⟨Sr, *with* Th⟩, ⟨Th⟩, ⟨Th, *through* G⟩, ⟨Th, *through* Lc⟩,
⟨Th, *p* Lc⟩, ⟨Th, *from* Sr⟩

115. {*buck*, *gyrate*, *squirm*, *wriggle*}

⟨Ag, Th⟩, ⟨Th⟩, ⟨Th, *p* G⟩

116. {*build*, *chisel*, *churn*, *compile*, *crochet*, *fashion*, *mold*, *sculpt*, *shape*, *whittle*}

⟨Ag, Bn, G⟩, ⟨Ag, Bn, G, *p* Sr⟩, ⟨Ag, G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* Sr⟩,
⟨Ag, G, *p* Sr, *for* Bn⟩, ⟨Ag, Th/Ptn, *into* G⟩, ⟨Ag, Th/Ptn, *into* G, *for* Bn⟩

Goal here is the result of the building or churning or sculpting, etc.

117. {*bulge*}

⟨Ptn, *with* Th⟩, ⟨Th⟩, ⟨Th, *p* Lc⟩

118. {*bump*}

⟨Ag, G/Ptn⟩, ⟨Ag, *at* G/Ptn⟩, ⟨Ag, *at* G/Ptn, *with* Th⟩, ⟨Ag, G/Ptn, *p* Lc⟩,
⟨Ag, G/Ptn, *p* Lc, *with* Th⟩, ⟨Ag, G/Ptn, *with* Th⟩, ⟨Ag, Ptn⟩, ⟨Ag, Th/Ptn⟩,
⟨Ag, Th/Ptn, *together*⟩, ⟨Ag, Th/Ptn, *against* G/Ptn⟩, ⟨Th⟩, ⟨Th, *together*⟩,
⟨Th, G/Ptn⟩, ⟨Th, *p* G/Ptn⟩, ⟨Th, G/Ptn, *p* Lc⟩

119. {*bundle*, *collate*, *combine*, *commingle*, *concatenate*, *glom*, *jumble*, *lump*, *merge*, *package*, *pool*}

⟨Ag, Th⟩, ⟨Ag, Th, *together*⟩, ⟨Ag, Th, *with* Th⟩, ⟨Th⟩, ⟨Th, *together*⟩, ⟨Th, *with* Th⟩

120. {*burgle*, *cheat*, *con*, *swindle*}

⟨Ag, Sr⟩, ⟨Ag, Sr, *of* Th⟩, ⟨Ag, Sr, *out-of* Th⟩

121. {*burn*}

⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨Ag, Sr⟩, ⟨Ins, Ptn⟩, ⟨Lc/Sr, *with* Th⟩, ⟨Ptn⟩,
⟨Ptn, *from* Ag⟩, ⟨Ptn, *p* Lc⟩, ⟨Ptn, *with* Th⟩, ⟨Sr⟩, ⟨Sr, *p* Lc⟩

122. {*burr*, *chink*, *chir*, *clomp*, *crepitate*, *dong*, *fizzle*, *knell*, *patter*, *peal*, *pink*, *plink*, *plonk*, *plunk*, *putter*, *shrill*, *squelch*, *swish*, *thrum*, *thunk*, *tick*, *ting*, *tootle*, *twang*, *ululate*, *vroom*, *whoosh*, *whump*, *zing*}

⟨Actr/Sr⟩, ⟨Actr/Sr, *p* Lc⟩, ⟨Th/Sr, *through* Lc⟩

123. {*burrow*, *delve*, *forage*, *fumble*, *grope*, *leaf*, *page*, *root*, *rummage*, *scrabble*, *thumb*, *tunnel*}

⟨Ag, *p* Lc, *for* G⟩, ⟨Ag, *for* G⟩, ⟨Ag, *for* G, *p* Lc⟩

The Agent takes on the properties of a Theme here, for some verbs, on some uses.

124. {*burst*}

⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨Ins, Ptn⟩, ⟨Ptn⟩, ⟨Th, *p* G⟩, ⟨Th, *from* Sr⟩, ⟨Th, *from* Sr, *p* Lc⟩

125. {*bus*, *ferry*}

⟨Ag, G, Th⟩, ⟨Ag, G, Th, *from* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *p* G⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Ag, Th, *from* Sr, *to* G⟩, ⟨Th, Lc⟩

126. {*butcher*}

⟨Actr⟩, ⟨Actr, *for* Bn⟩, ⟨Ag, Ptn⟩

127. {*buy*, *earn*, *procure*, *secure*, *win*}

⟨Ag, Bn, Th⟩, ⟨Ag, Bn, Th, *for* Th⟩, ⟨Ag, Bn, Th, *from* Sr⟩, ⟨Ag, Bn, Th, *from* Sr, *for* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *for* Bn, *for* Th⟩, ⟨Ag, Th, *for* Th⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Ag, Th, *from* Sr, *for* Bn⟩, ⟨Ag, Th, *from* Sr, *for* Bn, *for* Th⟩, ⟨Ag, Th, *from* Sr, *for* Th⟩

128. {*buzz*}

⟨Actr/Sr⟩, ⟨Actr/Sr, *p* Lc⟩, ⟨Ag/Sr⟩, ⟨Ag/Sr, *at* G⟩, ⟨Ag, Sr⟩, ⟨Lc/Sr, *with* Th⟩, ⟨Th/Sr, *through* Lc⟩

129. {*cable*, *e-mail*, *fax*, *modem*, *netmail*, *radio*, *satellite*, *semaphore*, *signal*, *telecast*, *telegraph*, *telephone*, *telex*, *wireless*}

⟨Ag, G⟩, ⟨Ag, *to* G, *about/that* Th⟩, ⟨Ag, G, Th⟩, ⟨Ag, G, *about/that* Th⟩, ⟨Ag, *for* G⟩, ⟨Ag, Th, *to* G⟩

130. {*cackle*}

⟨Ag/Sr⟩, ⟨Ag/Sr, *at* G⟩, ⟨Ag/Sr, *at/toward* G⟩, ⟨Ag/Sr, *to* G⟩,
⟨Ag/Sr, *to* G, *that/about* Th⟩, ⟨Ag/Sr, *that/about* Th⟩, ⟨Ag/Sr, Th, *to* G⟩,
⟨Ag/Sr, *for* G⟩, ⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *at* G⟩

131. {*call*}

⟨Ag/Sr⟩, ⟨Ag/Sr, *at* G⟩, ⟨Ag/Sr, *at/toward* G⟩, ⟨Ag/Sr, *to* G⟩,
⟨Ag/Sr, *to* G, *that/about* Th⟩, ⟨Ag/Sr, G/Th, Prpr⟩, ⟨Ag/Sr, *that/about* Th⟩,
⟨Ag/Sr, Th, *to* G⟩, ⟨Ag/Sr, *for* G⟩, ⟨Ag, Bn, G⟩, ⟨Ag, Bn, G, *p* Sr⟩, ⟨Ag, G⟩,
⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* Sr⟩, ⟨Ag, G, *p* Sr, *for* Bn⟩

132. {*calve*, *cub*, *exhale*, *fawn*, *foal*, *kitten*, *lamb*, *pup*, *whelp*}

⟨Sr⟩

133. {*camouflage*}

⟨Ag, Ptn, *as* Prpr⟩

134. {*canvass*, *examine*, *explore*, *frisk*, *inspect*, *investigate*, *quiz*, *raid*, *riffle*, *scan*, *survey*}

⟨Ag, Lc⟩, ⟨Ag, Lc, *for* G⟩

Goal signifies here the Goal of the inspection, etc.

135. {*care*}

⟨Ex⟩, ⟨Ex, *about* Th⟩, ⟨Ex, *for* G⟩

136. {*caress*, *pat*, *prod*, *stroke*}

⟨Ag, G⟩, ⟨Ag, G, *with* Ins/Th⟩, ⟨Ag, G, *p* Lc⟩, ⟨Ag, G, *p* Lc, *with* Ins/Th⟩

137. {*carry*}

⟨Ag, G, Th⟩, ⟨Ag, G, Th, *from* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *p* Lc⟩,
⟨Ag, Th, *from* Sr⟩, ⟨Ag, Th, *from* Sr, *to* G⟩

138. {*carve*}

⟨Ag, Bn, G⟩, ⟨Ag, Bn, G, *p* Sr⟩, ⟨Ag, G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* Sr⟩,
⟨Ag, G, *p* Sr, *for* Bn⟩, ⟨Ag, Ptn⟩, ⟨Ag, Ptn, *into* G⟩, ⟨Ag, Ptn, *into* G, *for* Bn⟩,
⟨Ag, Ptn, *with* Ins⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G/Lc⟩, ⟨Ins, Mnr⟩, ⟨Ins, Ptn⟩

The constructions with Theme are for carving e. g. a name onto the surface of something.

139. {*cascade*}

⟨Th⟩, ⟨Th, *p* G/Lc⟩, ⟨Th, *p* Lc⟩, ⟨Th, *from* Sr, *to* G⟩

140. {*cast*}

⟨Ag, Bn, G⟩, ⟨Ag, Bn, G, *p* Sr⟩, ⟨Ag, G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* Sr⟩,
⟨Ag, G, *p* Sr, *for* Bn⟩, ⟨Ag, Th⟩, ⟨Ag, Th/Ptn, *into* G⟩, ⟨Ag, Th/Ptn, *into* G, *for* Bn⟩,
⟨Ag, Th, *as* Prpr⟩, ⟨Ag, Th, *to* Prd⟩

141. {*certify*, *characterize*, *class*, *classify*, *describe*, *diagnose*, *herald*, *identify*, *lampoon*, *portray*, *stigmatize*, *treat*}

⟨Ag/Sr, G/Th, *as* Prpr⟩, ⟨Ag/Sr, G/Th, *to* Prd⟩

142. {*chalk*, *charcoal*, *copy*, *crayon*, *doodle*, *pencil*, *print*, *scrawl*, *scribble*, *sketch*, *stencil*, *trace*, *type*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* G/Lc⟩

143. {*change*}

⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *from* Sr⟩,
⟨Ag, Th, *from* Sr, *p* G⟩, ⟨Ag, Th, *for* Th⟩, ⟨Ag, Th, *for* Th, *for* Bn⟩, ⟨Ptn⟩, ⟨Th, *p* G⟩,
⟨Th, *from* Sr⟩, ⟨Th, *from* Sr, *p* G⟩

144. {*channel*, *dip*, *dump*, *funnel*, *ladle*, *scoop*, *tuck*, *wedge*}

⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* G, *with* Ins⟩

145. {*chant*}

⟨Actr/Sr⟩, ⟨Ag/Sr, *at/toward* G⟩, ⟨Ag/Sr, *to* G⟩, ⟨Ag/Sr, *to* G, *that/about* Th⟩, ⟨Ag/Sr, G, Th⟩, ⟨Ag/Sr, Th⟩, ⟨Ag/Sr, *that/about* Th⟩, ⟨Ag/Sr, Th, *to* G⟩, ⟨Ag/Sr, *for* G⟩

146. {*charge1*}

⟨Ag, G⟩, ⟨Ag, G, *for* G⟩, ⟨Ag, G, Th⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, G, Th, *for* G⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* G⟩

147. {*chase*, *trail*}

⟨Th, G/Th⟩, ⟨Th, *after* G/Th⟩, ⟨Th, G/Th, *p* Lc⟩, ⟨Th, *p* Lc, *after* G/Th⟩

148. {*chatter*}

⟨Actr/Sr⟩, ⟨Actr/Sr, *at* G⟩, ⟨Actr/Sr, *at/toward* G⟩, ⟨Actr/Sr, *to* G⟩, ⟨Actr/Sr, *to* G, *that/about* Th⟩, ⟨Actr/Sr, *p* Lc⟩, ⟨Actr/Sr, *for* G⟩, ⟨Actr/Sr, *that/about* Th⟩, ⟨Actr/Sr, Th, *to* G⟩, ⟨Actr, *with* Actr⟩, ⟨Actr, *with* Actr, *about* Prd⟩, ⟨Lc/Sr, *with* Th⟩, ⟨Th/Sr, *through* Lc⟩

149. {*check*}

⟨Actr, *on* G⟩, ⟨Actr, *p* Lc, *for* G⟩, ⟨Actr, Lc, *for* G⟩, ⟨Actr, *for* G⟩, ⟨Actr, *for* G, *p* Lc⟩

150. {*cherish*, *relish*}

⟨Ex, Th⟩, ⟨Ex, Th, *in* Th⟩, ⟨Ex, Th, *as* Prpr⟩, ⟨Ex, Th, *for* G⟩, ⟨Ex, Th, *for* G, *as* Prpr⟩

151. {*chew*, *chomp*, *munch*}

⟨Actr⟩, ⟨Ag, *on* Lc/Ptn⟩, ⟨Ag, Ptn⟩

152. {*chill*}

⟨Ag, Th⟩, ⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *with* Ins⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ins, Th⟩, ⟨Ptn, Mnr⟩, ⟨*that* Prd, Ptn⟩, ⟨Th⟩

153. {*chime*, *chug*, *clack*, *clatter*, *creak*, *gurgle*, *sizzle*, *sputter*, *whir*}

⟨Actr/Sr⟩, ⟨Actr/Sr, *p* Lc⟩, ⟨Lc/Sr, *with* Th⟩, ⟨Th/Sr, *through* Lc⟩

154. {*chip*}

⟨Ag, *at* G⟩, ⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *with* Ins⟩, ⟨Ag, Th/Ptn, *p* Lc⟩,
⟨Ag, Th/Ptn, *p* Lc, *with* Ins⟩, ⟨Ins, Mnr⟩, ⟨Ins, Th/Ptn⟩, ⟨Th/Ptn, Mnr⟩

155. {*choke*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, *up*, G⟩, ⟨Ag, *up*, G, *with* Th⟩, ⟨Ag, Ptn⟩, ⟨Ptn⟩,
⟨Ptn, Mnr⟩

156. {*choose*, *hire*}

⟨Ag, Bn, Th⟩, ⟨Ag, Bn, Th, *p* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *as* Prpr⟩,
⟨Ag, Th, *to* Prd⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *for* Bn⟩

157. {*chop*, *cube*, *dice*, *shred*, *slice*}

⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *with* Ins⟩, ⟨Ins, Mnr⟩

158. {*choreograph*, *direct*, *perform*, *silkscreen*}

⟨Actr⟩, ⟨Ag, G, Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩

159. {*chortle*, *chuckle*, *frown*, *giggle*, *glower*, *grimace*, *grin*, *guffaw*, *jeer*, *laugh*, *pout*, *scowl*, *sigh*, *simper*, *smile*, *smirk*, *snicker*, *snigger*, *snivel*, *sob*, *titter*}

⟨Ag⟩, ⟨Ag, *at* G⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *at* G⟩, ⟨Ex, *at* Th⟩

160. {*cite*}

⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *to* G⟩, ⟨Ag/Sr, Th, *as* Prpr⟩, ⟨Ag/Sr, Th, *to* Prd⟩

161. {*clang*, *clank*, *clink*, *clunk*, *crackle*, *rattle*, *ring2*}

⟨Actr/Sr⟩, ⟨Actr/Sr, *p* Lc⟩, ⟨Ag, Sr⟩, ⟨Lc/Sr, *with* Th⟩, ⟨Th/Sr, *through* Lc⟩

162. {*clap*}

⟨Ag⟩, ⟨Ag, *at* G⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *at* G⟩, ⟨Lc, *with* Th⟩, ⟨Th⟩, ⟨Th, *through* Lc⟩, ⟨Th, *p* Lc⟩

163. {*clash*}

⟨Actr⟩, ⟨Actr, *with* Actr⟩, ⟨Th/Sr, *through* Lc⟩, ⟨Th/Sr, *p* Lc⟩

164. {*clasp*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* G, *with* Ins⟩, ⟨Ag, Th, *together*⟩, ⟨Ag, Th, *together*, *with* Ins⟩, ⟨Ag, Th, *by* Ins⟩, ⟨Ag, Th, *p* Lc⟩

165. {*clean*}

⟨Ag, Bn, Ptn⟩, ⟨Ag, Ptn⟩, ⟨Ag, Ptn, *for* Bn⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨Ag, Sr⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ins, Ptn⟩

166. {*clear*}

⟨Ag, Bn, Ptn⟩, ⟨Ag, Ptn⟩, ⟨Ag, Ptn, *for* Bn⟩, ⟨Ag, Sr⟩, ⟨Ag, Sr, *of* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ins, Ptn⟩, ⟨Ptn⟩, ⟨Sr⟩

167. {*click*}

⟨Ag, Th⟩, ⟨Ag, Th, *at* G⟩, ⟨Lc/Sr, *with* Th⟩, ⟨Th/Sr, *through* Lc⟩, ⟨Th/Sr, *p* Lc⟩

168. {*climb*}

⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, *to* G⟩, ⟨Th, *p* G/Lc⟩, ⟨Th, *up* Lc⟩, ⟨Th, Lc/Pth⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩, ⟨Th, *from* Sr⟩, ⟨Th, *from* Sr, *to* G⟩

169. {*clip1*}

⟨Ag, *at* G⟩, ⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨Ag, Ptn, *p* Lc⟩, ⟨Ag, Ptn, *p* Lc, *with* Ins⟩, ⟨Ptn, Mnr⟩

170. {*clog1*, *dirty*, *fill*, *flood*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, *up*, G⟩, ⟨Ag, *up*, G, *with* Th⟩, ⟨G⟩, ⟨Ins, G⟩, ⟨Th, Lc⟩

171. {*cloister*, *conceal*, *curtain*, *hide*, *isolate*, *quarantine*, *screen*, *seclude*, *sequester*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* Lc⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Ag, Th, *from* Sr, *p* Lc⟩

172. {*close*}

⟨Ag, Th⟩, ⟨Ag, Th, *at* G⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ins, Th⟩, ⟨Th⟩

173. {*clump*}

⟨Th⟩, ⟨Th/Sr, *through* Lc⟩, ⟨Th/Sr, *p* Lc⟩, ⟨Th, *p* G⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩

Levin (1993) only classifies two senses of *clump*: to make a clumping noise, and to move about, clumping.

174. {*cluster*, *group*, *herd*, *mass*}

⟨Ag, Th⟩, ⟨Ag, Th, *together*⟩, ⟨Ag, Th, *p* Lc⟩, ⟨Ag, Th, *with* Th⟩, ⟨Th⟩, ⟨Th, *together*⟩, ⟨Th, *p* Lc⟩, ⟨Th, *with* Th⟩

175. {*clutch*, *grasp*, *grip*, *handle*, *wield*}

⟨Ag, Th⟩, ⟨Ag, Th, *by* Ins⟩, ⟨Ag, Th, *p* Lc⟩

176. {*coil*}

⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *for* Bn⟩, ⟨Ag, Th/Ptn, *into* G⟩,
⟨Ag, Th/Ptn, *into* G, *for* Bn⟩, ⟨Ag, Th, *around* Pth⟩, ⟨Th/Ptn, *into* G⟩,
⟨Th/Ptn, *into* G, *for* Bn⟩, ⟨Th, *around* Pth⟩

177. {*coin*, *compute*, *concoct*, *construct*, *create*, *design*, *fabricate*, *invent*, *manufacture*, *mint*, *organize*, *recreate*, *synthesize*}

⟨Ag, G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* Ins⟩, ⟨Ag, G, *p* Ins, *for* Bn⟩

178. {*collect*}

⟨Ag, Th⟩, ⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *for* Bn⟩, ⟨Ag, Th/Ptn, *into* G⟩,
⟨Ag, Th/Ptn, *into* G, *for* Bn⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *into* G⟩, ⟨Ag, Th, *together*⟩,
⟨Ag, Th, *with* Ins⟩, ⟨Ag, Th, *p* Lc⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Ag, Th, *from* Sr, *for* Bn⟩,
⟨Ins, Th⟩, ⟨Th⟩, ⟨Th/Ptn, *into* G⟩, ⟨Th/Ptn, *into* G, *for* Bn⟩, ⟨Th, *into* G⟩,
⟨Th, *together*⟩, ⟨Th, *p* Lc⟩

179. {*color*, *distemper*, *dye*, *enamel*, *glaze*, *japan*, *lacquer*, *shellac*, *tint*, *varnish*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨G, Mnr⟩

180. {*comb*}

⟨Actr, *p* Lc, *for* G⟩, ⟨Actr, Lc/Ptn⟩, ⟨Actr, Lc, *for* G⟩, ⟨Actr, *for* G⟩,
⟨Actr, *for* G, *p* Lc⟩, ⟨Actr, Th, *p* Sr⟩, ⟨Actr, Th, *p* Sr, *with* Ins⟩

181. {*come*}

⟨Th⟩, ⟨Th, *to* G⟩, ⟨Th, *p* Lc⟩, ⟨Th, *from* Sr⟩, ⟨Th, *from* Sr, *to* G⟩, ⟨Th, *from* Sr, *p* Lc⟩

182. {*compensate*}

⟨Ag, G⟩, ⟨Ag, G, *as* Prpr⟩, ⟨Ag, G, *for* G⟩, ⟨Ag, G, *for* G, *as* Prpr⟩, ⟨Ag, G, *with* Th⟩

183. {*complete*, *discontinue*, *initiate*, *quit*}

⟨Th, Prd⟩

184. {*compose*, *produce*}

⟨Actr⟩, ⟨Ag, G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *to* G⟩, ⟨Ag, G, *p* Ins⟩, ⟨Ag, G, *p* Ins, *for* Bn⟩

185. {*compress*, *freeze*, *melt*}

⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *for* Bn⟩, ⟨Ag, Th/Ptn, *into* G⟩,
⟨Ag, Th/Ptn, *into* G, *for* Bn⟩, ⟨Ag, Th/Ptn, *with* Ins⟩, ⟨Ins, Th/Ptn⟩, ⟨Ptn⟩,
⟨Th/Ptn, *into* G⟩, ⟨Th/Ptn, *into* G, *for* Bn⟩

186. {*confess*}

⟨Ag/Sr, G/Th, Prpr⟩, ⟨Ag/Sr, G/Th, *to* Prd⟩, ⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *to* G⟩, ⟨Ag, *to* G, *that* Th⟩, ⟨Ag, *that* Th⟩

187. {*confirm*, *disguise*, *enlist*, *enroll*, *establish*, *induct*, *recollect*, *reinstate*, *visualize*}

⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *as* Prpr⟩, ⟨Ag, Th, *to* Prd⟩

188. {*confuse*, *muddle*}

⟨Ag, Th⟩, ⟨Ag, Th, *with* Th⟩, ⟨*that* Prd, Ptn⟩

189. {*connect*, *join*}

⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *together*⟩, ⟨Ag, Th, *with* Th⟩, ⟨Th⟩, ⟨Th, *to* G⟩, ⟨Th, *together*⟩, ⟨Th, *with* Th⟩

190. {*convey*}

⟨Ag/Sr, *to* G, *that* Th⟩, ⟨Ag/Sr, *that* Th⟩, ⟨Ag, G, Th⟩, ⟨Ag, G, Th, *from* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *to* G, *from* Sr⟩, ⟨Ag, Th, *from* Sr⟩

191. {*corrode*}

⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨Ins, Ptn⟩, ⟨Ptn⟩, ⟨Ptn, *p* Lc⟩, ⟨Ptn, *with* Th⟩

192. {*cost*}

⟨Th, Prpr⟩

193. {*cough*}

⟨Ag/Sr⟩, ⟨Ag/Sr, *at* G⟩, ⟨Ag/Sr, *on* G⟩, ⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *at* G⟩

194. {*count*}

⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *as* Prpr⟩, ⟨Ag, Th, *to* Prd⟩, ⟨Th, *as* Prpr⟩

195. {*court*, *cuddle*, *embrace*, *nuzzle*, *pet*, *preen*, *primp*}

⟨Ag, Th⟩, ⟨Th⟩

196. {*cover*}

⟨Ag, G⟩, ⟨Ag, G, *in* Th⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, *up*, G⟩, ⟨Ag, *up*, G, *with* Th⟩, ⟨Th, Lc⟩

197. {*covet*}

⟨Ex, Th⟩, ⟨Ex, Th, *as* Prpr⟩, ⟨Ex, Th, *for* G⟩, ⟨Ex, Th, *for* G, *as* Prpr⟩

198. {*cower*, *cringe*}

⟨Actr, *at* Ag⟩, ⟨Actr, *at* Th⟩

199. {*crab*}

⟨Actr⟩, ⟨Ag/Sr⟩, ⟨Ag/Sr, *at* G⟩, ⟨Ag/Sr, *to* G⟩, ⟨Ag/Sr, *to* G, *about* Th⟩,
⟨Ag/Sr, *that* Prd⟩, ⟨Ag/Sr, *that* Prd, *to* G⟩, ⟨Ag/Sr, *about* Th⟩,
⟨Ag/Sr, *about* Th, *to* G⟩

200. {*crack*}

⟨Ag, Sr/Ptn⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ins, Th⟩, ⟨Lc, *with* Th⟩, ⟨Th⟩,
⟨Th, *through* Lc⟩, ⟨Th, Mnr⟩, ⟨Th, *p* Lc⟩

201. {*cram*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, *for* G⟩, ⟨Ag, Th, *p* G⟩

202. {*crash*}

⟨Ag, Th⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ins, Th⟩, ⟨Lc, *with* Th⟩, ⟨Th⟩, ⟨Th, *together*⟩,
⟨Th, *p* G/Ptn⟩, ⟨Th, *through* Lc⟩, ⟨Th, Mnr⟩, ⟨Th, *p* Lc⟩

203. {*crave*}

⟨Ex, Th⟩, ⟨Ex, *for* Th⟩, ⟨Ex, Th, *as* Prpr⟩, ⟨Ex, Th, *for* G⟩, ⟨Ex, Th, *for* G, *as* Prpr⟩

204. {*crawl*}

⟨Lc, *with* Th⟩, ⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, *p* G/Lc⟩, ⟨Th, *p* Lc⟩, ⟨Th, *p* Sr⟩,
⟨Th, *p* Sr, *p* G⟩, ⟨Th, *from* Sr, *to* G⟩

205. {*cream*}

⟨Ag, Th/Ptn⟩, ⟨Ag, Th, *into* G⟩, ⟨Ag, Th, *with* Th⟩, ⟨Th, *with* Th⟩

206. {*crease*, *crinkle*, *crumple*, *rumple*}

⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *with* Ins⟩, ⟨Th/Ptn⟩

207. {*creep*, *hop*}

⟨Lc, *with* Th⟩, ⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, *p* Lc⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩

208. {*crop*, *dent*, *fillet*, *gash*, *kill*, *mangle*, *notch*, *perforate*, *slit*}

⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨Ins, Ptn⟩

209. {*cross*}

⟨Ag, Th⟩, ⟨Ag, Th, *at* G⟩, ⟨Th⟩, ⟨Th, G⟩, ⟨Th, Lc⟩

210. {*crown*}

⟨Ag, G/Th, *as* Prpr⟩, ⟨Ag, G/Th, Prpr⟩, ⟨Ag, G⟩, ⟨Ag, G, Prpr⟩, ⟨Ag, G, *with* Th⟩

211. {*cruise*, *sail*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *along* Lc⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *p* G⟩,
⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, Lc⟩, ⟨Th, *along* Lc⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩

212. {*crunch*}

⟨Actr⟩, ⟨Ag, *on* Lc/Ptn⟩, ⟨Ag, Ptn⟩, ⟨Ag, Sr/Ptn⟩, ⟨Th/Sr, *p* Lc⟩, ⟨Th, *through* Lc⟩

213. {*crush*}

⟨Ag, Th⟩, ⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *with* Ins⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ins, Th⟩,
⟨*that* Prd, Ptn⟩, ⟨Th, Mnr⟩

214. {*cry*}

⟨Actr⟩, ⟨Ag/Sr, *at* G⟩, ⟨Ag/Sr, *on* G⟩, ⟨Ag, *at/toward* G⟩, ⟨Ag, *to* G⟩,
⟨Ag, *to* G, *that/about* Th⟩, ⟨Ag, *for* G⟩, ⟨Ag, Th⟩, ⟨Ag, *that/about* Th⟩,
⟨Ag, Th, *at* G⟩, ⟨Ag, Th, *to* G⟩, ⟨Th/Sr, *through* Lc⟩

215. {*cull*}

⟨Ag, Sr⟩, ⟨Ag, Sr, *of* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* Sr⟩

216. {*curl*}

⟨Ag, Th⟩, ⟨Ag, Th, *around* Pth⟩, ⟨Th, *around* Pth⟩

217. {*cut*}

⟨Ag, Bn, G⟩, ⟨Ag, Bn, G, *p* Sr⟩, ⟨Ag, G⟩, ⟨Ag, *at* G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* Sr⟩,
⟨Ag, G, *p* Sr, *for* Bn⟩, ⟨Ag, Ptn⟩, ⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *into* G⟩,
⟨Ag, Th/Ptn, *into* G, *for* Bn⟩, ⟨Ag, Th/Ptn, *with* Ins⟩, ⟨Ag, Th/Ptn, *p* Lc⟩,
⟨Ag, Th/Ptn, *p* Lc, *with* Ins⟩, ⟨Ag, Th/Ptn, *apart*⟩, ⟨Ag, Th/Ptn, *off-of/off* Sr⟩,
⟨*that* Prd, Ptn⟩, ⟨Th, *p* G/Lc⟩, ⟨Th, Mnr⟩, ⟨Th, *from* Sr, *to* G⟩

Two of the bare Themes are for Levin's (1993) *Meander* verbs, as in *the road cuts through the center of town.*

218. {*dance*}

⟨Actr/Th⟩, ⟨Actr/Th, *p* G⟩, ⟨Actr/Th, *p* Lc⟩, ⟨Actr/Th, *along* Lc⟩,
⟨Actr/Th, *p* Sr⟩, ⟨Actr/Th, *p* Sr, *p* G⟩, ⟨Ag/Th, Bn, G⟩, ⟨Ag/Th, G⟩,
⟨Ag/Th, G, *for* Bn⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *along* Lc⟩, ⟨Ag, Th, *p* Sr⟩,
⟨Ag, Th, *p* Sr, *p* G⟩

219. {*dash*}

⟨Ag, G/Ptn⟩, ⟨Ag, *at* G/Ptn⟩, ⟨Ag, *at* G/Ptn, *with* Th⟩, ⟨Ag, G/Ptn, *p* Lc⟩,
⟨Ag, G/Ptn, *p* Lc, *with* Th⟩, ⟨Ag, G/Ptn, *with* Th⟩, ⟨Ag, Th/Ptn⟩,
⟨Ag, Th/Ptn, *together*⟩, ⟨Ag, Th/Ptn, *against* G/Ptn⟩, ⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, G/Ptn⟩,
⟨Th, G/Ptn, *p* Lc⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩

220. {*date*}

⟨Actr⟩, ⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Ptn⟩

Another case one might want to consider homonymous: with a Goal, this is putting a *date* on something; otherwise, it's people dating one another.

221. {*daub*, *pump*, *spatter*, *splatter*, *spray*, *spritz*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *at* G⟩, ⟨Th, *on/onto* G⟩

222. {*declare*}

⟨Ag/Sr, G/Th, Prpr⟩, ⟨Ag/Sr, G/Th, *to* Prd⟩, ⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *to* G⟩,
⟨Ag, *to* G, *that* Th⟩, ⟨Ag, G/Th, Prpr⟩, ⟨Ag, Th⟩, ⟨Ag, *that* Th⟩, ⟨Ag, Th, *to* G⟩

223. {*decompose*}

⟨Ag, Th⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ins, Th⟩, ⟨Ptn⟩, ⟨Ptn, *p* Lc⟩, ⟨Th⟩

224. {*decouple*, *detach*, *differentiate*, *disassemble*, *disconnect*, *disentangle*, *dissociate*, *distinguish*, *part*, *segregate*, *separate*, *sunder*, *unbolt1*, *unbuckle*, *unbutton*, *unchain*, *unclamp*, *unclasp*, *unclip2*, *unfasten*, *unglue*, *unhinge*, *unhitch*, *unhook*, *unlace*, *unlatch*, *unleash*, *unlock*, *unpeg*, *unpin*, *unscrew*, *unshackle*, *unstaple*, *unstitch*, *untie*, *unzip*}

⟨Ag, Th⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Th⟩, ⟨Th, *from* Sr⟩

225. {*define*}

⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *as* Prpr⟩, ⟨Ag, Th, *to* Prd⟩

226. {*defrost*}

⟨Ag, Sr⟩, ⟨Ag, Sr, *with* Ins⟩, ⟨Ins, Sr⟩, ⟨Sr⟩

227. {*delight*}

⟨Ag, Ex⟩, ⟨Ag, Ex, *with* Ins⟩, ⟨Ex, Mnr⟩, ⟨Ex, *in* Th⟩, ⟨Ex, *over* Th⟩, ⟨*that* Prd, Ex⟩

228. {*demolish*}

⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨*that* Prd, Ptn⟩

229. {*depart*, *escape*, *exit*, *flee*}

⟨Th⟩, ⟨Th, *to* G⟩, ⟨Th, Sr⟩, ⟨Th, *from* Sr⟩, ⟨Th, *from* Sr, *to* G⟩

230. {*derive*}

⟨Ag, G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* Ins⟩, ⟨Ag, G, *p* Ins, *for* Bn⟩, ⟨G/Th, *from* Sr⟩

231. {*designate*}

⟨Ag, G/Th, *as* Prpr⟩, ⟨Ag, G/Th, Prpr⟩, ⟨Ag, G/Th, *to* Prd⟩

232. {*desire*}

⟨Ex, Th⟩, ⟨Ex, Th, *as* Prpr⟩, ⟨Ex, Th, *to* Prd⟩, ⟨Ex, Th, *for* G⟩,
⟨Ex, Th, *for* G, *as* Prpr⟩

233. {*detect*, *discern*, *notice*, *sense*}

⟨G, Th⟩, ⟨G, *that* Th⟩, ⟨G, Th, *in* Lc⟩

We're treating this as non-agentive, for better or worse. Thus the 'sensor' (Goal) receives the sensation (Theme). Alternatively, the Goal is also an Experiencer

234. {*devastate*}

⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *with* Ins⟩,
⟨*that* Prd, Ptn⟩, ⟨Th, Mnr⟩

235. {*develop*}

⟨Ag, Ptn⟩, ⟨Ag, Ptn, *for* Bn⟩, ⟨Ag, Ptn, *p* Ins⟩, ⟨Ag, Ptn, *p* Ins, *for* Bn⟩, ⟨Ag, Th/Ptn, *into* G⟩, ⟨Ag, Th/Ptn, *into* G, *for* Bn⟩, ⟨Th/Ptn, *into* G⟩, ⟨Th/Ptn, *from* Sr⟩, ⟨Th/Ptn, *from* Sr, *p* Lc⟩

236. {*dictate*}

⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *to* G⟩, ⟨Ag, G, Th⟩

237. {*differ*}

⟨Th⟩, ⟨Th, *from* Sr⟩, ⟨Th, *with* Th⟩

238. {*dig*}

⟨Actr⟩, ⟨Actr, Lc⟩, ⟨Actr, Lc, *for* G⟩, ⟨Actr, *p* Lc⟩, ⟨Actr, *p* Lc, *for* G⟩, ⟨Actr, *for* G⟩, ⟨Actr, *for* G, *p* Lc⟩, ⟨Ag, G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* Ins⟩, ⟨Ag, G, *p* Ins, *for* Bn⟩, ⟨Ag, G, *p* Lc⟩, ⟨Ag, Th, *into* G⟩, ⟨Ag, Th, *through* G⟩, ⟨Th, *into* G⟩

239. {*din*, *echo*, *resonate*, *resound*, *reverberate*}

⟨Lc/Sr, *with* Th⟩, ⟨Th, *through/in* Lc⟩

240. {*disarm*, *relieve*}

⟨Ag, Sr⟩, ⟨Ag, Sr, *with* Ins⟩, ⟨Ag, Sr, *of* Th⟩, ⟨*that* Prd, Sr⟩

241. {*discover*}

⟨Ag/G, *that* Prd⟩, ⟨Ag/G, Th⟩, ⟨Ag/G, Th, *to* Prd⟩

242. {*disdain*}

⟨Ag/Sr, G⟩, ⟨Ag/Sr, G/Th, *in* Lc⟩, ⟨Ag/Sr, G/Th, *as* Prpr⟩, ⟨Ag/Sr, G/Th, *for* G⟩, ⟨Ag/Sr, G/Th, *for* G, *as* Prpr⟩

243. {*dispatch*}

⟨Ag, G, Th⟩, ⟨Ag, G, Th, *from* Sr⟩, ⟨Ag, Ptn⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩,
⟨Ag, Th, *to* G, *from* Sr⟩, ⟨Ag, Th, *from* Sr⟩

244. {*disrobe*, *undress*}

⟨Ag, Sr⟩, ⟨Sr⟩

245. {*distill*, *erase*, *expunge*}

⟨Ag, Sr, Prpr, *of* Th⟩, ⟨Ag, Th, *p* Sr⟩

246. {*divide*}

⟨Ag, Th⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Ins, Th⟩, ⟨Th⟩, ⟨Th, *from* Sr⟩

247. {*divorce*}

⟨Ag, Th⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Th⟩, ⟨Th, Sr⟩, ⟨Th, *from* Sr⟩

248. {*doff*, *shed*}

⟨Sr, Th⟩

249. {*doll*, *spruce*, *tog*}

⟨Ag, G, *up*⟩, ⟨Ag, *up*⟩

250. {*doubt*, *expect*}

⟨Lc/Th, *that* Prd⟩, ⟨Lc/Th, Prd/Th, *to* Prd⟩

251. {*drag*}

⟨Actr, G, Th⟩, ⟨Actr, G, Th, *from* Sr⟩, ⟨Actr, *p* Lc, *for* G⟩, ⟨Actr, Lc, *for* G⟩,
⟨Actr, *for* G⟩, ⟨Actr, *for* G, *p* Lc⟩, ⟨Actr, Th⟩, ⟨Actr, Th, *to* G⟩,
⟨Actr, Th, *from* Sr⟩, ⟨Actr, Th, *from* Sr, *to* G⟩

252. {*drain*}

⟨Ag, Sr⟩, ⟨Ag, Sr, *of* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ins, Th⟩, ⟨Sr⟩, ⟨Sr, *of* Th⟩, ⟨Th⟩

253. {*draw*}

⟨Actr⟩, ⟨Ag, Bn, G⟩, ⟨Ag, G⟩, ⟨Ag, *at/on* G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* G/Lc⟩, ⟨Ag, Th, *apart*⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *off-of/off* Sr⟩, ⟨Th, *apart*⟩, ⟨Th, *off-of/off* Sr⟩

The Goals that are direct objects are pictures to be drawn; otherwise, most of these constructions are more closely related to a very different sense of *draw*, as in *to draw a sword*, i. e. from its sheath.

254. {*dress*}

⟨Ag, G⟩, ⟨Ag, G, *up*⟩, ⟨Ag, *up*⟩, ⟨G⟩

255. {*dribble*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *p* G⟩, ⟨Sr⟩, ⟨Sr, *on* G⟩, ⟨Sr, Th⟩, ⟨Sr, *with* Th⟩, ⟨Th, *p* G⟩, ⟨Th, *through* Lc⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩, ⟨Th, *from* Sr⟩

256. {*drift*, *slouch*, *totter*}

⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, *p* Lc⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩

257. {*drill*, *gouge*, *mash*, *mow*, *spear*}

⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨Ins, Mnr⟩

258. {*drink*, *eat*}

⟨Actr/G⟩, ⟨Actr/G, Th⟩

259. {*drip*, *spurt*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *p* G⟩, ⟨Sr, Th⟩, ⟨Sr, *with* Th⟩, ⟨Th, *p* G⟩, ⟨Th, *through* Lc⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩, ⟨Th, *from* Sr⟩

260. {*drive*}

⟨Ag, G, Th⟩, ⟨Ag, G, Th, *from* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *to* G⟩,
⟨Ag, Th, *along* Lc⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *p* G⟩, ⟨Ag, Th, *from* Sr⟩,
⟨Ag, Th, *from* Sr, *to* G⟩, ⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, Lc⟩, ⟨Th, *along* Lc⟩, ⟨Th, *p* Sr⟩,
⟨Th, *p* Sr, *p* G⟩

261. {*drizzle*, *sprinkle*}

⟨*it*⟩, ⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *at* G⟩, ⟨Th, *on/onto* G⟩

262. {*drool*}

⟨Sr⟩, ⟨Sr, *on* G⟩, ⟨Sr, Th⟩, ⟨Th, *through* Lc⟩, ⟨Th, *from* Sr⟩

263. {*drop*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *down* Lc⟩, ⟨Ag, Th, *down* Lc, *p* G⟩,
⟨Ag, Th, *down* Lc, *p* Sr⟩, ⟨Ag, Th, *down* Lc, *p* Sr, *p* G⟩, ⟨Ag, Th, *p* Sr⟩,
⟨Ag, Th, *p* Sr, *p* G⟩, ⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, *p* G/Lc⟩, ⟨Th, *down*⟩, ⟨Th, *down*, *p* G⟩,
⟨Th, *down*, *p* Sr⟩, ⟨Th, *down*, *p* Sr, *p* G⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩,
⟨Th, *from* Sr, *to* G⟩

264. {*drum*, *smack*}

⟨Ag, G/Ptn⟩, ⟨Ag, *at* G/Ptn⟩, ⟨Ag, *at* G/Ptn, *with* Th⟩, ⟨Ag, G/Ptn, *p* Lc⟩,
⟨Ag, G/Ptn, *p* Lc, *with* Th⟩, ⟨Ag, G/Ptn, *with* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th/Ptn⟩,
⟨Ag, Th/Ptn, *together*⟩, ⟨Ag, Th/Ptn, *against* G/Ptn⟩, ⟨Ag, Th, *at* G⟩, ⟨Th, G/Ptn⟩,
⟨Th, G/Ptn, *p* Lc⟩

265. {*dust*}

⟨Ag, *at* G⟩, ⟨Ag, Sr⟩, ⟨Ag, Sr, Prpr, *of* Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *at* G⟩

266. {*ease*}

⟨Ag, Th⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ag, Th, *out-of* Sr⟩, ⟨Th⟩

267. {*edge*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Th, Lc⟩, ⟨Th, Th⟩

268. {*eliminate*}

⟨Ag, Ptn⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* Sr⟩

269. {*emanate*, *exude*}

⟨Sr, Th⟩, ⟨Th⟩, ⟨Th, *p* Lc⟩, ⟨Th, *through* Lc⟩, ⟨Th, *from* Sr⟩, ⟨Th, *from* Sr, *p* Lc⟩

270. {*embarass*}

⟨*that* Prd, Ex⟩, ⟨Th, Mnr⟩

271. {*embarrass*}

⟨Ag, Ex⟩, ⟨Ag, Ex, *with* Ins⟩

272. {*embezzle*, *extort*, *filch*, *pilfer*, *pirate*, *plagiarize*, *purloin*, *thieve*, *wangle*}

⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *from* Sr/Ptn⟩, ⟨Ag, Th, *from* Sr/Ptn, *for* Bn⟩

273. {*embroider*}

⟨Ag, Bn, G⟩, ⟨Ag, Bn, G, *p* Sr⟩, ⟨Ag, G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* Sr⟩,
⟨Ag, G, *p* Sr, *for* Bn⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th/Ptn, *into* G⟩,
⟨Ag, Th/Ptn, *into* G, *for* Bn⟩, ⟨Ag, Th, *p* G⟩

274. {*employ*, *reject*, *represent*}

⟨Ag, Th⟩, ⟨Ag, Th, *as* Prpr⟩, ⟨Ag, Th, *as* Prd⟩, ⟨Ag, Th, *to* Prd⟩

275. {*empty*}

⟨Ag, Sr⟩, ⟨Ag, Sr, *with* Ins⟩, ⟨Ag, Sr, *of* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ins, Sr⟩,
⟨Sr⟩, ⟨Sr, *of* Th⟩

276. {*end*, *finish*, *resume*, *terminate*}

⟨Th⟩, ⟨Th, Prd⟩

277. {*engage*}

⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ag, Th, *as* Prpr⟩, ⟨Ag, Th, *to* Prd⟩, ⟨*that* Prd, Ptn⟩, ⟨Th, Mnr⟩

278. {*entangle*, *interlace*, *intersperse*, *interweave*}

⟨Ag, Th⟩, ⟨Ag, Th, *with* Th⟩, ⟨Th⟩, ⟨Th, Th⟩

The non-agentive constructions don't sound good to our ears, but they're listed in Levin (1993).

279. {*enter*}

⟨Ag, Th, *into* G⟩, ⟨Th⟩, ⟨Th, G⟩, ⟨Th, *to* G⟩, ⟨Th, *from* Sr⟩, ⟨Th, *from* Sr, *to* G⟩

280. {*envisage*}

⟨Ag/Sr, G/Th⟩, ⟨Ag/Sr, G/Th, *as* Prpr⟩

281. {*erode*, *moult*, *rot*, *smolder*, *stagnate*, *wilt*, *wither*}

⟨Ptn⟩, ⟨Ptn, *p* Lc⟩

282. {*esteem*}

⟨Ag/Sr, G⟩, ⟨Ag/Sr, G/Th, *in* Lc⟩, ⟨Ag/Sr, G/Th, Prpr⟩, ⟨Ag/Sr, G/Th, *as* Prpr⟩, ⟨Ag/Sr, G/Th, *as* Prd⟩, ⟨Ag/Sr, G/Th, *for* G⟩, ⟨Ag/Sr, G/Th, *for* G, *as* Prpr⟩

283. {*evolve*}

⟨Ag, Th⟩, ⟨Ag, Th, *into* G⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Th⟩, ⟨Th, *into* G⟩, ⟨Th, *p* Lc⟩, ⟨Th, *from* Sr⟩, ⟨Th, *from* Sr, *p* Lc⟩

284. {*exalt*, *idolize*, *prize*, *revere*, *venerate*, *worship*}

⟨Ag/Sr, G⟩, ⟨Ag/Sr, G/Th, *in* Lc⟩, ⟨Ag/Sr, G/Th, *for* G⟩, ⟨Ag/Sr, G/Th, *for* G, *as* Prpr⟩

285. {*excuse*, *forgive*, *recompense*, *remunerate*, *welcome*}

⟨Ag, G⟩, ⟨Ag, G, *as* Prpr⟩, ⟨Ag, G, *for* G⟩, ⟨Ag, G, *for* G, *as* Prpr⟩

286. {*exercise*}

⟨Actr⟩, ⟨Ag, Th⟩, ⟨Th⟩

287. {*exist*, *flourish*, *live*, *prosper*, *survive*, *thrive*}

⟨Actr/Th⟩, ⟨Actr/Th, *p* Lc⟩, ⟨Actr/Th, *on* Th/Sr⟩

288. {*expel*, *remove*}

⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *from* Sr⟩

289. {*explode*, *pop*}

⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨Ins, Ptn⟩, ⟨Lc/Sr, *with* Th⟩, ⟨Ptn⟩,
⟨Sr/Ptn, *through* Lc⟩, ⟨Sr/Ptn, *p* Lc⟩

290. {*extend*}

⟨Ag, G, Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Th⟩, ⟨Th, *p* Lc⟩

291. {*extirpate*}

⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* Sr⟩

292. {*extract*, *winkle*, *withdraw*}

⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *from* Sr⟩,
⟨Ag, Th, *from* Sr, *for* Bn⟩

293. {*faint*}

⟨Ptn⟩, ⟨Ptn, *at/from* Sr⟩

294. {*fall*}

⟨Th⟩, ⟨Th, *to* G⟩, ⟨Th, *down* Lc⟩, ⟨Th, *for* G⟩, ⟨Th, *from* Sr⟩, ⟨Th, *from* Sr, *to* G⟩

295. {*fancy*}

⟨Ex, Th⟩, ⟨Ex, Th, *in* Th⟩, ⟨Ex, Th, Prpr⟩, ⟨Ex, Th, *as* Prpr⟩, ⟨Ex, Th, *for* G⟩, ⟨Ex, Th, *for* G, *as* Prpr⟩, ⟨Ex, *that* Prd⟩

296. {*fear*}

⟨Ag/Sr, G⟩, ⟨Ag/Sr, G/Th, *in* Lc⟩, ⟨Ag/Sr, G/Th, *as* Prpr⟩, ⟨Ag/Sr, G/Th, *for* G⟩, ⟨Ag/Sr, G/Th, *for* G, *as* Prpr⟩, ⟨Ex⟩, ⟨Ex, *that* Prd⟩, ⟨Ex, *for* G⟩

297. {*feed*}

⟨Ag/G, *on* Th⟩, ⟨Ag, G⟩, ⟨Ag, G, Th⟩, ⟨Ag, G, *p* Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Th, G⟩

298. {*feel*}

⟨Ag/Ex, Lc⟩, ⟨Ag/Ex, Lc, *for* G⟩, ⟨Ex, *p* Lc⟩, ⟨Ex, *p* Lc, *for* G⟩, ⟨Ex, Th⟩, ⟨Ex, Th, *in* Lc⟩, ⟨Ex, Th, *to* Prd⟩, ⟨Ex, Prd⟩, ⟨Ex, *that* Prd⟩, ⟨Ex, *for* G⟩, ⟨Ex, *for* G, *p* Lc⟩, ⟨Ex, G⟩, ⟨Ex, G, *p* Lc⟩, ⟨Ex, *for* Th⟩, ⟨Ptn, Prpr⟩, ⟨Ptn, Prpr, *to* Ex⟩

299. {*ferret*, *nose*}

⟨Ag, Th, *out-of* Sr⟩

300. {*fidget*}

⟨Th⟩, ⟨Th, *p* G⟩

301. {*file2*}

⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *with* Ins⟩, ⟨Ins, Mnr⟩, ⟨Ins, Ptn⟩

302. {*filter*, *hoover*, *hose*, *mop*, *plow*, *sandpaper*, *shear*, *vacuum*}

⟨Ag, Sr⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *with* Ins⟩

303. {*find*}

⟨Ag/G, Bn, Th⟩, ⟨Ag/G, Bn, Th, *p* Sr⟩, ⟨Ag/G, Th⟩, ⟨Ag/G, Th, *for* Bn⟩, ⟨Ag/G, Th, *p* Sr⟩, ⟨Ag/G, Th, *p* Sr, *for* Bn⟩, ⟨Ag, G/Th, *to* Prd⟩, ⟨Ex/G, *that* Th⟩, ⟨Ex/G, Th, Prpr⟩

304. {*fine*, *tax*}

⟨Ag, G, *for* Ag⟩, ⟨Ag, G, Th⟩, ⟨Ag, G, Th, *for* Ag⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Ag⟩

305. {*fish*}

⟨Actr⟩, ⟨Actr, Lc⟩, ⟨Actr, Lc, *for* G⟩, ⟨Actr, *p* Lc⟩, ⟨Actr, *p* Lc, *for* G⟩, ⟨Actr, *for* G⟩, ⟨Actr, *for* G, *p* Lc⟩, ⟨Actr, Th⟩, ⟨Actr, Th, *p* Lc⟩

306. {*fix*}

⟨Ag, Bn, G⟩, ⟨Ag, G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, Th, *at* Lc⟩

With Theme, the reference is to putting something in a fixed 'position'; with Goal, to preparing something.

307. {*fizz*}

⟨Sr⟩, ⟨Th/Sr, *through* Lc⟩, ⟨Th/Sr, *p* Lc⟩

308. {*flap*, *wiggle*}

⟨Ag, Th⟩, ⟨Ag, Th, *at* G⟩, ⟨Ag, Th, *p* Lc⟩, ⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, *p* Lc⟩

309. {*flash*}

⟨Ag, Th⟩, ⟨Ag, Th, *at* G⟩, ⟨Lc/Sr, *with* Th⟩, ⟨Sr⟩, ⟨Sr, *p* Lc⟩

310. {*float*}

⟨Ag, G, Th⟩, ⟨Ag, G, Th, *p* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *to* G, *p* Sr⟩, ⟨Ag, Th, *p* Lc⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *p* G⟩, ⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, *to* G⟩, ⟨Th, *to* G, *p* Sr⟩, ⟨Th, *p* Lc⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩

311. {*flog*}

⟨Ag, G/Ptn⟩, ⟨Ag, G/Ptn, *p* Lc⟩, ⟨Ag, G/Ptn, *p* Lc, *with* Th⟩, ⟨Ag, G/Ptn, *with* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Ag, Th, *from* Sr, *for* Bn⟩

Possibly one might view this as homonymy: with a Theme, this is *flog* as in *steal*.

312. {*floss*}

⟨Ag⟩, ⟨Ag, Sr⟩

313. {*flutter*}

⟨Ag, Th⟩, ⟨Ag, Th, *at* G⟩, ⟨Th⟩, ⟨Th, *p* Lc⟩

314. {*fly*}

⟨Ag, G, Th⟩, ⟨Ag, G, Th, *from* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *p* Lc⟩, ⟨Ag, Th, *along* Lc⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *p* G⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Ag, Th, *from* Sr, *to* G⟩, ⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, *p* Lc⟩, ⟨Th, Lc/Pth⟩, ⟨Th, *along* Lc⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩

315. {*foam*}

⟨Lc, *with* Th⟩, ⟨Sr, Th⟩, ⟨Sr, *with* Th⟩, ⟨Th⟩, ⟨Th, *p* Lc⟩, ⟨Th, *through* Lc⟩, ⟨Th, *from* Sr⟩

316. {*fog*, *hail2*, *lightning*, *mist*, *mizzle*, *rain*, *sleet*, *snow*, *storm*}

⟨*it*⟩

317. {*fold*}

⟨Ag, Bn, G⟩, ⟨Ag, Bn, G, *p* Sr⟩, ⟨Ag, G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* Sr⟩, ⟨Ag, G, *p* Sr, *for* Bn⟩, ⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *for* Bn⟩, ⟨Ag, Th/Ptn, *at* G⟩, ⟨Ag, Th/Ptn, *into* G⟩, ⟨Ag, Th/Ptn, *into* G, *for* Bn⟩, ⟨Ag, Th/Ptn, *with* Ins⟩, ⟨Th/Ptn⟩, ⟨Th/Ptn, *into* G⟩, ⟨Th/Ptn, *into* G, *for* Bn⟩

318. {*follow*}

⟨Ag/Th, G/Th⟩, ⟨Ag/Th, G/Th, *p* Lc⟩, ⟨Th, G/Th⟩

319. {*forge*}

⟨Ag, Bn, G⟩, ⟨Ag, Bn, G, *p* Sr⟩, ⟨Ag, G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* Sr⟩,
⟨Ag, G, *p* Sr, *for* Bn⟩, ⟨Ag, Th⟩, ⟨Ag, Th/Ptn, *into* G⟩, ⟨Ag, Th/Ptn, *into* G, *for* Bn⟩,
⟨Ag, Th, *p* G/Lc⟩

The constructions with Theme are for forging e. g. a name onto the surface of something.

320. {*form*}

⟨Ag, G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* G⟩, ⟨Ag, G, *p* Ins⟩, ⟨Ag, G, *p* Ins, *for* Bn⟩,
⟨Ag, G, *from* Sr⟩, ⟨Ag, G, *from* Sr, *p* G⟩, ⟨G⟩, ⟨G, *p* G⟩, ⟨G, *p* Lc⟩, ⟨G, *from* Sr⟩,
⟨G, *from* Sr, *p* G⟩, ⟨G, *from* Sr, *p* Lc⟩

321. {*fracture*}

⟨Ag, Ptn⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ins, Th⟩, ⟨Th, Mnr⟩

322. {*fret*, *moon*, *rhapsodize*}

⟨Actr, *about* Th⟩, ⟨Actr, *over* Th⟩

323. {*fume*}

⟨Ex/Sr, *over* Ag⟩, ⟨Sr, *at* Th⟩

324. {*fuse*}

⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *together*⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ag, Th, *with* Th⟩,
⟨Ins, Th⟩, ⟨Th⟩, ⟨Th, *to* G⟩, ⟨Th, *together*⟩, ⟨Th, *with* Th⟩

325. {*gain*}

⟨Ag, Bn, Th⟩, ⟨Ag, Bn, Th, *p* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *p* Sr⟩,
⟨Ag, Th, *p* Sr, *for* Bn⟩, ⟨Th⟩

326. {*gape*, *gawk*, *goggle*}

⟨Ag/Sr⟩, ⟨Ag/Sr, *at* G⟩, ⟨Ag/Sr, *around/through/into* G⟩, ⟨Ag/Sr, Th⟩,
⟨Ag/Sr, Th, *at* G⟩

327. {*gasp*}

⟨Ag/Sr⟩, ⟨Ag/Sr, *at* G⟩, ⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *at* G⟩, ⟨Ex, *at* Th⟩

328. {*gather*}

⟨Ag, Bn, Th⟩, ⟨Ag, Bn, Th, *p* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *together*⟩, ⟨Ag, Th, *p* Lc⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *for* Bn⟩, ⟨Ag, Th, *with* Th⟩, ⟨Th⟩, ⟨Th, *together*⟩, ⟨Th, *p* Lc⟩, ⟨Th, *with* Th⟩

329. {*gaze*, *glance*, *leer*, *ogle*, *peek*, *peep1*, *peer*, *stare*}

⟨Ag/Sr, *at* G⟩, ⟨Ag/Sr, *around/through/into* G⟩

330. {*germinate*}

⟨Ptn⟩, ⟨Th⟩, ⟨Th, *p* Lc⟩

331. {*gladden*}

⟨Ag, Ex/Ptn⟩, ⟨Ag, Ex/Ptn, *with* Ins⟩, ⟨Ins, Ptn⟩, ⟨Ptn⟩, ⟨Ptn, *at* Ag⟩, ⟨Ptn, Mnr⟩, ⟨*that* Prd, Ptn⟩

332. {*glare*}

⟨Ag/Sr⟩, ⟨Ag/Sr, *at* G⟩, ⟨Ag/Sr, *around/through/into* G⟩, ⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *at* G⟩, ⟨Lc/Sr, *with* Th⟩, ⟨Sr⟩, ⟨Sr, *p* Lc⟩

333. {*glean*, *memorize*}

⟨Ag/G, Th⟩, ⟨Ag/G, Th, *from* Sr⟩

334. {*gnaw*}

⟨Actr⟩, ⟨Ag, *at* G⟩, ⟨Ag, *on* Lc/Ptn⟩, ⟨Ag, Ptn⟩

335. {*go*}

⟨Th⟩, ⟨Th, *to* G⟩, ⟨Th, *p* G/Lc⟩, ⟨Th, *from* Sr⟩, ⟨Th, *from* Sr, *to* G⟩

336. {*gobble*}

⟨Ag/G, *down*, Th⟩, ⟨Ag/Sr⟩, ⟨Ag/Sr, *at* G⟩, ⟨Ag, Th⟩

There might be more homonymy here: the sound of gobbling vs. eating in a gobbling manner.

337. {*gorge*}

⟨Ag/G, *on* Th⟩

338. {*grant*, *guarantee*}

⟨Ag, G, Th⟩, ⟨Ag, Th⟩, ⟨Ag, *that* Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *to* Prd⟩

339. {*grate*}

⟨Ag, *on* Ex⟩, ⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨Ins, Mnr⟩, ⟨Ins, Ptn⟩

340. {*graze*}

⟨Actr⟩, ⟨Actr/Th, *on* Lc⟩, ⟨Th, G⟩, ⟨Th, G, *with* Ins⟩, ⟨Th, G, *p* Lc⟩,
⟨Th, G, *p* Lc, *with* Ins⟩

341. {*grease*, *powder*, *sand*, *water*, *wax1*}

⟨Ag, G⟩, ⟨Ag, G, *with* Ins⟩

342. {*grieve*}

⟨Ag, Ex⟩, ⟨Ag, Ex, *with* Ins⟩, ⟨Ex⟩, ⟨Ex, Mnr⟩, ⟨Ex, *over* Th⟩, ⟨Ex, *for* G⟩,
⟨*that* Prd, Ex⟩

343. {*grind*}

⟨Ag, Bn, G⟩, ⟨Ag, Bn, G, *p* Sr⟩, ⟨Ag, G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* Sr⟩,
⟨Ag, G, *p* Sr, *for* Bn⟩, ⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨Ag, Th/Ptn⟩,
⟨Ag, Th/Ptn, *at* G⟩, ⟨Ag, Th/Ptn, *into* G⟩, ⟨Ag, Th/Ptn, *into* G, *for* Bn⟩, ⟨Ins, Mnr⟩,
⟨Ins, Ptn⟩

344. {*gripe*, *grouch*}

⟨Ag/Sr⟩, ⟨Ag/Sr, *at* G⟩, ⟨Ag/Sr, *to* G⟩, ⟨Ag/Sr, *to* G, *about* Th⟩, ⟨Ag/Sr, *that* Prd⟩, ⟨Ag/Sr, *that* Prd, *to* G⟩, ⟨Ag/Sr, *about* Th⟩, ⟨Ag/Sr, *about* Th, *to* G⟩

345. {*groan*, *moan*}

⟨Actr/Sr⟩, ⟨Actr/Sr, *p* Lc⟩, ⟨Ag/Sr⟩, ⟨Ag/Sr, *at* G⟩, ⟨Ag/Sr, *at/toward* G⟩, ⟨Ag/Sr, *to* G⟩, ⟨Ag/Sr, *to* G, *that/about* Th⟩, ⟨Ag/Sr, *that/about* Th⟩, ⟨Ag/Sr, Th, *to* G⟩, ⟨Ag/Sr, *for* G⟩, ⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *at* G⟩, ⟨Lc/Sr, *with* Th⟩, ⟨Th/Sr, *through* Lc⟩

346. {*groove*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ex, *on* Th⟩

More homonymy here, probably: putting grooves in something, vs. acting 'in a groove'.

347. {*grouse*}

⟨Actr⟩, ⟨Ag/Sr⟩, ⟨Ag/Sr, *to* G⟩, ⟨Ag/Sr, *to* G, *about* Th⟩, ⟨Ag/Sr, *that* Prd⟩, ⟨Ag/Sr, *that* Prd, *to* G⟩, ⟨Ag/Sr, *about* Th⟩, ⟨Ag/Sr, *about* Th, *to* G⟩

348. {*grow*}

⟨Ag, Bn, G⟩, ⟨Ag, Bn, G, *p* Ins⟩, ⟨Ag, G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* Ins⟩, ⟨Ag, G, *p* Ins, *for* Bn⟩, ⟨Ag, G, *from* Sr⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Th, *into* G⟩, ⟨G⟩, ⟨G, *from* Sr⟩, ⟨Ins, G⟩, ⟨Ptn⟩, ⟨Th⟩, ⟨Th, *into* G⟩, ⟨Th, *p* Lc⟩, ⟨Th, *from* Sr⟩, ⟨Th, *from* Sr, *p* Lc⟩

349. {*growl*}

⟨Actr/Sr⟩, ⟨Actr/Sr, *p* Lc⟩, ⟨Ag/Sr⟩, ⟨Ag/Sr, *at* G⟩, ⟨Ag/Sr, *at/toward* G⟩, ⟨Ag/Sr, *to* G⟩, ⟨Ag/Sr, *to* G, *that/about* Th⟩, ⟨Ag/Sr, *that/about* Th⟩, ⟨Ag/Sr, Th, *to* G⟩, ⟨Ag/Sr, *for* G⟩, ⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *at* G⟩, ⟨Th/Sr, *through* Lc⟩

350. {*grumble*}

⟨Ag/Sr⟩, ⟨Ag/Sr, *at* G⟩, ⟨Ag/Sr, *at/toward* G⟩, ⟨Ag/Sr, *to* G⟩,
⟨Ag/Sr, *to* G, *that/about* Th⟩, ⟨Ag/Sr, *to* G, *about* Th⟩, ⟨Ag/Sr, *that/about* Th⟩,
⟨Ag/Sr, Th, *to* G⟩, ⟨Ag/Sr, *that* Prd⟩, ⟨Ag/Sr, *that* Prd, *to* G⟩, ⟨Ag/Sr, *for* G⟩,
⟨Ag/Sr, *about* Th⟩, ⟨Ag/Sr, *about* Th, *to* G⟩

351. {*gush*}

⟨Ex/Sr, *over* Ag⟩, ⟨Sr, Th⟩, ⟨Sr, *with* Th⟩, ⟨Th⟩, ⟨Th, *p* Lc⟩, ⟨Th, *through* Lc⟩,
⟨Th, *from* Sr⟩, ⟨Th, *from* Sr, *p* Lc⟩

352. {*hack*}

⟨Ag, Bn, G⟩, ⟨Ag, Bn, G, *p* Sr⟩, ⟨Ag, G⟩, ⟨Ag, *at* G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* Sr⟩,
⟨Ag, G, *p* Sr, *for* Bn⟩, ⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *into* G⟩,
⟨Ag, Th/Ptn, *into* G, *for* Bn⟩, ⟨Ag, Th/Ptn, *with* Ins⟩, ⟨Ag, Th/Ptn, *p* Lc⟩,
⟨Ag, Th/Ptn, *p* Lc, *with* Ins⟩, ⟨Ag, Th/Ptn, *apart*⟩, ⟨Ag, Th/Ptn, *off-of/off* Sr⟩

Some of the Goals refer to entities that are hacked together; the Theme/Patients are the entities that get hacked apart.

353. {*halt*}

⟨Ag, Prd⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ins, Th⟩, ⟨Th⟩, ⟨Th, Prd⟩

354. {*hammer*}

⟨Ag, Bn, G⟩, ⟨Ag, Bn, G, *p* Sr⟩, ⟨Ag, G⟩, ⟨Ag, G/Ptn⟩, ⟨Ag, *at* G/Ptn⟩,
⟨Ag, *at* G/Ptn, *with* Th⟩, ⟨Ag, G/Ptn, *p* Lc⟩, ⟨Ag, G/Ptn, *p* Lc, *with* Th⟩,
⟨Ag, G/Ptn, *with* Th⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* Sr⟩, ⟨Ag, G, *p* Sr, *for* Bn⟩,
⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *into* G⟩, ⟨Ag, Th/Ptn, *into* G, *for* Bn⟩,
⟨Ag, Th/Ptn, *together*⟩, ⟨Ag, Th/Ptn, *against* G/Ptn⟩, ⟨Th, G/Ptn⟩,
⟨Th, G/Ptn, *p* Lc⟩

355. {*hang*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Ptn⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *at* G⟩,
⟨Ag, Th, *p* Lc⟩, ⟨Th⟩, ⟨Th, *p* Lc⟩

356. {*happen*}

⟨Th⟩, ⟨Th, *to* Ex⟩

357. {*harmonize*}

⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ptn⟩, ⟨Ptn⟩

358. {*harness*, *leash*, *muzzle*, *plaster*, *yoke*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* G, *with* Ins⟩, ⟨Ag, Th, *together*⟩, ⟨Ag, Th, *together*, *with* Ins⟩

359. {*hasten*}

⟨Ag, Th⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ins, Th⟩

360. {*hatch*}

⟨Ag, Bn, G⟩, ⟨Ag, Bn, G, *p* Ins⟩, ⟨Ag, G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* Ins⟩, ⟨Ag, G, *p* Ins, *for* Bn⟩, ⟨Ag, Ptn⟩, ⟨Ag, Ptn, *into* G⟩, ⟨Ag, Ptn, *from* Sr⟩, ⟨Ptn⟩, ⟨Ptn, *into* G⟩, ⟨Ptn, *from* Sr⟩

361. {*head*, *top*}

⟨Ag, Sr⟩, ⟨Th, Lc⟩

362. {*hear*}

⟨G, Th⟩, ⟨G, *of/about* Th⟩, ⟨G, *that* Th⟩, ⟨G, Th, *in* Lc⟩

363. {*heave*}

⟨Ag, *at/on* G⟩, ⟨Ag, G, Th⟩, ⟨Ag, G, Th, *from* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Ag, Th, *from* Sr, *to* G⟩

364. {*hew*, *saw*}

⟨Ag, *at* G⟩, ⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *with* Ins⟩, ⟨Ag, Th/Ptn, *p* Lc⟩, ⟨Ag, Th/Ptn, *p* Lc, *with* Ins⟩, ⟨Ag, Th, *apart*⟩, ⟨Ag, Th, *off-of/off* Sr⟩, ⟨Th, Mnr⟩, ⟨Th, *apart*⟩, ⟨Th, *off-of/off* Sr⟩

365. {*hit*}

⟨Ag, G/Ptn⟩, ⟨Ag, *at* G/Ptn⟩, ⟨Ag, *at* G/Ptn, *with* Th⟩, ⟨Ag, G/Ptn, *p* Lc⟩,
⟨Ag, G/Ptn, *p* Lc, *with* Th⟩, ⟨Ag, G/Ptn, *with* Th⟩, ⟨Ag, G, Th/Ptn⟩, ⟨Ag, Th/Ptn⟩,
⟨Ag, Th/Ptn, *to* G⟩, ⟨Ag, Th/Ptn, *together*⟩, ⟨Ag, Th/Ptn, *against* G/Ptn⟩,
⟨Th, G/Ptn⟩, ⟨Th, *p* G/Ptn⟩, ⟨Th, G/Ptn, *p* Lc⟩, ⟨Th, Lc/Ptn⟩

366. {*hoard*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* Lc⟩

367. {*hoist*}

⟨Ag, G, Th⟩, ⟨Ag, G, Th, *from* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *to* G⟩,
⟨Ag, Th, *up* Lc⟩, ⟨Ag, Th, *up* Lc, *p* G⟩, ⟨Ag, Th, *up* Lc, *p* Sr⟩,
⟨Ag, Th, *up* Lc, *p* Sr, *p* G⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *p* G⟩, ⟨Ag, Th, *from* Sr⟩,
⟨Ag, Th, *from* Sr, *to* G⟩

368. {*hold*}

⟨Ag, Th⟩, ⟨Ag, *that* Th⟩, ⟨Ag, Th, *by* Ins⟩, ⟨Ag, Th, *p* Lc⟩, ⟨Ag, Th, *to* Prd⟩, ⟨Lc, Th⟩

369. {*honor*}

⟨Ag/Sr, G⟩, ⟨Ag/Sr, G/Th, *as* Prpr⟩, ⟨Ag/Sr, G/Th, *as* Prd⟩, ⟨Ag/Sr, G/Th, *for* G⟩,
⟨Ag/Sr, G/Th, *for* G, *as* Prpr⟩

370. {*hoot*, *scream*, *screech*, *squeal*, *trill*, *wail*}

⟨Actr/Sr⟩, ⟨Actr/Sr, *p* Lc⟩, ⟨Ag/Sr⟩, ⟨Ag/Sr, *at* G⟩, ⟨Ag/Sr, *at/toward* G⟩,
⟨Ag/Sr, *to* G⟩, ⟨Ag/Sr, *to* G, *that/about* Th⟩, ⟨Ag/Sr, *that/about* Th⟩,
⟨Ag/Sr, Th, *to* G⟩, ⟨Ag/Sr, *for* G⟩, ⟨Th/Sr, *through* Lc⟩

371. {*house*, *store*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* Lc⟩, ⟨Lc, Th⟩

372. {*howl*}

⟨Ag/Sr⟩, ⟨Ag/Sr, *at* G⟩, ⟨Ag/Sr, *at/toward* G⟩, ⟨Ag/Sr, *to* G⟩,
⟨Ag/Sr, *to* G, *that/about* Th⟩, ⟨Ag/Sr, *that/about* Th⟩, ⟨Ag/Sr, Th, *to* G⟩,
⟨Ag/Sr, *p* Lc⟩, ⟨Ag/Sr, *for* G⟩, ⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *at* G⟩, ⟨Lc/Sr, *with* Th⟩,
⟨*with* Th⟩, ⟨Th/Sr, *through* Lc⟩

373. {*hug*}

⟨Actr/Th, Th⟩, ⟨Ag/G⟩, ⟨Th⟩, ⟨Th, Lc⟩

374. {*hum*}

⟨Actr/Sr⟩, ⟨Actr/Sr, *p* Lc⟩, ⟨Ag/Sr, G, Th⟩, ⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *to* G⟩, ⟨Ex⟩,
⟨Ex, *from* Ag⟩, ⟨Lc/Sr, *with* Th⟩, ⟨Th/Sr, *through* Lc⟩

Experiencer is used in what Levin (1993) calls the *Tingle*-verb sense, as in *my skin is tingling*.

375. {*hunt*, *poach2*, *scrounge*}

⟨Actr⟩, ⟨Actr, Lc⟩, ⟨Actr, Lc, *for* G⟩, ⟨Actr, *p* Lc⟩, ⟨Actr, *p* Lc, *for* G⟩,
⟨Actr, *for* G⟩, ⟨Actr, *for* G, *p* Lc⟩, ⟨Actr, G⟩, ⟨Actr, G, *p* Lc⟩

376. {*hurry*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *p* G⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Th⟩,
⟨Th, *p* G⟩, ⟨Th, *with* Th⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩, ⟨Th, *from* Sr⟩

377. {*hurt*}

⟨Actr/Ex, Ptn⟩, ⟨Ag, Ex⟩, ⟨Ag, Ex, *with* Ins⟩, ⟨Ex⟩, ⟨Ex, *from* Ag⟩, ⟨Ex, Mnr⟩,
⟨*that* Prd, Ex⟩

Constructions ⟨Agent, Experiencer⟩ and ⟨Actor/Experiencer, Patient⟩ are intended to capture the difference between *he hurt her* and *he hurt his foot*, respectively; in the latter case *he* isn't necessarily the Cause of his injury.

378. {*incorporate*}

⟨Ag, Th⟩, ⟨Ag, Th, *as* Prpr⟩, ⟨Ag, Th, *to* Prd⟩, ⟨Ag, Th, *with* Th⟩, ⟨Th⟩

379. {*inhale*}

⟨G⟩

380. {*inherit*, *receive*}

⟨G, Th⟩, ⟨G, Th, *from* Sr⟩

381. {*ink*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G/Lc⟩

382. {*insult*}

⟨Ag, G⟩, ⟨Ag, G, *with* Ins⟩, ⟨Ag, G, *as* Prpr⟩, ⟨Ag, G, *for* G⟩, ⟨Ag, G, *for* G, *as* Prpr⟩,
⟨*that* Prd, G⟩

383. {*intend*}

⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *as* Prd⟩, ⟨Ag/Sr, Th, *to* Prd⟩

384. {*intone*}

⟨Ag⟩, ⟨Ag, G, Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩

385. {*iron*}

⟨Ag, Bn, Ptn⟩, ⟨Ag, Ptn⟩, ⟨Ag, Ptn, *for* Bn⟩, ⟨Ag, Th, *p* Sr/Ptn⟩,
⟨Ag, Th, *p* Sr/Ptn, *with* Ins⟩

386. {*issue*}

⟨Ag, G, Th⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Th⟩, ⟨Th, *p* Lc⟩,
⟨Th, *from* Sr⟩, ⟨Th, *from* Sr, *p* Lc⟩

387. {*itch*}

⟨Ag, Ex⟩, ⟨Ex⟩, ⟨Ex, *from* Ag⟩, ⟨Ex, *for* G⟩

388. {*jab*}

⟨Ag, G⟩, ⟨Ag, *at* G⟩, ⟨Ag, *at* G, *with* Th⟩, ⟨Ag, G, *p* Lc⟩, ⟨Ag, G, *p* Lc, *with* Th⟩,
⟨Ag, G, *with* Th⟩, ⟨Ag, Th, *through* G⟩, ⟨Th, G⟩, ⟨Th, G, *p* Lc⟩

389. {*jar2*}

⟨Ag, Ex⟩, ⟨Ag, *on* Ex⟩, ⟨Ag, Ex, *with* Ins⟩, ⟨Ex, Mnr⟩, ⟨*that* Prd, Ex⟩

390. {*jerk*, *press*, *thrust*}

⟨Ag, *at/on* G⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩

391. {*jump*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *p* G⟩, ⟨Th⟩, ⟨Th, G⟩, ⟨Th, *p* G⟩,
⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩

392. {*keep*}

⟨Actr, Prd⟩, ⟨Ag, Bn, Th⟩, ⟨Ag, Bn, Th, *p* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩,
⟨Ag, Th, *p* Lc⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *for* Bn⟩

393. {*kick*}

⟨Actr/Th⟩, ⟨Ag, G/Ptn⟩, ⟨Ag, *at* G/Ptn⟩, ⟨Ag, *at* G/Ptn, *with* Th⟩,
⟨Ag, G/Ptn, *p* Lc⟩, ⟨Ag, G/Ptn, *p* Lc, *with* Th⟩, ⟨Ag, G/Ptn, *with* Th⟩,
⟨Ag, G, Th/Ptn⟩, ⟨Ag, G, Th/Ptn, *from* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th/Ptn⟩,
⟨Ag, Th/Ptn, *to* G⟩, ⟨Ag, Th/Ptn, *together*⟩, ⟨Ag, Th/Ptn, *against* G/Ptn⟩,
⟨Ag, Th/Ptn, *apart*⟩, ⟨Ag, Th/Ptn, *from* Sr⟩, ⟨Ag, Th/Ptn, *from* Sr, *to* G⟩,
⟨Ag, Th/Ptn, *off-of/off* Sr⟩, ⟨Th, G/Ptn⟩, ⟨Th, G/Ptn, *p* Lc⟩

394. {*kiss*}

⟨Actr⟩, ⟨Ag, G⟩, ⟨Ag, G, *with* Ins/Th⟩, ⟨Ag, G, *p* Lc⟩, ⟨Ag, G, *p* Lc, *with* Ins/Th⟩

395. {*knead*, *wad*, *work*}

⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *for* Bn⟩, ⟨Ag, Th/Ptn, *into* G⟩,
⟨Ag, Th/Ptn, *into* G, *for* Bn⟩, ⟨Th/Ptn, *into* G⟩, ⟨Th/Ptn, *into* G, *for* Bn⟩

396. {*knit*}

⟨Ag, Bn, G⟩, ⟨Ag, Bn, G, *p* Sr⟩, ⟨Ag, G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* Sr⟩,
⟨Ag, G, *p* Sr, *for* Bn⟩, ⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *at* G⟩, ⟨Ag, Th/Ptn, *into* G⟩,
⟨Ag, Th/Ptn, *into* G, *for* Bn⟩

397. {*knock*}

⟨Ag, G/Ptn⟩, ⟨Ag, *at* G/Ptn⟩, ⟨Ag, *at* G/Ptn, *with* Th⟩, ⟨Ag, G/Ptn, *p* Lc⟩,
⟨Ag, G/Ptn, *p* Lc, *with* Th⟩, ⟨Ag, G/Ptn, *with* Th⟩, ⟨Ag, G, Th/Ptn⟩,
⟨Ag, Th/Ptn, *to* G⟩, ⟨Ag, Th/Ptn, *together*⟩, ⟨Ag, Th/Ptn, *against* G/Ptn⟩,
⟨Ag, Th/Ptn, *apart*⟩, ⟨Ag, Th/Ptn, *off-of/off* Sr⟩, ⟨Th/Ptn, *together*⟩,
⟨Th/Sr, *through* Lc⟩, ⟨Th/Sr, *p* Lc⟩, ⟨Th, G/Ptn⟩, ⟨Th, *p* G/Ptn⟩, ⟨Th, G/Ptn, *p* Lc⟩

398. {*know*}

⟨Lc/Th, *of/about* Prd⟩, ⟨Lc/Th, *that* Prd⟩, ⟨Lc/Th, Prd/Th, *to* Prd⟩

Location/Theme is intended to reflect that *know* is stative, so the subject isn't an Actor, let alone an Agent. The subject isn't doing anything; it just *knows*.

399. {*lash*}

⟨Ag, G⟩, ⟨Ag, G/Ptn⟩, ⟨Ag, *at* G/Ptn⟩, ⟨Ag, *at* G/Ptn, *with* Th⟩, ⟨Ag, G/Ptn, *p* Lc⟩,
⟨Ag, G/Ptn, *p* Lc, *with* Th⟩, ⟨Ag, G/Ptn, *with* Th⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Th/Ptn⟩,
⟨Ag, Th/Ptn, *together*⟩, ⟨Ag, Th/Ptn, *against* G/Ptn⟩, ⟨Ag, Th, *p* G⟩,
⟨Ag, Th, *p* G, *with* Ins⟩, ⟨Ag, Th, *together*⟩, ⟨Ag, Th, *together*, *with* Ins⟩,
⟨Th, G/Ptn⟩, ⟨Th, G/Ptn, *p* Lc⟩, ⟨Th, Lc⟩

400. {*last*}

⟨Th⟩, ⟨Th, Pth⟩, ⟨Th, *for* Pth⟩

401. {*leak*, *radiate*, *seep*}

⟨Sr, Th⟩, ⟨Th, *through* Lc⟩, ⟨Th, *from* Sr⟩

402. {*learn*}

⟨Ag/G, *from* Sr⟩, ⟨Ag/G, Th⟩, ⟨Ag/G, *of/about* Th⟩, ⟨Ag/G, *of/about* Th, *from* Sr⟩,
⟨Ag/G, Th, *from* Sr⟩

403. {*lease*, *rent*}

⟨Ag, Bn, Th⟩, ⟨Ag, Bn, Th, *for* Th⟩, ⟨Ag, Bn, Th, *from* Sr⟩,
⟨Ag, Bn, Th, *from* Sr, *for* Th⟩, ⟨Ag, G, Th⟩, ⟨Ag, G, Th, *for* Bn⟩,
⟨Ag, G, Th, *for* Bn, *for* Th⟩, ⟨Ag, G, Th, *for* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩,
⟨Ag, Th, *for* Bn, *for* Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *to* G, *for* Bn⟩,
⟨Ag, Th, *to* G, *for* Bn, *for* Th⟩, ⟨Ag, Th, *to* G, *for* Th⟩, ⟨Ag, Th, *from* Sr⟩,
⟨Ag, Th, *from* Sr, *for* Bn⟩, ⟨Ag, Th, *from* Sr, *for* Bn, *for* Th⟩,
⟨Ag, Th, *from* Sr, *for* Th⟩, ⟨Ag, Th, *for* Th⟩

404. {*leave*}

⟨Actr/Th, Th⟩, ⟨Actr/Th, Th, *p* Lc⟩, ⟨Ag, G/Th, *with* Th⟩, ⟨Ag, G, Th⟩,
⟨Ag, G, Th, *p* Sr/Ptn⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn/G⟩, ⟨Ag, Th, *p* Lc⟩, ⟨Ag, Th, *to* G⟩,
⟨Ag, Th, *p* Sr/Ptn⟩, ⟨Ag, Th, *p* Sr/Ptn, *for* Bn/G⟩, ⟨Th⟩, ⟨Th, Sr⟩

405. {*lick*}

⟨Actr, Lc⟩, ⟨Actr, Lc, *with* Ins⟩, ⟨Actr, Lc, *p* Lc⟩, ⟨Actr, Lc, *p* Lc, *with* Ins⟩,
⟨Ag, *at* G⟩, ⟨Ag, *on* Lc⟩, ⟨Ag, Sr, Prpr, *of* Th⟩, ⟨Ag, Th, *p* Sr⟩

406. {*lift*}

⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *up* Lc⟩, ⟨Ag, Th, *up* Lc, *p* G⟩,
⟨Ag, Th, *up* Lc, *p* Sr⟩, ⟨Ag, Th, *up* Lc, *p* Sr, *p* G⟩, ⟨Ag, Th, *p* Sr⟩,
⟨Ag, Th, *p* Sr, *p* G⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Ag, Th, *from* Sr, *for* Bn⟩

407. {*light*}

⟨Ag, Bn, Ptn⟩, ⟨Ag, Ptn⟩, ⟨Ag, Ptn, *for* Bn⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨Ins, Ptn⟩

408. {*link*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* G, *with* Ins⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *together*⟩,
⟨Ag, Th, *together*, *with* Ins⟩, ⟨Ag, Th, *with* Th⟩, ⟨Th⟩, ⟨Th, *to* G⟩, ⟨Th, *together*⟩,
⟨Th, *with* Th⟩

409. {*listen*}

⟨Ag, *p* Lc, *for* Th⟩, ⟨Ag, *for* Th⟩, ⟨Ag, *for* Th, *p* Lc⟩, ⟨Ag, *to* Th⟩

410. {*litter*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, *up*, G⟩, ⟨Ag, *up*, G, *with* Th⟩, ⟨Sr⟩, ⟨Th, Lc⟩

411. {*lodge*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* Lc⟩, ⟨Th, *p* Lc⟩

412. {*look*}

⟨Ag, *at* G⟩, ⟨Ag, *p* Lc, *for* G⟩, ⟨Ag, *around/through/into* G⟩, ⟨Ag, *for* G⟩,
⟨Ag, *for* G, *p* Lc⟩, ⟨Th, Prpr⟩, ⟨Th, Prpr, *to* Ag⟩

413. {*loop*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* G, *with* Ins⟩, ⟨Ag, Th, *together*⟩,
⟨Ag, Th, *together*, *with* Ins⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ag, Th, *around* Pth⟩, ⟨Ins, Th⟩,
⟨Th⟩, ⟨Th, *around* Pth⟩

414. {*lower*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *down* Lc⟩, ⟨Ag, Th, *down* Lc, *p* G⟩,
⟨Ag, Th, *down* Lc, *p* Sr⟩, ⟨Ag, Th, *down* Lc, *p* Sr, *p* G⟩, ⟨Ag, Th, *p* Sr⟩,
⟨Ag, Th, *p* Sr, *p* G⟩

415. {*maintain*, *mean*}

⟨Ex, Th, *to* Prd⟩, ⟨Ex, *that* Prd⟩

416. {*make*}

⟨Ag, Bn, G⟩, ⟨Ag, Bn, G, *p* Sr⟩, ⟨Ag, G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* Sr⟩,
⟨Ag, G, *p* Sr, *for* Bn⟩, ⟨Ag, Th/Ptn, *into* G⟩, ⟨Ag, Th/Ptn, *into* G, *for* Bn⟩,
⟨Ag, Th/Ptn, Prpr⟩

417. {*mark*}

⟨Ag, G/Th, *as* Prpr⟩, ⟨Ag, G/Th, Prpr⟩, ⟨Ag, G/Th, *to* Prd⟩, ⟨Ag, G⟩,
⟨Ag, G, *with* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩

418. {*masquerade*, *officiate*}

⟨Actr, *as* Prpr⟩

419. {*mate*}

⟨Actr⟩, ⟨Actr, *with* Actr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *with* Th⟩

420. {*mature*}

⟨Ptn⟩, ⟨Ptn, *into* G⟩

421. {*meander*, *wander*}

⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, *p* G/Lc⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩, ⟨Th, *from* Sr, *to* G⟩

422. {*measure*, *register*, *weigh*}

⟨Ag, Th⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Th, Prpr/Lc⟩

The analysis here suggests that the Theme is being place on a figurative scale (regardless of whether there is a literal scale or not).

423. {*meet*}

⟨Th⟩, ⟨Th, Th⟩, ⟨Th, *with* Th⟩

424. {*mince*}

⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨Ins, Mnr⟩, ⟨Ins, Ptn⟩, ⟨Th, *p* G⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩

425. {*mine*}

⟨Actr⟩, ⟨Actr, Lc⟩, ⟨Actr, Lc, *for* G⟩, ⟨Actr, *p* Lc⟩, ⟨Actr, *p* Lc, *for* G⟩, ⟨Actr, *for* G⟩, ⟨Actr, *for* G, *p* Lc⟩, ⟨Actr, Th, *p* Lc⟩, ⟨Actr, Th⟩

426. {*mingle*}

⟨Actr/Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *together*⟩, ⟨Ag, Th, *with* Th⟩, ⟨Th, *together*⟩, ⟨Th, *with* Th⟩

427. {*miss*}

⟨Ex, Th⟩, ⟨Ex, Th, *in* Th⟩, ⟨Ex, Th, *as* Prpr⟩, ⟨Ex, Th, *for* G⟩,
⟨Ex, Th, *for* G, *as* Prpr⟩, ⟨Ex, *that* Prd⟩, ⟨Th, Lc⟩

428. {*model*}

⟨Actr⟩, ⟨Actr, *for* Bn⟩, ⟨Actr, Th⟩, ⟨Actr, Th, *for* Bn⟩, ⟨Actr, Th, *p* Ins⟩,
⟨Actr, Th, *p* Ins, *for* Bn⟩

429. {*moor*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* G, *with* Ins⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *together*⟩,
⟨Ag, Th, *together*, *with* Ins⟩, ⟨Th⟩, ⟨Th, *to* G⟩, ⟨Th, *together*⟩

430. {*mourn*}

⟨Ag/Sr, G⟩, ⟨Ag/Sr, G/Th, *in* Lc⟩, ⟨Ag/Sr, G/Th, *as* Prpr⟩, ⟨Ag/Sr, G/Th, *for* G⟩,
⟨Ag/Sr, G/Th, *for* G, *as* Prpr⟩, ⟨Ex⟩, ⟨Ex, *over* Th⟩, ⟨Ex, *that* Prd⟩, ⟨Ex, *for* G⟩

431. {*move*}

⟨Ag, G, Th⟩, ⟨Ag, G, Th, *p* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *to* G, *p* Sr⟩,
⟨Ag, Th, *with* Ins⟩, ⟨Ag, Th, *p* Sr⟩, ⟨*that* Prd, Th⟩, ⟨Th⟩, ⟨Th, *to* G⟩,
⟨Th, *to* G, *p* Sr⟩, ⟨Th, Mnr⟩, ⟨Th, *p* Sr⟩

432. {*mulct*}

⟨Ag, G, *for* Ag⟩, ⟨Ag, G, Th⟩, ⟨Ag, G, Th, *for* Ag⟩, ⟨Ag, Sr⟩, ⟨Ag, Sr, *of* Th⟩, ⟨Ag, Th⟩,
⟨Ag, Th, *for* Ag⟩

433. {*mushroom*}

⟨Actr⟩, ⟨Th/Ptn⟩

The construction ⟨Actor⟩ is for expressing a search for e. g. mushrooms.

434. {*need*, *want*}

⟨Ex, Th⟩, ⟨Ex, Th, Prpr⟩, ⟨Ex, Th, *as* Prpr⟩, ⟨Ex, Th, *to* Prd⟩, ⟨Ex, Th, *for* G⟩,
⟨Ex, Th, *for* G, *as* Prpr⟩

435. {*nibble*}

⟨Actr⟩, ⟨Ag, *at* G⟩, ⟨Ag, Ptn⟩, ⟨Ag, *on* Ptn⟩

436. {*nod*, *point*, *shrug*, *wink*}

⟨Ag⟩, ⟨Ag, *at* G⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *at* G⟩

437. {*note*}

⟨Ag/Sr, *to* G, *that* Th⟩, ⟨Ag/Sr, *that* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩, ⟨G, *that* Prd⟩, ⟨G, Th⟩

438. {*nudge*}

⟨Ag, G, Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Th, G⟩, ⟨Th, G, *with* Ins⟩, ⟨Th, G, *p* Lc⟩, ⟨Th, G, *p* Lc, *with* Ins⟩

439. {*oar*, *pedal*, *ride*, *tack2*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *along* Lc⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *p* G⟩, ⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, *along* Lc⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩

440. {*observe*}

⟨Ag/G, *that* Prd⟩, ⟨Ag/G, Th⟩, ⟨Ag/G, Th, *to* Prd⟩, ⟨Ag/Sr, *to* G, *that* Th⟩, ⟨Ag/Sr, G/Th, *for* G⟩, ⟨Ag/Sr, *that* Th⟩

441. {*offer*}

⟨Ag, G, *to* Prd⟩, ⟨Ag, G, Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *as* Prpr⟩

442. {*ooze*, *spout*}

⟨Sr, Th⟩, ⟨Sr, *with* Th⟩, ⟨Th, *through* Lc⟩, ⟨Th, *from* Sr⟩

443. {*open*}

⟨Ag, Th⟩, ⟨Ag, Th, *at* G⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ag, Th, *p* Lc⟩, ⟨Ins, Th⟩, ⟨Th⟩, ⟨Th, *p* Lc⟩, ⟨Th, *from* Sr⟩, ⟨Th, *from* Sr, *p* Lc⟩

444. {*oppose*}

⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ptn⟩, ⟨Ag, Th/Ptn, *as* Prpr⟩

445. {*overchange1*}

⟨Ag, G, *for* G⟩, ⟨Ag, G, Th⟩, ⟨Ag, G, Th, *for* G⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* G⟩

446. {*overhear*}

⟨G, Th⟩, ⟨G, *that* Th⟩

447. {*paddle*}

⟨Ag, G/Ptn⟩, ⟨Ag, G/Ptn, *p* Lc⟩, ⟨Ag, G/Ptn, *p* Lc, *with* Th⟩, ⟨Ag, G/Ptn, *with* Th⟩,
⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *along* Lc⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *p* G⟩,
⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, *along* Lc⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩

448. {*paint*}

⟨Actr⟩, ⟨Ag/Sr, G/Th, *as* Prpr⟩, ⟨Ag/Sr, G/Th, *to* Prd⟩, ⟨Ag, Bn, G⟩, ⟨Ag, G⟩,
⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* G/Lc⟩, ⟨G, Mnr⟩

449. {*pair*}

⟨Ag, Th⟩, ⟨Ag, Th, *together*⟩, ⟨Ag, Th, *with* Th⟩, ⟨Th, *with* Th⟩

450. {*pardon*}

⟨Ag/Sr, G/Th⟩, ⟨Ag/Sr, G/Th, *as* Prpr⟩, ⟨Ag/Sr, G/Th, *for* G⟩,
⟨Ag/Sr, G/Th, *for* G, *as* Prpr⟩

451. {*partition*, *sever*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Th⟩, ⟨Th, *from* Sr⟩

452. {*pass*}

⟨Ag, G, Th⟩, ⟨Ag, G, Th, *from* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *to* G, *from* Sr⟩,
⟨Ag, Th, *from* Sr⟩, ⟨Th⟩, ⟨Th, Lc⟩

453. {*paw*}

⟨Ag, *at* G⟩, ⟨Ag, G/Ptn⟩, ⟨Ag, G/Ptn, *p* Lc⟩, ⟨Ag, *p* Lc, *for* G⟩, ⟨Ag, *for* G⟩, ⟨Ag, *for* G, *p* Lc⟩

454. {*peck*}

⟨Ag⟩, ⟨Ag, *at* G⟩, ⟨Ag, G/Ptn⟩, ⟨Ag, G/Ptn, *p* Lc⟩, ⟨Ag, *on* Lc⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* Lc⟩

455. {*peg*}

⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* G, *with* Ins⟩, ⟨Ag, Th, *together*⟩, ⟨Ag, Th, *together*, *with* Ins⟩, ⟨Ag, Th, *at* Lc⟩

456. {*pelt*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨*with* Th⟩

457. {*perceive*}

⟨G, *that* Prd⟩, ⟨G, Th⟩

458. {*perspire*}

⟨Actr/Sr⟩

459. {*phone*}

⟨Ag, Bn, G⟩, ⟨Ag, Bn, G, *p* Sr⟩, ⟨Ag, G⟩, ⟨Ag, *to* G, *about/that* Th⟩, ⟨Ag, G, Th⟩, ⟨Ag, G, *about/that* Th⟩, ⟨Ag, *for* G⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *for* Bn⟩

460. {*pick*}

⟨Ag, Bn, Th⟩, ⟨Ag, Bn, Th, *p* Sr⟩, ⟨Ag, *at* G⟩, ⟨Ag, *on* Ptn⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *for* Bn⟩

461. {*pierce*}

⟨Ag, G⟩, ⟨Ag, G, *with* Ins⟩, ⟨Ag, G, *with* Ins, *p* Lc⟩, ⟨Ag, G, *p* Lc⟩,
⟨Ag, G, *p* Lc, *with* Th⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Th, *through* G⟩, ⟨Th, G⟩, ⟨Th, G, *p* Lc⟩

462. {*pinch*}

⟨Ag, G/Ptn⟩, ⟨Ag, G/Ptn, *with* Ins/Th⟩, ⟨Ag, G/Ptn, *p* Lc⟩,
⟨Ag, G/Ptn, *p* Lc, *with* Ins/Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *from* Sr⟩,
⟨Ag, Th, *from* Sr, *for* Bn⟩

More possible homonymy: the Themes are things that are stolen, rather than given a little (literal) squeeze.

463. {*plank*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Ptn⟩, ⟨Ptn⟩

464. {*play*}

⟨Actr⟩, ⟨Actr, *with* Actr⟩, ⟨Actr, Bn, Th⟩, ⟨Actr, Th⟩, ⟨Actr, Th, *for* Bn⟩

465. {*plop*}

⟨Ag, Th, *p* Lc⟩, ⟨Th/Sr, *through* Lc⟩, ⟨Th/Sr, *p* Lc⟩, ⟨Th, *p* Lc⟩, ⟨Th, *from* Sr⟩,
⟨Th, *from* Sr, *p* Lc⟩

466. {*plot*}

⟨Actr⟩, ⟨Actr, *with* Actr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G/Lc⟩

467. {*pluck*}

⟨Ag, Bn, Th⟩, ⟨Ag, Bn, Th, *p* Sr⟩, ⟨Ag, *at* G⟩, ⟨Ag, Sr, Prpr, *of* Th⟩, ⟨Ag, Th⟩,
⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *for* Bn⟩

468. {*plunge*, *tumble*}

⟨Th⟩, ⟨Th, *to* G⟩, ⟨Th, *p* G/Lc⟩, ⟨Th, *down* Lc⟩, ⟨Th, *from* Sr⟩, ⟨Th, *from* Sr, *to* G⟩

469. {*poison*}

⟨Ag, G/Ptn⟩, ⟨Ag, G/Ptn, *with* Th⟩

470. {*poke*}

⟨Ag, G⟩, ⟨Ag, *at* G⟩, ⟨Ag, *at* G, *with* Th⟩, ⟨Ag, G, *p* Lc⟩, ⟨Ag, G, *p* Lc, *with* Th⟩,
⟨Ag, G, *with* Th⟩, ⟨Ag, *p* Lc, *for* G⟩, ⟨Ag, *for* G⟩, ⟨Ag, *for* G, *p* Lc⟩,
⟨Ag, Th, *through* G⟩, ⟨Th, G⟩, ⟨Th, G, *p* Lc⟩

471. {*polish*}

⟨Actr, Lc/Ptn⟩, ⟨Ag, G/Lc/Ptn, *with* Ins⟩, ⟨Ag, Sr/Ptn, Prpr, *of* Th⟩,
⟨Ag, Th, *p* Sr⟩

472. {*pose*}

⟨Actr, *as* Prpr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩

473. {*pound*}

⟨Ag, G/Ptn⟩, ⟨Ag, *at* G/Ptn⟩, ⟨Ag, *at* G/Ptn, *with* Th⟩, ⟨Ag, G/Ptn, *p* Lc⟩,
⟨Ag, G/Ptn, *p* Lc, *with* Th⟩, ⟨Ag, G/Ptn, *with* Th⟩, ⟨Ag, Th/Ptn, *into* G⟩,
⟨Ag, Th/Ptn, *into* G, *for* Bn⟩, ⟨Ag, Th/Ptn, *together*⟩, ⟨Ag, Th/Ptn, *against* G/Ptn⟩,
⟨Th/Ptn⟩, ⟨Th/Ptn, *from* Ag⟩, ⟨Th, G/Ptn⟩, ⟨Th, G/Ptn, *p* Lc⟩

474. {*pour*}

⟨Ag, Bn, Th⟩, ⟨Ag, Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* Sr⟩,
⟨Ag, Th, *p* Sr, *p* G⟩, ⟨*with* Th⟩, ⟨Sr, Th⟩, ⟨Th, *p* G⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩,
⟨Th, *from* Sr⟩, ⟨Th, *through* Sr⟩

475. {*preach*, *quote*}

⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *to* G⟩, ⟨Ag, *to* G, *that* Th⟩, ⟨Ag, G, Th⟩, ⟨Ag, *that* Th⟩

476. {*prick*}

⟨Ag, G/Ptn⟩, ⟨Ag, G/Ptn, *with* Ins⟩, ⟨Ag, G/Ptn, *p* Lc⟩,
⟨Ag, G/Ptn, *p* Lc, *with* Ins⟩, ⟨Ag, G/Ptn, *with* Th⟩, ⟨Ag, Th, *p* G⟩,
⟨Ag, Th, *through* G⟩

477. {*prickle*, *reel*, *smart*, *tingle*}

⟨Ex⟩, ⟨Ex, *from* Sr⟩

478. {*proclaim*}

⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *to* G⟩, ⟨Ag, *to* G, *that* Th⟩, ⟨Ag, *that* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, Prpr⟩, ⟨Ag, Th, *to* Prd⟩

479. {*propagate*}

⟨Ag, Th⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ins, Th⟩, ⟨Th⟩, ⟨Th, *p* Lc⟩

480. {*prowl*}

⟨Actr/Th⟩, ⟨Actr/Th, *p* G⟩, ⟨Actr/Th, *p* Sr⟩, ⟨Actr/Th, *p* Sr, *p* G⟩, ⟨Actr, *p* Lc, *for* G⟩, ⟨Actr, Lc, *for* G⟩, ⟨Actr, *for* G⟩, ⟨Actr, *for* G, *p* Lc⟩

481. {*prune*}

⟨Ag, Sr⟩, ⟨Ag, Sr, *with* Ins⟩, ⟨Ag, Sr, Prpr, *of* Th⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ins, Mnr⟩, ⟨Ins, Sr⟩

482. {*pry*}

⟨Ag, Th, *apart*⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *off-of/off* Sr⟩, ⟨Th, *apart*⟩, ⟨Th, *off-of/off* Sr⟩

483. {*pucker*}

⟨Ag, Th⟩, ⟨Ag, Th, *at* G⟩, ⟨Th⟩, ⟨Th, *from* Sr⟩

484. {*puff*}

⟨Ag, Sr⟩, ⟨Sr, Th⟩, ⟨Sr, *with* Th⟩, ⟨Th, *through* Lc⟩, ⟨Th, *from* Sr⟩

485. {*puke*, *vomit*}

⟨Sr⟩, ⟨Sr, *on* G⟩

486. {*pull*}

⟨Ag, Bn, Th⟩, ⟨Ag, Bn, Th, *p* Sr⟩, ⟨Ag, *at/on* G⟩, ⟨Ag, G, Th⟩, ⟨Ag, G, Th, *from* Sr⟩,
⟨Ag, Ptn⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *apart*⟩,
⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *for* Bn⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Ag, Th, *from* Sr, *to* G⟩,
⟨Ag, Th, *off-of/off* Sr⟩, ⟨Th, *apart*⟩, ⟨Th, *off-of/off* Sr⟩

487. {*pulverize*}

⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *with* Ins⟩, ⟨Ins, Mnr⟩, ⟨Ins, Th/Ptn⟩, ⟨Ptn⟩

488. {*punch*}

⟨Ag, *at* G⟩, ⟨Ag, G/Ptn⟩, ⟨Ag, G/Ptn, *with* Ins⟩, ⟨Ag, G/Ptn, *p* Lc⟩, ⟨Ins, Mnr⟩

489. {*purchase*}

⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *for* Bn, *for* Th⟩, ⟨Ag, Th, *from* Sr⟩,
⟨Ag, Th, *from* Sr, *for* Bn⟩, ⟨Ag, Th, *from* Sr, *for* Bn, *for* Th⟩,
⟨Ag, Th, *from* Sr, *for* Th⟩, ⟨Ag, Th, *for* Th⟩

490. {*purge*}

⟨Ag, Sr⟩, ⟨Ag, Sr, Prpr, *of* Th⟩, ⟨Ag, Sr, *of* Th⟩, ⟨Ag, Th, *p* Sr⟩

491. {*purify*}

⟨Ag, Sr⟩, ⟨Ag, Sr, *with* Ins⟩, ⟨Ag, Sr, *of* Th⟩, ⟨Ins, Sr⟩

492. {*pursue*, *shadow*}

⟨Ag/Th, G/Th⟩, ⟨Ag/Th, G/Th, *p* Lc⟩

493. {*push*}

⟨Ag, *at/on* G⟩, ⟨Ag, G, Th⟩, ⟨Ag, G, Th, *from* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩,
⟨Ag, Th, *p* G, *with* Ins⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *apart*⟩, ⟨Ag, Th, *from* Sr⟩,
⟨Ag, Th, *from* Sr, *to* G⟩, ⟨Ag, Th, *off-of/off* Sr⟩, ⟨Th, *apart*⟩, ⟨Th, *off-of/off* Sr⟩

494. {*qualify*, *rank*}

⟨Ag, Th⟩, ⟨Ag, Th, *as* Prpr⟩, ⟨Ag, Th, *to* Prd⟩, ⟨Th, *as* Prpr⟩

495. {*quarry*}

⟨Actr, *p* Lc, *for* G⟩, ⟨Actr, Lc, *for* G⟩, ⟨Actr, *for* G⟩, ⟨Actr, *for* G, *p* Lc⟩,
⟨Actr, Th⟩

496. {*rage*}

⟨Actr⟩, ⟨Actr, *at* Ag⟩, ⟨Actr, *at/toward* G⟩, ⟨Actr, *to* G⟩,
⟨Actr, *to* G, *that/about* Th⟩, ⟨Actr, *p* Lc⟩, ⟨Actr, *about* Th⟩, ⟨Actr, *over* Th⟩,
⟨Actr, *for* G⟩, ⟨Actr, *that/about* Th⟩, ⟨Actr, Th, *to* G⟩, ⟨Lc, *with* Actr⟩

497. {*raise*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *at* G⟩, ⟨Ag, Th, *up* Lc⟩, ⟨Ag, Th, *up* Lc, *p* G⟩,
⟨Ag, Th, *up* Lc, *p* Sr⟩, ⟨Ag, Th, *up* Lc, *p* Sr, *p* G⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *p* G⟩

498. {*rake*}

⟨Actr, *p* Lc, *for* G⟩, ⟨Actr, Lc, *for* G⟩, ⟨Actr, *for* G⟩, ⟨Actr, *for* G, *p* Lc⟩,
⟨Actr, Th, *p* Sr⟩, ⟨Actr, Th, *p* Sr, *with* Ins⟩, ⟨Ag, Sr⟩, ⟨Ag, Th, *p* G⟩,
⟨Ag, Th, *p* G, *with* Ins⟩

499. {*ram*}

⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* G, *with* Ins⟩, ⟨Th, *p* G/Ptn⟩

500. {*ransack*}

⟨Ag, Lc⟩, ⟨Ag, Lc/Sr⟩, ⟨Ag, Lc/Sr, *of* Th⟩, ⟨Ag, Lc, *for* G⟩

501. {*rap*}

⟨Actr⟩, ⟨Actr, *with* Th⟩, ⟨Actr, *with* Th, *about* Prd⟩, ⟨Actr, *about* Prd⟩,
⟨Ag, G/Ptn⟩, ⟨Ag, *at* G/Ptn⟩, ⟨Ag, *at* G/Ptn, *with* Th⟩, ⟨Ag, G/Ptn, *p* Lc⟩,
⟨Ag, G/Ptn, *p* Lc, *with* Th⟩, ⟨Ag, G/Ptn, *with* Th⟩, ⟨Ag, Th/Ptn⟩,
⟨Ag, Th/Ptn, *together*⟩, ⟨Ag, Th/Ptn, *against* G/Ptn⟩, ⟨Th/Sr, *through* Lc⟩,
⟨Th/Sr, *p* Lc⟩, ⟨Th, G/Ptn⟩, ⟨Th, G/Ptn, *p* Lc⟩

The constructions with Actor refer to people conversing, those with Patient refer to something hitting something else, and the others refer to a locale from which a similarly characteristic sound is being emitted.

502. {*rate*}

⟨Ag/Sr, G/Th⟩, ⟨Ag/Sr, G/Th, *to* Prd⟩, ⟨Ag/Sr, G/Th, Prpr⟩,
⟨Ag/Sr, G/Th, *as* Prpr⟩, ⟨Ag, Th, *at* Lc⟩, ⟨Th, *as* Prpr⟩

503. {*react*}

⟨Actr, *to* Ag⟩

504. {*read*}

⟨Ag/G⟩, ⟨Ag/G, *for* G⟩, ⟨Ag/G, *from* Sr⟩, ⟨Ag/G, Sr⟩, ⟨Ag/G, Sr, *with* Ins⟩,
⟨Ag/G, Th⟩, ⟨Ag/G, *of/about* Th⟩, ⟨Ag/G, *of/about* Th, *from* Sr⟩, ⟨Ag/G, *that* Th⟩,
⟨Ag/G, Th, *from* Sr⟩, ⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *to* G⟩, ⟨Ag, G, Th⟩, ⟨Sr, Th⟩

505. {*recite*}

⟨Ag⟩, ⟨Ag/Sr, G, Th⟩, ⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *to* G⟩, ⟨Ag, *to* G, *that* Th⟩,
⟨Ag, *that* Th⟩

506. {*recognize*}

⟨G, *that* Prd⟩, ⟨G, Prd/Th, *to* Prd⟩, ⟨G, Th⟩

507. {*recommend*}

⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *as* Prpr⟩, ⟨Ag/Sr, Th, *to* Prd⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩

508. {*reek*, *stink*}

⟨Sr⟩, ⟨Sr, *of* Th⟩

509. {*regard*}

⟨Ag/Sr, G/Prd⟩, ⟨Ag/Sr, G/Th⟩, ⟨Ag/Sr, G/Th, *as* Prpr⟩

510. {*rejoice*}

⟨Actr, *at* Ag⟩, ⟨Actr, *about* Th⟩, ⟨Actr, *over* Th⟩, ⟨Actr, *in* Prd⟩

511. {*relay*}

⟨Ag, *to* G, *about/that* Th⟩, ⟨Ag, *to* G, *that* Th⟩, ⟨Ag, G, Th⟩, ⟨Ag, G, *about/that* Th⟩, ⟨Ag, *for* G⟩, ⟨Ag, Th⟩, ⟨Ag, *that* Th⟩, ⟨Ag, Th, *to* G⟩

512. {*remember*}

⟨G, Th⟩, ⟨G, Th, *as* Prpr⟩, ⟨G, Th, *to* Prd⟩

513. {*render*}

⟨Ag, G, Th⟩, ⟨Ag, Sr⟩, ⟨Ag, Sr, *of* Th⟩, ⟨Ag, Th, *to* G⟩

514. {*repay*}

⟨Ag, G⟩, ⟨Ag, G, *as* Prpr⟩, ⟨Ag, G, *for* G⟩, ⟨Ag, G, *for* G, *as* Prpr⟩, ⟨Ag, G, Th⟩, ⟨Ag, Th, *to* G⟩

515. {*repeat*}

⟨Ag/Sr, *to* G, *that* Th⟩, ⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *to* G⟩, ⟨Ag/Sr, *that* Th⟩, ⟨Ag, Prd⟩, ⟨Th⟩

516. {*report*}

⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *to* G⟩, ⟨Ag, *to* G, *that* Th⟩, ⟨Ag, *that* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *as* Prpr⟩, ⟨Ag, Th, Prpr⟩, ⟨Ag, Th, *to* Prd⟩

517. {*repudiate*}

⟨Ag/Sr, G⟩, ⟨Ag/Sr, G/Th, *as* Prd⟩

518. {*return*}

⟨Ag, G, Th⟩, ⟨Ag, G, Th, *from* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *to* G, *from* Sr⟩,
⟨Ag, Th, *from* Sr⟩, ⟨Th⟩, ⟨Th, *to* G⟩, ⟨Th, *from* Sr⟩, ⟨Th, *from* Sr, *to* G⟩

519. {*reveal*}

⟨Ag/Sr, *to* G, *that* Th⟩, ⟨Ag/Sr, *that* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩,
⟨Ag, Th, *as* Prpr⟩, ⟨Ag, Th, *to* Prd⟩

520. {*revolve*, *rotate*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* Lc⟩, ⟨Th⟩, ⟨Th, *p* Lc⟩, ⟨Th, *around* Pth⟩

521. {*reward*}

⟨Ag, G⟩, ⟨Ag, G, *for* G⟩, ⟨Ag, G, *for* G, *as* Prpr⟩, ⟨Ag, G, *with* Th⟩

522. {*rifle*}

⟨Actr, *p* Lc, *for* G⟩, ⟨Actr, Lc, *for* G⟩, ⟨Actr, *for* G⟩, ⟨Actr, *for* G, *p* Lc⟩,
⟨Ag, *p* Lc, *for* G⟩, ⟨Ag, *for* G⟩, ⟨Ag, *for* G, *p* Lc⟩, ⟨Ag, Sr⟩, ⟨Ag, Sr, *of* Th⟩

523. {*rip*}

⟨Ag, Th⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ag, Th, *apart*⟩, ⟨Ag, Th, *off-of/off* Sr⟩, ⟨Ins, Th⟩,
⟨Th, Mnr⟩, ⟨Th, *apart*⟩, ⟨Th, *off-of/off* Sr⟩

524. {*ripple*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Th⟩, ⟨Th, Lc⟩, ⟨Th, *p* Lc⟩

525. {*rise*}

⟨Th⟩, ⟨Th, *to* G⟩, ⟨Th, *p* Lc⟩, ⟨Th, *up* Lc⟩, ⟨Th, *from* Sr⟩, ⟨Th, *from* Sr, *to* G⟩,
⟨Th, *from* Sr, *p* Lc⟩

526. {*roar*}

⟨Ag/Sr⟩, ⟨Ag/Sr, *at* G⟩, ⟨Ag/Sr, *at/toward* G⟩, ⟨Ag/Sr, *to* G⟩,
⟨Ag/Sr, *to* G, *that/about* Th⟩, ⟨Ag/Sr, *that/about* Th⟩, ⟨Ag/Sr, Th, *to* G⟩,
⟨Ag/Sr, *p* Lc⟩, ⟨Ag/Sr, *for* G⟩, ⟨Lc/Sr, *with* Th⟩, ⟨*with* Th⟩, ⟨Th/Sr, *through* Lc⟩

527. {*robe*}

⟨Ag, G⟩, ⟨Ag, G, *in* Th⟩, ⟨Ag, G, *with* Th⟩, ⟨Th, Lc⟩, ⟨Th, *in* Lc⟩

528. {*roll*}

⟨Ag, Bn, G⟩, ⟨Ag, Bn, G, *p* Sr⟩, ⟨Ag, Bn, Th⟩, ⟨Ag, G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* Sr⟩,
⟨Ag, G, *p* Sr, *for* Bn⟩, ⟨Ag, G, Th⟩, ⟨Ag, G, Th, *p* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th/Ptn, *into* G⟩,
⟨Ag, Th/Ptn, *into* G, *for* Bn⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *around* G⟩,
⟨Ag, Th, *at* G⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *to* G, *p* Sr⟩, ⟨Ag, Th, *together*⟩,
⟨Ag, Th, *apart*⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *p* G⟩, ⟨Ag, Th, *off-of/off* Sr⟩,
⟨Ag, Th, *with* Th⟩, ⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, *around* G⟩, ⟨Th, *to* G⟩, ⟨Th, *to* G, *p* Sr⟩,
⟨Th, *together*⟩, ⟨Th, *apart*⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩, ⟨Th, *off-of/off* Sr⟩,
⟨Th, *with* Th⟩

529. {*row*}

⟨Ag, G, Th⟩, ⟨Ag, G, Th, *from* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *to* G⟩,
⟨Ag, Th, *along* Lc⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *p* G⟩, ⟨Ag, Th, *from* Sr⟩,
⟨Ag, Th, *from* Sr, *to* G⟩, ⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, *along* Lc⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩

530. {*rub*}

⟨Actr, Lc/Ptn⟩, ⟨Ag, G⟩, ⟨Ag, *at* G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Sr, Prpr, *of* Th⟩,
⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *at* G⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Th, *on/onto* G⟩

531. {*run*}

⟨Ag, Bn, Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Lc, *with* Th⟩, ⟨Th⟩, ⟨Th, *p* G⟩,
⟨Th, *p* G/Lc⟩, ⟨Th, *p* Lc⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩, ⟨Th, *from* Sr, *to* G⟩

532. {*rupture*}

⟨Ag, Th⟩, ⟨Ag, Th/Ptn⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ins, Th⟩, ⟨Th⟩

533. {*rush*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, *with* Th⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩, ⟨Th, *from* Sr⟩

534. {*rustle*}

⟨Actr/Sr⟩, ⟨Actr/Sr, *p* Lc⟩, ⟨Ag, Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *from* Sr/Ptn⟩, ⟨Ag, Th, *from* Sr/Ptn, *for* Bn⟩, ⟨Lc/Sr, *with* Th⟩, ⟨Th/Sr, *through* Lc⟩

535. {*save*}

⟨Ag, Bn, Th⟩, ⟨Ag, Bn, Th, *for* G⟩, ⟨Ag, Bn, Th, *p* Sr⟩, ⟨Ag, Bn, Th, *p* Sr, *for* G⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* G⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *for* G⟩

536. {*scour*}

⟨Actr, Lc⟩, ⟨Actr, *p* Lc, *for* G⟩, ⟨Actr, Lc, *for* G⟩, ⟨Actr, *for* G⟩, ⟨Actr, *for* G, *p* Lc⟩, ⟨Actr, Sr, Prpr, *of* Th⟩, ⟨Actr, Th, *p* Sr⟩

537. {*scramble*}

⟨Ag, Bn, Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *into* G⟩, ⟨Ag, Th, *together*⟩, ⟨Ag, Th, *with* Th⟩, ⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, *into* G⟩, ⟨Th, *together*⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩, ⟨Th, *with* Th⟩

538. {*scrape*}

⟨Ag, *at* G⟩, ⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨Ag, Ptn, *p* Lc⟩, ⟨Ag, Ptn, *p* Lc, *with* Ins⟩, ⟨Ag, Sr/Ptn, Prpr, *of* Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* G, *with* Ins⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ptn, Mnr⟩

539. {*scratch*}

⟨Ag, *at* G⟩, ⟨Ag, G/Ptn⟩, ⟨Ag, G/Ptn, *p* Lc⟩, ⟨Ag, Ptn⟩, ⟨Ag, Sr, Prpr, *of* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *with* Ins⟩, ⟨Ag, Th/Ptn, *p* Lc⟩, ⟨Ag, Th/Ptn, *p* Lc, *with* Ins⟩, ⟨Ag, Th, *p* G/Lc⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Th, Mnr⟩

540. {*scrub*, *skim*}

⟨Ag, *at* G⟩, ⟨Ag, Sr, Prpr, *of* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* Sr⟩

541. {*scrutinize*}

⟨Actr/Sr, G/Lc/Ptn⟩, ⟨Actr/Sr, G/Lc/Ptn, *for* G⟩

542. {*see*}

⟨Ex, Th⟩, ⟨Ex, Th, *in* Lc⟩, ⟨Ex, Th, *as* Prpr⟩, ⟨Ex, Prd⟩, ⟨Ex, *that* Prd⟩

543. {*seed*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Sr⟩, ⟨Ag, Th, *p* G⟩

544. {*seek*}

⟨Actr/G, Th⟩, ⟨Actr/G, Th, *from* Sr⟩

545. {*seem*}

⟨Th, Prpr⟩, ⟨Th, Prpr, *to* Ex⟩

546. {*seethe*}

⟨Actr⟩, ⟨Actr/Ex, *over* Ag⟩, ⟨Actr, *p* Lc⟩, ⟨Lc, *with* Actr⟩

547. {*select*}

⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *as* Prpr⟩, ⟨Ag, Th, *to* Prd⟩, ⟨Ag, Th, *from* Sr⟩,
⟨Ag, Th, *from* Sr, *for* Bn⟩

548. {*sell*}

⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *for* Bn, *for* Th⟩, ⟨Ag, Th, *to* G⟩,
⟨Ag, Th, *to* G, *for* Bn⟩, ⟨Ag, Th, *to* G, *for* Bn, *for* Th⟩, ⟨Ag, Th, *to* G, *for* Th⟩,
⟨Ag, Th, *for* Th⟩

549. {*serve*}

⟨Actr, *as* Prpr⟩, ⟨Ag, G⟩, ⟨Ag, G, Th⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* Lc⟩,
⟨Ag, Th, *to* G⟩, ⟨Th, G⟩

550. {*set*}

⟨Ag, Bn, Th⟩, ⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *p* G⟩

551. {*settle*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* Lc⟩, ⟨Th, *p* Lc⟩

552. {*sew*}

⟨Ag, Bn, G⟩, ⟨Ag, Bn, G, *p* Sr⟩, ⟨Ag, G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* Sr⟩,
⟨Ag, G, *p* Sr, *for* Bn⟩, ⟨Ag, Th/Ptn, *into* G⟩, ⟨Ag, Th/Ptn, *into* G, *for* Bn⟩,
⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *together*⟩

553. {*shake*}

⟨Ag, Th⟩, ⟨Ag, Th/Ptn, *into* G⟩, ⟨Ag, Th/Ptn, *into* G, *for* Bn⟩, ⟨Ag, Th, *for* Bn⟩,
⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* G, *with* Ins⟩, ⟨Ag, Th, *at* G⟩, ⟨Ag, Th, *into* G⟩,
⟨Ag, Th, *together*⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ag, Th, *p* Lc⟩, ⟨Ag, Th, *with* Th⟩,
⟨*that* Prd, Th⟩, ⟨Th⟩, ⟨Th/Ptn, *into* G⟩, ⟨Th/Ptn, *into* G, *for* Bn⟩, ⟨Th, *into* G⟩,
⟨Th, *together*⟩, ⟨Th, *p* Lc⟩, ⟨Th, Mnr⟩, ⟨Th, *with* Th⟩

554. {*shame*}

⟨Ag, Ex⟩, ⟨Ag, Ex/Th, *as* Prpr⟩, ⟨Ag, Ex/Th, *for* G⟩, ⟨Ag, Ex/Th, *for* G, *as* Prpr⟩,
⟨Ag, Ex, *with* Ins⟩, ⟨Ex, Mnr⟩, ⟨*that* Prd, Ex⟩

555. {*shatter*, *splinter*}

⟨Ag, Th⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ins, Th⟩, ⟨Th, Mnr⟩

556. {*shave*}

⟨Ag/Sr⟩, ⟨Ag, Sr⟩, ⟨Ag, Th, *p* Sr⟩

557. {*shelter*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* Lc⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Ag, Th, *from* Sr, *p* Lc⟩, ⟨Th, *p* Lc⟩

558. {*shine*}

⟨Ag, Th⟩, ⟨Lc/Sr, *with* Th⟩, ⟨Sr⟩, ⟨Sr, *p* Lc⟩

559. {*shoot*}

⟨Ag, Bn, G/Ptn⟩, ⟨Ag, Bn, G/Ptn, *p* Sr/Ptn⟩, ⟨Ag, *at* G⟩, ⟨Ag, G/Ptn⟩,
⟨Ag, G/Ptn, *for* Bn⟩, ⟨Ag, G/Ptn, *p* Lc⟩, ⟨Ag, G/Ptn, *p* Sr/Ptn⟩,
⟨Ag, G/Ptn, *p* Sr/Ptn, *for* Bn⟩, ⟨Ag, G, Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩

560. {*shove*, *tug*}

⟨Ag, *at/on* G⟩, ⟨Ag, G, Th⟩, ⟨Ag, G, Th, *from* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩,
⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *apart*⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Ag, Th, *from* Sr, *to* G⟩,
⟨Ag, Th, *off-of/off* Sr⟩, ⟨Th, *apart*⟩, ⟨Th, *off-of/off* Sr⟩

561. {*shovel*}

⟨Ag, Sr⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* G, *with* Ins⟩, ⟨Ag, Th, *into* G⟩, ⟨Ag, Th, *p* Sr⟩,
⟨Ag, Th, *p* Sr, *with* Ins⟩

562. {*show*}

⟨Ag, *to* G, *that* Th⟩, ⟨Ag, G, Th⟩, ⟨Ag, G, *that* Th⟩, ⟨Ag, Th⟩, ⟨Ag, *that* Th⟩,
⟨Ag, Th, *at* G⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *to* Prd⟩

563. {*shower*}

⟨Actr⟩, ⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Th, *p* G⟩, ⟨G⟩, ⟨*with* Th⟩

564. {*shrink*}

⟨Ag, Th⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ins, Th⟩, ⟨Th⟩, ⟨Th, *at* Ag⟩

565. {*shuffle*}

⟨Actr/Th⟩, ⟨Actr/Th, *p* G⟩, ⟨Actr/Th, *along* Lc⟩, ⟨Actr/Th, *p* Sr⟩,
⟨Actr/Th, *p* Sr, *p* G⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *at* G⟩, ⟨Ag, Th, *into* G⟩,
⟨Ag, Th, *together*⟩, ⟨Ag, Th, *along* Lc⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *p* G⟩,
⟨Ag, Th, *with* Th⟩

566. {*sicken*}

⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨Ins, Ptn⟩, ⟨Ptn⟩, ⟨Ptn, *of* Ag⟩, ⟨Ptn, *at/from* G⟩, ⟨Ptn, *at* G⟩, ⟨Ptn, Mnr⟩, ⟨*that* Prd, Ptn⟩

567. {*sift*}

⟨Actr, *p* Lc, *for* G⟩, ⟨Actr, Lc, *for* G⟩, ⟨Actr, *for* G⟩, ⟨Actr, *for* G, *p* Lc⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Th, *from* Sr⟩

568. {*sign*}

⟨Ag, G⟩, ⟨Ag, *to* G, *about/that* Th⟩, ⟨Ag, G, Th⟩, ⟨Ag, G, *about/that* Th⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, *for* G⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *to* G⟩

569. {*silver*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨G⟩, ⟨Ins, G⟩

570. {*sing*}

⟨Actr/Sr⟩, ⟨Actr/Sr, *at* G⟩, ⟨Actr/Sr, *at/toward* G⟩, ⟨Actr/Sr, *to* G⟩, ⟨Actr/Sr, *to* G, *that/about* Th⟩, ⟨Actr/Sr, G, Th⟩, ⟨Actr/Sr, Th⟩, ⟨Actr/Sr, *that/about* Th⟩, ⟨Actr/Sr, Th, *to* G⟩, ⟨Actr/Sr, *p* Lc⟩, ⟨Actr/Sr, *for* G⟩, ⟨Lc/Sr, *with* Th⟩, ⟨Th/Sr, *through* Lc⟩

571. {*siphon*}

⟨Ag, Sr⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* G, *with* Ins⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *with* Ins⟩

572. {*skewer*, *tape*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* G, *with* Ins⟩, ⟨Ag, Th, *together*⟩, ⟨Ag, Th, *together*, *with* Ins⟩

573. {*slam*}

⟨Ag, G, Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Th⟩, ⟨Th, *together*⟩, ⟨Th, *p* G/Ptn⟩

574. {*slash*}

⟨Ag, *at* G⟩, ⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *with* Ins⟩, ⟨Ag, Th/Ptn, *p* Lc⟩,
⟨Ag, Th/Ptn, *p* Lc, *with* Ins⟩, ⟨Th/Ptn, Mnr⟩

575. {*slaughter*}

⟨Ag, Bn, Th⟩, ⟨Ag, Bn, Th, *p* Sr⟩, ⟨Ag, Ptn⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩,
⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *for* Bn⟩

576. {*sleep*}

⟨Actr⟩, ⟨Ag, Actr/Th, *p* Lc⟩, ⟨Lc, Actr/Th⟩

577. {*slip*}

⟨Ag/G, Th⟩, ⟨Ag, G, Th⟩, ⟨Ag, G, Th, *from* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩,
⟨Ag, Th, *to* G, *from* Sr⟩, ⟨Ag, Th, *apart*⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Ag, Th, *off-of/off* Sr⟩,
⟨Th⟩, ⟨Th, *apart*⟩, ⟨Th, *off-of/off* Sr⟩

578. {*slop*}

⟨Ag, Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *p* G⟩, ⟨Sr, Th⟩,
⟨Th, *p* G⟩, ⟨Th, *through* Lc⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩, ⟨Th, *from* Sr⟩

579. {*slosh*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *p* G⟩, ⟨Th, *p* G⟩, ⟨Th, *p* Sr⟩,
⟨Th, *p* Sr, *p* G⟩

580. {*slurp*}

⟨Ag/G, Th⟩, ⟨Ag, *at* G⟩

581. {*smash*}

⟨Ag, G/Ptn⟩, ⟨Ag, *at* G/Ptn⟩, ⟨Ag, *at* G/Ptn, *with* Th⟩, ⟨Ag, G/Ptn, *p* Lc⟩,
⟨Ag, G/Ptn, *p* Lc, *with* Th⟩, ⟨Ag, G/Ptn, *with* Th⟩, ⟨Ag, G, Th/Ptn⟩, ⟨Ag, Th/Ptn⟩,
⟨Ag, Th/Ptn, *to* G⟩, ⟨Ag, Th/Ptn, *together*⟩, ⟨Ag, Th/Ptn, *against* G/Ptn⟩,
⟨Ag, Th/Ptn, *with* Ins⟩, ⟨Ins, Th/Ptn⟩, ⟨Th/Ptn, *together*⟩, ⟨Th/Ptn, Mnr⟩,
⟨Th, *p* G/Ptn⟩

582. {*smell*}

⟨Ag, Sr⟩, ⟨Ag, Sr, *for* Th⟩, ⟨G, Th, *in* Lc⟩, ⟨G, Th⟩, ⟨G, Th, *p* Lc⟩, ⟨Sr⟩, ⟨Sr, Prpr⟩, ⟨Sr, Prpr, *to* G⟩, ⟨Sr, *of* Th⟩

583. {*smoke*}

⟨Lc, *with* Th⟩, ⟨Ptn⟩, ⟨Ptn, *p* Lc⟩

584. {*smooth*}

⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨Ag, Sr/Ptn, Prpr, *of* Th⟩, ⟨Ag, Th/Ptn, *p* Sr⟩, ⟨Ins, Ptn⟩, ⟨Ptn⟩, ⟨Th⟩

585. {*smother*}

⟨Ag, G/Ptn⟩, ⟨Ag, G/Ptn, *with* Th⟩, ⟨Th, Lc/Ptn⟩

586. {*smuggle*}

⟨Ag, G, Th⟩, ⟨Ag, G, Th, *from* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *to* G, *from* Sr⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Ag, Th, *from* Sr, *for* Bn⟩

587. {*snail*}

⟨Actr⟩, ⟨Ag, Sr⟩

588. {*snap*}

⟨Actr/Sr, *at* G⟩, ⟨Ag/Sr, *at/toward* G⟩, ⟨Ag/Sr, *to* G⟩, ⟨Ag/Sr, *to* G, *that/about* Th⟩, ⟨Ag/Sr, *for* G⟩, ⟨Ag/Sr, *that/about* Th⟩, ⟨Ag/Sr, Th, *to* G⟩, ⟨Ag, Ptn⟩, ⟨Ag, Ptn, *at* G⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨Ins, Ptn⟩, ⟨Lc/Sr, *with* Th⟩, ⟨Ptn⟩, ⟨Ptn, Mnr⟩, ⟨Th/Sr, *through* Lc⟩, ⟨Th/Sr, *p* Lc⟩

589. {*sneak*}

⟨Ag, G, Th⟩, ⟨Ag, G, Th, *from* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *to* G, *from* Sr⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *p* G⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Ag, Th, *from* Sr, *for* Bn⟩, ⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩

590. {*sneeze*, *snore*, *yawn*}

⟨Ag, Th⟩, ⟨Ag, Th, *at* G⟩, ⟨Sr⟩, ⟨Sr, *at* G⟩

591. {*sniff*}

⟨Ag⟩, ⟨Ag, *at* G⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *at* G⟩, ⟨Ex, *at* Th⟩, ⟨Ex, *around/through/into* G⟩

592. {*snip*}

⟨Ag, *at* G⟩, ⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *with* Ins⟩, ⟨Ag, Th/Ptn, *p* Lc⟩,
⟨Ag, Th/Ptn, *p* Lc, *with* Ins⟩

593. {*snoop*}

⟨Actr, *on* G⟩, ⟨Actr, *p* Lc⟩, ⟨Actr, *p* Lc, *for* G⟩, ⟨Actr, *for* G⟩, ⟨Actr, *for* G, *p* Lc⟩

594. {*snort*}

⟨Ag/Sr⟩, ⟨Ag/Sr, *at* G⟩, ⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *at* G⟩

595. {*soak*}

⟨Ag, G, *with* Th⟩, ⟨Ag, *up*, Th⟩, ⟨Ag, *up*, Th, *with* Ins⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* Sr⟩,
⟨Th⟩, ⟨Th, Lc⟩

596. {*sober*}

⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨Ins, Ptn⟩, ⟨Ptn⟩, ⟨Ptn, Mnr⟩, ⟨*that* Prd, Ptn⟩

597. {*sound*}

⟨Lc/Sr, *with* Th⟩, ⟨Sr, Prpr⟩, ⟨Sr, Prpr, *to* G⟩, ⟨Th, *through/in* Lc⟩

598. {*spare*}

⟨Ag, G, Th⟩, ⟨Ag, G, Th, *for* G⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* G⟩

599. {*spawn*}

⟨Ag, Th⟩, ⟨Sr⟩

600. {*speak*}

⟨Actr/Sr⟩, ⟨Actr/Sr, *to* G⟩, ⟨Actr/Sr, *to* G, *about* Th⟩, ⟨Actr/Sr, *about* Th⟩, ⟨Actr, *with* Actr⟩, ⟨Actr, *with* Actr, *about* Th⟩, ⟨Actr, *together*⟩

601. {*spew*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *p* G⟩, ⟨Sr, Th⟩, ⟨Th, *p* G⟩, ⟨Th, *through* Lc⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩, ⟨Th, *from* Sr⟩

602. {*spill*}

⟨Ag, Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *p* G⟩, ⟨Sr, Th⟩, ⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, *p* Lc⟩, ⟨Th, *through* Lc⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩, ⟨Th, *from* Sr⟩, ⟨Th, *from* Sr, *p* Lc⟩

603. {*spin*}

⟨Ag, Bn, G⟩, ⟨Ag, Bn, G, *p* Sr⟩, ⟨Ag, G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *to* G⟩, ⟨Ag, G, *p* Sr⟩, ⟨Ag, G, *p* Sr, *for* Bn⟩, ⟨Ag, Th/Ptn, *into* G⟩, ⟨Ag, Th/Ptn, *into* G, *for* Bn⟩, ⟨Ag, Th, *around* G⟩, ⟨Ex/Th⟩, ⟨Ex/Th, *from* Ag⟩, ⟨Th, *around* G⟩

604. {*spit1*}

⟨*it*⟩, ⟨Sr⟩, ⟨Sr, *on* G⟩

605. {*splash*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Sr/Ptn⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *at* G⟩, ⟨Lc, *with* Th⟩, ⟨Th⟩, ⟨Th, *on/onto* G⟩, ⟨Th, *through* G⟩, ⟨Th, *p* Lc⟩

606. {*splice*}

⟨Ag, Th⟩, ⟨Ag, Th, *into* G⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *together*⟩, ⟨Th⟩, ⟨Th, *into* G⟩, ⟨Th, *to* G⟩, ⟨Th, *together*⟩

607. {*split*}

⟨Ag, Th⟩, ⟨Ag, Th/Ptn⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ag, Th, *apart*⟩, ⟨Ag, Th, *off-of/off* Sr⟩, ⟨Ins, Th⟩, ⟨Th⟩, ⟨Th, Mnr⟩, ⟨Th, *apart*⟩, ⟨Th, *from* Sr⟩, ⟨Th, *off-of/off* Sr⟩

608. {*sponge*}

⟨Actr⟩, ⟨Actr, Lc⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *p* Sr⟩,
⟨Ag, Th, *p* Sr, *with* Ins⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Ag, Th, *from* Sr, *for* Bn⟩

The construction ⟨Actor⟩ is for something like *we're going sponging*, i. e. looking for sponges; for the same verb, then, some of the Themes here are for the act of sponging as a kind of theft (though in our dialect it sounds better with *sponge off of*).

609. {*spoon*}

⟨Actr⟩, ⟨Actr, *with* Actr⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* G, *with* Ins⟩

610. {*spot1*}

⟨*it*⟩, ⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, *up*, G⟩, ⟨Ag, *up*, G, *with* Th⟩, ⟨Th, Lc⟩

611. {*spraypaint*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G/Lc⟩, ⟨G, Mnr⟩

612. {*spread*}

⟨Ag, G, *with* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Th⟩, ⟨Th, *p* Lc⟩, ⟨Th, *from* Sr⟩,
⟨Th, *from* Sr, *p* Lc⟩

613. {*sprout*}

⟨Ag, Th⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ins, Th⟩, ⟨Lc, *with* Th⟩, ⟨Ptn⟩, ⟨Sr, Th⟩,
⟨Sr, *with* Th⟩, ⟨Th⟩, ⟨Th, *through* Lc⟩, ⟨Th, *p* Lc⟩, ⟨Th, *from* Sr⟩

614. {*squash*, *squish*}

⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *for* Bn⟩, ⟨Ag, Th/Ptn, *p* G⟩,
⟨Ag, Th/Ptn, *p* G, *with* Ins⟩, ⟨Ag, Th/Ptn, *into* G⟩, ⟨Ag, Th/Ptn, *into* G, *for* Bn⟩,
⟨Ag, Th/Ptn, *with* Ins⟩, ⟨Ins, Mnr⟩, ⟨Th/Ptn, *into* G⟩, ⟨Th/Ptn, *into* G, *for* Bn⟩

615. {*squeeze*}

⟨Actr, Lc/Ptn⟩, ⟨Ag, Sr/Ptn, Prpr, *of* Th⟩, ⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *for* Bn⟩, ⟨Ag, Th/Ptn, *p* G⟩, ⟨Ag, Th/Ptn, *p* G, *with* Ins⟩, ⟨Ag, Th/Ptn, *into* G⟩, ⟨Ag, Th/Ptn, *into* G, *for* Bn⟩, ⟨Ag, Th/Ptn, *p* Sr⟩, ⟨Th/Ptn, *into* G⟩, ⟨Th/Ptn, *into* G, *for* Bn⟩

616. {*squint*}

⟨Ag/Sr, *at* G⟩, ⟨Ag/Sr, *around/through/into* G⟩, ⟨Ag, Th, *at* G⟩

617. {*squirt*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Sr⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *at* G⟩, ⟨Sr, Th⟩, ⟨Th, *on/onto* G⟩, ⟨Th, *through* Lc⟩, ⟨Th, *from* Sr⟩

618. {*stagger*}

⟨Ag, Th⟩, ⟨Ag, Th, *with* Ins⟩, ⟨*that* Prd, Ptn⟩, ⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, Mnr⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩

619. {*stain*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, *up*, G⟩, ⟨Ag, *up*, G, *with* Th⟩, ⟨G, Mnr⟩, ⟨Th, Lc⟩

620. {*stalk1*, *track*}

⟨Ag/Th, G/Th⟩, ⟨Ag/Th, G/Th, *p* Lc⟩, ⟨Ag/Th, Lc⟩, ⟨Ag/Th, Lc, *for* G⟩

621. {*stamp*}

⟨Ag, G⟩, ⟨Ag, G, Prpr⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *at* G⟩

622. {*stand*}

⟨Actr/Ex, Th⟩, ⟨Actr/Ex, Th, *in* Lc⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* Lc⟩, ⟨Th⟩, ⟨Th, *p* Lc⟩, ⟨Th, Lc⟩, ⟨Th, Lc, *as* Prpr⟩, ⟨Th, Lc, *for* G⟩, ⟨Th, Lc, *for* G, *as* Prpr⟩

623. {*steal*}

⟨Ag, Bn, Th⟩, ⟨Ag, Bn, Th, *p* Sr/Ptn⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩,
⟨Ag, Th, *p* Sr/Ptn⟩, ⟨Ag, Th, *p* Sr/Ptn, *for* Bn⟩, ⟨Ag, Th, *from* Sr/Ptn⟩,
⟨Ag, Th, *from* Sr/Ptn, *for* Bn⟩, ⟨Th, *from* Sr⟩, ⟨Th, *from* Sr, *p* Lc⟩

624. {*steam*}

⟨Ag, Ptn⟩, ⟨Ptn⟩, ⟨Sr, Th⟩, ⟨Sr, *with* Th⟩, ⟨Th, *through* Lc⟩, ⟨Th, *from* Sr⟩

625. {*stem*}

⟨Ag, Sr⟩, ⟨Th, *from* Sr⟩, ⟨Th, *from* Sr, *p* Lc⟩

626. {*stick*}

⟨Ag, G⟩, ⟨Ag, G, *p* Lc⟩, ⟨Ag, G, *p* Lc, *with* Th⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Th⟩,
⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *through* G⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *together*⟩, ⟨Th⟩, ⟨Th, G⟩,
⟨Th, *to* G⟩, ⟨Th, *together*⟩, ⟨Th, G, *p* Lc⟩

627. {*stifle*}

⟨Ag, Ptn⟩, ⟨Ptn, Mnr⟩

628. {*sting*}

⟨Ag, Ex/Ptn⟩, ⟨Ag, Ex/Ptn, *with* Ins⟩, ⟨Ag, Ex/Ptn, *p* Lc⟩,
⟨Ag, Ex/Ptn, *p* Lc, *with* Ins⟩, ⟨Ag, Ex, *with* Ins⟩, ⟨Ptn⟩, ⟨Ptn, *from* Ag⟩,
⟨*that* Prd, Ex⟩

629. {*stir*}

⟨Ag, Th⟩, ⟨Ag, Th, *into* G⟩, ⟨Ag, Th, *together*⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ag, Th, *p* Lc⟩,
⟨Ag, Th, *with* Th⟩, ⟨*that* Prd, Th⟩, ⟨Th⟩, ⟨Th, *into* G⟩, ⟨Th, *together*⟩, ⟨Th, *p* Lc⟩,
⟨Th, Mnr⟩, ⟨Th, *with* Th⟩

630. {*stitch*}

⟨Ag, Bn, G⟩, ⟨Ag, Bn, G, *p* Sr⟩, ⟨Ag, G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* Sr⟩,
⟨Ag, G, *p* Sr, *for* Bn⟩, ⟨Ag, Th/Ptn, *into* G⟩, ⟨Ag, Th/Ptn, *into* G, *for* Bn⟩,
⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* G, *with* Ins⟩, ⟨Ag, Th, *together*⟩,
⟨Ag, Th, *together*, *with* Ins⟩

631. {*stone*, *tassel*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Sr⟩

632. {*stop*}

⟨Ag, *up*, G⟩, ⟨Ag, *up*, G, *with* Th⟩, ⟨Th⟩, ⟨Th, *p* Lc⟩, ⟨Th, Prd⟩

633. {*straggle*}

⟨Th, *p* G/Lc⟩, ⟨Th, *from* Sr, *to* G⟩

634. {*strain*}

⟨Ag, Ptn⟩, ⟨Ag, Sr, Prpr, *of* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* Sr⟩

635. {*strap*}

⟨Ag, G/Ptn⟩, ⟨Ag, G/Ptn, *p* Lc⟩, ⟨Ag, G/Ptn, *p* Lc, *with* Th⟩, ⟨Ag, G/Ptn, *with* Th⟩,
⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* G, *with* Ins⟩, ⟨Ag, Th, *together*⟩,
⟨Ag, Th, *together*, *with* Ins⟩

⟨Agent, Goal/Patient⟩ is for expressing corporal punishment e. g. using a strap.

636. {*stream*}

⟨Sr, Th⟩, ⟨Sr, *with* Th⟩, ⟨Th⟩, ⟨Th, *p* Lc⟩, ⟨Th, *through* Lc⟩, ⟨Th, *from* Sr⟩,
⟨Th, *from* Sr, *p* Lc⟩

637. {*stretch*}

⟨Ag, Th⟩, ⟨Ag, Th, *at* G⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ins, Th⟩, ⟨Th⟩, ⟨Th, *p* G/Lc⟩,
⟨Th, *from* Sr, *to* G⟩

638. {*strike*}

⟨Ag, G/Ptn⟩, ⟨Ag, *at* G/Ptn⟩, ⟨Ag, *at* G/Ptn, *with* Th⟩, ⟨Ag, G/Ptn, *with* Ins⟩, ⟨Ag, G/Ptn, *p* Lc⟩, ⟨Ag, G/Ptn, *p* Lc, *with* Th⟩, ⟨Ag, G/Ptn, *with* Th⟩, ⟨Ag, Sr/Ptn⟩, ⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *together*⟩, ⟨Ag, Th/Ptn, *against* G/Ptn⟩, ⟨*that* Prd, Ex/G⟩, ⟨Th⟩, ⟨Th, G/Ptn⟩, ⟨Th, G/Ptn, *p* Lc⟩, ⟨Th, *through* Lc⟩, ⟨Th, *p* Lc⟩

Some of the Themes refer to the travels of a sound that has been struck.

639. {*string*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* G, *with* Ins⟩, ⟨Ag, Th, *together*⟩, ⟨Ag, Th, *together*, *with* Ins⟩

640. {*strip*}

⟨Ag, Sr⟩, ⟨Ag, Sr, Prpr, *of* Th⟩, ⟨Ag, Sr, *of* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Sr⟩

641. {*study*}

⟨Actr⟩, ⟨Actr/G, *from* Sr⟩, ⟨Actr/G, Th, *from* Sr⟩, ⟨Actr/Sr, G⟩, ⟨Actr/Sr, G/Prd⟩, ⟨Actr/Sr, G/Th, *for* G⟩, ⟨Actr, *for* G⟩

642. {*stump*}

⟨Ag, Ex⟩, ⟨Ag, Ex, *with* Ins⟩, ⟨*that* Prd, Ex⟩, ⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩

643. {*style*}

⟨Ag/Sr, G/Th, Prpr⟩, ⟨Ag, Ptn⟩, ⟨Ag, Ptn, *for* Bn⟩, ⟨Ag, Ptn, *p* Ins⟩, ⟨Ag, Ptn, *p* Ins, *for* Bn⟩

644. {*suck*}

⟨Ag, *up*, Th⟩, ⟨Ag, *at* Sr⟩, ⟨Ag, *on* Sr⟩, ⟨Ag, Th, *p* Sr⟩

645. {*suggest*}

⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *to* G⟩, ⟨Ag, *to* G, *that* Th⟩, ⟨Ag, Th⟩, ⟨Ag, *that* Th⟩, ⟨Ag, Th, *to* G⟩

646. {*support*}

⟨Ag/Sr, Th/Ptn, *for* G⟩, ⟨Ag/Sr, Th/Ptn, *for* G, *as* Prpr⟩, ⟨Ag/Sr, Th, *in* Lc⟩,
⟨Ag, Ptn⟩

647. {*suspect*}

⟨Ag/Sr, G/Th, *to* Prd⟩, ⟨Ag/Sr, *that* Prd⟩, ⟨Lc/Th, *that* Prd⟩,
⟨Lc/Th, Prd/Th, *to* Prd⟩

648. {*swab*}

⟨Ag, G⟩, ⟨Ag, *at* G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Sr, Prpr, *of* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩,
⟨Ag, Th, *p* Sr⟩

649. {*swallow*}

⟨Actr/G⟩, ⟨Ag/G, *down*, Th⟩, ⟨Ag/G, Th⟩

650. {*sweat*}

⟨Sr⟩, ⟨Sr, *on* G⟩, ⟨Sr, Th⟩, ⟨Sr, *with* Th⟩, ⟨Th, *through* Lc⟩, ⟨Th, *from* Sr⟩

651. {*sweep*}

⟨Ag, *at* G⟩, ⟨Ag, Sr/Ptn/Lc⟩, ⟨Ag, Sr, Prpr, *of* Th⟩, ⟨Ag, Th, *p* G⟩,
⟨Ag, Th, *p* G, *with* Ins⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Th, *p* G/Lc⟩, ⟨Th, *p* Lc⟩,
⟨Th, *from* Sr, *to* G⟩

652. {*swim*}

⟨Lc, *with* Th⟩, ⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, *p* Lc⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩, ⟨Th, *from* Sr⟩

653. {*swing*}

⟨Ag, Th⟩, ⟨Ag, Th, *p* Lc⟩, ⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, *p* Lc⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩

654. {*swipe*}

⟨Ag, *at* G⟩, ⟨Ag, G/Ptn⟩, ⟨Ag, G/Ptn, *p* Lc⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩,
⟨Ag, Th, *from* Sr/Ptn⟩, ⟨Ag, Th, *from* Sr/Ptn, *for* Bn⟩

655. {*swirl*}

⟨Ag, Th⟩, ⟨Ag, Th, *into* G⟩, ⟨Ag, Th, *together*⟩, ⟨Ag, Th, *p* Lc⟩, ⟨Th⟩, ⟨Th, *into* G⟩, ⟨Th, *together*⟩, ⟨Th, *p* Lc⟩

656. {*swonosh*}

⟨Th/Sr, *through* Lc⟩

657. {*swoon*}

⟨Ptn, *at* Ag⟩, ⟨Th⟩, ⟨Th, *at/from* G⟩

658. {*tail*}

⟨Ag/Th, G/Th⟩, ⟨Ag/Th, G/Th, *p* Lc⟩, ⟨Ag, Sr⟩

659. {*take*}

⟨Ag, G, Th⟩, ⟨Ag, G, Th, *from* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *p* Lc⟩, ⟨Ag, Th, *as* Prpr⟩, ⟨Ag, Th, *to* Prd⟩, ⟨Ag, Th, *from* Sr⟩, ⟨Ag, Th, *from* Sr, *for* Bn⟩, ⟨Ag, Th, *from* Sr, *to* G⟩, ⟨G, Th⟩

660. {*talk*}

⟨Actr/Sr⟩, ⟨Actr/Sr, *to* G⟩, ⟨Actr/Sr, *to* G, *about* Th⟩, ⟨Actr/Sr, *about* Th⟩, ⟨Actr, *together*⟩

661. {*taste*}

⟨Ag, Sr⟩, ⟨Ag, Sr, *for* Th⟩, ⟨G, Th, *in* Lc⟩, ⟨G, Th⟩, ⟨G, Th, *p* Lc⟩, ⟨Sr, Prpr⟩, ⟨Sr, Prpr, *to* G⟩

662. {*teach*}

⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *to* G⟩, ⟨Ag, *to* G, *that* Th⟩, ⟨Ag, G, Th⟩, ⟨Ag, G, *that* Th⟩, ⟨Ag, *that* Th⟩

663. {*tear*}

⟨Ag, Th⟩, ⟨Ag, Th, *with* Ins⟩, ⟨Ag, Th, *apart*⟩, ⟨Ag, Th, *off-of/off* Sr⟩, ⟨Ins, Th⟩, ⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, Mnr⟩, ⟨Th, *apart*⟩, ⟨Th, *p* Sr⟩, ⟨Th, *p* Sr, *p* G⟩, ⟨Th, *off-of/off* Sr⟩

664. {*tease*}

⟨Ag, Ex⟩, ⟨Ag, Ex, *with* Ins⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *out-of* Sr⟩, ⟨*that* Prd, Ex⟩

665. {*teem*}

⟨Lc, *with* Th⟩, ⟨Th⟩, ⟨*with* Th⟩, ⟨Th, *p* Lc⟩

666. {*tell*}

⟨Ag, G, Th⟩, ⟨Ag, G, *of/about* Th⟩, ⟨Ag, G, *that/to* Th⟩, ⟨Ag, *of/about* Th⟩, ⟨Ag, *that/to* Th⟩, ⟨Ag, Th, *to* G⟩

667. {*think*}

⟨Ag/Sr, G/Th, Prpr⟩, ⟨Ag/Sr, G/Th, *to* Prd⟩, ⟨Ag/Sr, *of/about* Prd⟩, ⟨Ag/Sr, *that* Prd⟩

668. {*thrill*}

⟨Ag, Ex⟩, ⟨Ag, Ex, *with* Ins⟩, ⟨Ex, *at* Ag⟩, ⟨Ex, Mnr⟩, ⟨Ex, *to* Ag⟩, ⟨*that* Prd, Ex⟩

669. {*throb*}

⟨Th⟩, ⟨Th, *p* Lc⟩, ⟨Th, *from* Sr⟩

670. {*throw*}

⟨Ag, G, Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *with* Ins⟩

671. {*thud*}

⟨Th⟩, ⟨Th, *together*⟩, ⟨Th, *p* G/Ptn⟩, ⟨Th, *through* Lc⟩, ⟨Th, *p* Lc⟩

672. {*thump*}

⟨Ag, G/Ptn⟩, ⟨Ag, *at* G/Ptn⟩, ⟨Ag, *at* G/Ptn, *with* Th⟩, ⟨Ag, G/Ptn, *p* Lc⟩,
⟨Ag, G/Ptn, *p* Lc, *with* Th⟩, ⟨Ag, G/Ptn, *with* Th⟩, ⟨Ag, Th/Ptn⟩,
⟨Ag, Th/Ptn, *together*⟩, ⟨Ag, Th/Ptn, *against* G/Ptn⟩, ⟨Lc, *with* Th⟩, ⟨Th⟩,
⟨Th, G/Ptn⟩, ⟨Th, G/Ptn, *p* Lc⟩, ⟨Th, *through* Lc⟩, ⟨Th, *p* Lc⟩

673. {*thunder*}

⟨*it*⟩, ⟨Actr/Sr⟩, ⟨Actr/Sr, *p* Lc⟩, ⟨Ag/Sr, *at/toward* G⟩, ⟨Ag/Sr, *to* G⟩,
⟨Ag/Sr, *to* G, *that/about* Th⟩, ⟨Ag/Sr, *that/about* Th⟩, ⟨Ag/Sr, Th, *to* G⟩,
⟨Ag/Sr, *for* G⟩, ⟨Lc/Sr, *with* Th⟩, ⟨Th/Sr, *through* Lc⟩

674. {*tickle*}

⟨Ag, Ptn⟩, ⟨Ag, Ptn, *with* Ins⟩, ⟨Ag, Ptn, *with* Ins/Th⟩, ⟨Ag, Ptn, *p* Lc⟩,
⟨Ag, Ptn, *p* Lc, *with* Ins/Th⟩, ⟨Ex⟩, ⟨Ex/Ptn, Mnr⟩, ⟨Ex, *from* Ag⟩,
⟨*that* Prd, Ex/Ptn⟩

675. {*tilt2*}

⟨Actr⟩, ⟨Actr, *with* Actr⟩

676. {*tip2*, *undercharge1*}

⟨Ag, G⟩, ⟨Ag, G, *for* G⟩, ⟨Ag, G, Th⟩, ⟨Ag, G, Th, *for* G⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* G⟩

677. {*tire*}

⟨Ag, Ex⟩, ⟨Ag, Ex, *with* Ins⟩, ⟨Ex⟩, ⟨Ex, Mnr⟩, ⟨Ex, *of* Th⟩, ⟨*that* Prd, Ex⟩

678. {*tire2*}

⟨Ag, Th⟩, ⟨Ag, Th, *with* Ins⟩

679. {*toss*}

⟨Ag, Bn, Th⟩, ⟨Ag, G, Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩, ⟨Ag, Th, *at* G⟩, ⟨Ag, Th, *to* G⟩

680. {*total*}

⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *with* Ins⟩, ⟨Ag, Th/Ptn, *with* Th/Ptn⟩, ⟨Th, Prpr⟩

681. {*touch*}

⟨Ag, G/Th⟩, ⟨Ag, G/Th, *with* Ins⟩, ⟨*that* Prd, G/Th⟩, ⟨Th⟩, ⟨Th, G⟩,
⟨Th, G, *with* Ins⟩, ⟨Th, G, *p* Lc⟩, ⟨Th, G, *p* Lc, *with* Ins⟩, ⟨Th, Lc⟩

682. {*towel*}

⟨Actr, Lc/Ptn⟩, ⟨Ag, Sr⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *p* Sr, *with* Ins⟩

683. {*trade*}

⟨Ag, Sr/G, Th⟩, ⟨Ag, Sr/G, Th, *for* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* Bn⟩,
⟨Ag, Th, *for* Bn, *for* Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *to* G, *for* Bn⟩,
⟨Ag, Th, *to* G, *for* Bn, *for* Th⟩, ⟨Ag, Th, *to* G, *for* Th⟩, ⟨Ag, Th, *for* Th⟩,
⟨Ag, Th, *for* Th, *for* Bn⟩

684. {*train*}

⟨Ag, Ptn⟩, ⟨Ag, Th/Ptn, *as* Prpr⟩, ⟨Ag, Th/Ptn, *to* Prd⟩

685. {*transport*}

⟨Ag, G, Th⟩, ⟨Ag, G, Th, *from* Sr⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *to* G, *from* Sr⟩,
⟨Ag, Th, *with* Ins⟩, ⟨Ag, Th, *from* Sr⟩, ⟨*that* Prd, Th⟩

686. {*trim*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Sr, Prpr, *of* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Th, Lc⟩

687. {*trust*}

⟨Ag/Sr, G⟩, ⟨Ag/Sr, G/Th, *in* Lc⟩, ⟨Ag/Sr, G/Th, *as* Prpr⟩, ⟨Ag/Sr, G/Th, *for* G⟩,
⟨Ag/Sr, G/Th, *for* G, *as* Prpr⟩, ⟨Ag/Sr, G/Th, *with* Th⟩, ⟨Ag/Sr, *that* Prd⟩

688. {*turn*}

⟨Ag, Ptn⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *at* G⟩, ⟨Ag, Th, *from* Sr⟩,
⟨Ag, Th, *from* Sr, *p* G⟩, ⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, *p* G/Lc⟩, ⟨Th, *around* Pth⟩,
⟨Th, *from* Sr⟩, ⟨Th, *from* Sr, *p* G⟩, ⟨Th, *from* Sr, *to* G⟩

689. {*twirl*}

⟨Ag, Th⟩, ⟨Ag, Th/Ptn, *into* G⟩, ⟨Ag, Th/Ptn, *into* G, *for* Bn⟩, ⟨Ag, Th, *for* Bn⟩,
⟨Ag, Th, *around* G⟩, ⟨Th/Ptn, *into* G⟩, ⟨Th/Ptn, *into* G, *for* Bn⟩, ⟨Th, *around* G⟩

690. {*twist*}

⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *into* G⟩, ⟨Ag, Th/Ptn, *into* G, *for* Bn⟩,
⟨Ag, Th, *around* Pth⟩, ⟨Th/Ptn, *into* G⟩, ⟨Th/Ptn, *into* G, *for* Bn⟩, ⟨Th, *p* G/Lc⟩,
⟨Th, *around* Pth⟩, ⟨Th, *from* Sr, *to* G⟩

691. {*use*}

⟨Actr, Ins⟩, ⟨Actr, Ins, *p* Lc/Ptn⟩, ⟨Actr, Ins, *as* Prd⟩, ⟨Actr, Ins, *to* Prd⟩,
⟨Lc/Ptn, Ins⟩

692. {*value*}

⟨Ag/Sr, G⟩, ⟨Ag/Sr, G/Th, *in* Lc⟩, ⟨Ag/Sr, G/Th, *as* Prpr⟩, ⟨Ag/Sr, G/Th, *as* Prd⟩,
⟨Ag/Sr, G/Th, *for* G⟩, ⟨Ag/Sr, G/Th, *for* G, *as* Prpr⟩, ⟨Ag/Sr, *that* Prd⟩,
⟨Ag, Th, *at* Lc⟩

693. {*vein*}

⟨Ag, G⟩, ⟨Ag, G, *with* Th⟩, ⟨Ag, Sr⟩, ⟨Th, Lc⟩

694. {*view*}

⟨Actr/Sr, G/Lc/Ptn⟩, ⟨Ag/Sr, G/Th⟩, ⟨Ag/Sr, G/Th, *as* Prpr⟩

695. {*vote*}

⟨Ag/Sr, Bn, Th⟩, ⟨Ag/Sr, Bn, Th, *for* G⟩, ⟨Ag/Sr, Bn, Th, *p* Sr⟩,
⟨Ag/Sr, Bn, Th, *p* Sr, *for* G⟩, ⟨Ag/Sr, G/Th, Prpr⟩, ⟨Ag/Sr, G, Th⟩, ⟨Ag/Sr, Th⟩,
⟨Ag/Sr, Th, *to* G⟩, ⟨Ag/Sr, Th, *for* G⟩, ⟨Ag/Sr, Th, *p* Sr⟩, ⟨Ag/Sr, Th, *p* Sr, *for* G⟩

696. {*wager*}

⟨Ag, G⟩, ⟨Ag, G, Prd⟩, ⟨Ag, G, *that* Prd⟩, ⟨Ag, G, *for* G⟩, ⟨Ag, G, Th⟩,
⟨Ag, G, Th, Prd⟩, ⟨Ag, G, Th, *that* Prd⟩, ⟨Ag, G, Th, *for* G⟩, ⟨Ag, Prd⟩,
⟨Ag, *that* Prd⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *for* G⟩

697. {*warrant*}

⟨Ag/Sr, G/Th, *to* Prd⟩, ⟨Ag/Sr, *that* Prd⟩, ⟨Ag, Th, Prpr⟩

698. {*wash*}

⟨Actr⟩, ⟨Ag, Bn, Ptn⟩, ⟨Ag, Ptn⟩, ⟨Ag, Ptn, *for* Bn⟩, ⟨Ag, Sr, Prpr, *of* Th⟩,
⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* Sr⟩

699. {*wave*}

⟨Ag⟩, ⟨Ag, *at* G⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *at* G⟩, ⟨Ag, Th, *p* Lc⟩, ⟨Th⟩, ⟨Th, *p* Lc⟩

700. {*wear*}

⟨Ag, Sr, Prpr, *of* Th⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* Sr⟩, ⟨Lc, Th⟩

701. {*weave*}

⟨Ag, Bn, G⟩, ⟨Ag, Bn, G, *p* Sr⟩, ⟨Ag, G⟩, ⟨Ag, G, *for* Bn⟩, ⟨Ag, G, *p* Sr⟩,
⟨Ag, G, *p* Sr, *for* Bn⟩, ⟨Ag, Th/Ptn, *into* G⟩, ⟨Ag, Th/Ptn, *into* G, *for* Bn⟩,
⟨Th, *p* G/Lc⟩, ⟨Th, *from* Sr, *to* G⟩

702. {*weed*}

⟨Actr, Sr⟩, ⟨Ag, Sr⟩, ⟨Ag, Sr, Prpr, *of* Th⟩, ⟨Ag, Th, *p* Sr⟩

703. {*weep*}

⟨Actr⟩, ⟨Actr, *for* G⟩, ⟨Ag/Sr⟩, ⟨Ag/Sr, *at* G⟩, ⟨Ag/Sr, *on* G⟩, ⟨Ag/Sr, Th⟩,
⟨Ag/Sr, Th, *at* G⟩

704. {*whip*}

⟨Ag, G/Ptn⟩, ⟨Ag, G/Ptn, *p* Lc⟩, ⟨Ag, G/Ptn, *p* Lc, *with* Th⟩, ⟨Ag, G/Ptn, *with* Th⟩,
⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *for* Bn⟩, ⟨Ag, Th/Ptn, *into* G⟩,
⟨Ag, Th/Ptn, *into* G, *for* Bn⟩, ⟨Ag, Th/Ptn, *together*⟩, ⟨Ag, Th/Ptn, *with* Th⟩,
⟨Th/Ptn⟩, ⟨Th/Ptn, *into* G⟩, ⟨Th/Ptn, *into* G, *for* Bn⟩, ⟨Th/Ptn, *together*⟩,
⟨Th/Ptn, *with* Th⟩

705. {*whirl*}

⟨Ag, Th, *around* G⟩, ⟨Th, *around* G⟩

706. {*whisk*}

⟨Ag, *at* G⟩, ⟨Ag, Ptn⟩, ⟨Ag, Ptn, *p* Lc⟩, ⟨Ag, Ptn, *p* Lc, *with* Th⟩,
⟨Ag, Ptn, *with* Th⟩, ⟨Ag, Sr, Prpr, *of* Th⟩, ⟨Ag, Th, *into* G⟩, ⟨Ag, Th, *together*⟩,
⟨Ag, Th, *p* Sr⟩, ⟨Ag, Th, *with* Th⟩

707. {*whistle*}

⟨Actr/Sr⟩, ⟨Actr/Sr, *p* Lc⟩, ⟨Ag/Sr⟩, ⟨Ag/Sr, *at* G⟩, ⟨Ag/Sr, *at/toward* G⟩,
⟨Ag/Sr, *to* G⟩, ⟨Ag/Sr, *to* G, *that/about* Th⟩, ⟨Ag/Sr, G, Th⟩,
⟨Ag/Sr, *that/about* Th⟩, ⟨Ag/Sr, Th, *to* G⟩, ⟨Ag/Sr, *for* G⟩, ⟨Ag/Sr, Th⟩,
⟨Ag/Sr, Th, *at* G⟩, ⟨Th/Sr, *through* Lc⟩

708. {*wind1*}

⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *for* Bn⟩, ⟨Ag, Th/Ptn, *into* G⟩,
⟨Ag, Th/Ptn, *into* G, *for* Bn⟩, ⟨Ag, Th, *around* Pth⟩, ⟨Th/Ptn, *into* G⟩,
⟨Th/Ptn, *into* G, *for* Bn⟩, ⟨Th, *p* G/Lc⟩, ⟨Th, *around* Pth⟩, ⟨Th, *from* Sr, *to* G⟩

709. {*wipe*}

⟨Ag, *at* G⟩, ⟨Ag, Sr/Ptn/Lc⟩, ⟨Ag, Sr, Prpr, *of* Th⟩, ⟨Ag, Th, *p* G⟩,
⟨Ag, Th, *p* G, *with* Ins⟩, ⟨Ag, Th, *into* G⟩, ⟨Ag, Th, *p* Sr⟩

710. {*wire*}

⟨Ag, G⟩, ⟨Ag, *to* G, *about/that* Th⟩, ⟨Ag, G, Th⟩, ⟨Ag, G, *about/that* Th⟩,
⟨Ag, G, Th, *from* Sr⟩, ⟨Ag, *for* G⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *p* G, *with* Ins⟩,
⟨Ag, Th, *to* G⟩, ⟨Ag, Th, *together*⟩, ⟨Ag, Th, *together*, *with* Ins⟩, ⟨Ag, Th, *from* Sr⟩,
⟨Ag, Th, *from* Sr, *to* G⟩

711. {*witness*}

⟨Actr/Sr, *for* Bn⟩, ⟨G, Th⟩

712. {*wobble*}

⟨Ag, Th⟩, ⟨Th⟩, ⟨Th, *p* G⟩, ⟨Th, *p* Lc⟩

713. {*worry*}

⟨Actr/Ex, Mnr⟩, ⟨Actr/Ex, *about* Th⟩, ⟨Actr, *over* Th⟩, ⟨Ag, Actr/Ex⟩,
⟨Ag, Actr/Ex, *with* Ins⟩, ⟨*that* Prd, Actr/Ex⟩

714. {*wring*}

⟨Actr, Lc/Ptn⟩, ⟨Ag, Sr/Ptn, Prpr, *of* Th⟩, ⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *p* G⟩,
⟨Ag, Th/Ptn, *p* G, *with* Ins⟩, ⟨Ag, Th/Ptn, *at* G⟩, ⟨Ag, Th/Ptn, *into* G⟩,
⟨Ag, Th/Ptn, *p* Sr⟩

715. {*wrinkle*}

⟨Ag, Th/Ptn⟩, ⟨Ag, Th/Ptn, *at* G⟩, ⟨Ag, Th/Ptn, *with* Ins⟩, ⟨Th/Ptn⟩

716. {*write*}

⟨Actr⟩, ⟨Ag/Sr, G, Th⟩, ⟨Ag/Sr, Th⟩, ⟨Ag/Sr, Th, *to* G⟩, ⟨Ag, *to* G, *that* Th⟩,
⟨Ag, G, Th⟩, ⟨Ag, G, *that* Th⟩, ⟨Ag, Th⟩, ⟨Ag, *that* Th⟩, ⟨Ag, Th, *p* G⟩

717. {*yank*}

⟨Ag, *at/on* G⟩, ⟨Ag, Th⟩, ⟨Ag, Th, *p* G⟩, ⟨Ag, Th, *apart*⟩, ⟨Ag, Th, *off-of/off* Sr⟩,
⟨Th, *apart*⟩, ⟨Th, *off-of/off* Sr⟩

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