APPARENT POLYSEMY AND THEMATIC UNDERSPECIFICATION*

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In this paper, I would like to extend the theory of thematic underspecification proposed in Cowper (1989) for the verb have, and applied to manner-of-motion verbs in Cowper (1990). The two main claims of the theory are given in (1).

1. The lexical conceptual structure of a single lexical item contains no disjunctions and no optional elements. It may contain variables ranging over conceptual categories such as function, event, state, thing, path, place, etc.
2. General rules, referring not to specific lexical items, but rather to the structure and content of conceptual structures, instantiate variables and spell out additional conceptual structure.

I will take as a starting point the analysis of motion verbs given in Cowper (1990). Working with Levin and Rappaport's (1989) classification of motion verbs, given in (2), I proposed the lexical representations in (3) and the rules in (4).

<table>
<thead>
<tr>
<th>DIRECTION</th>
<th>MANNER</th>
</tr>
</thead>
<tbody>
<tr>
<td>'arrive' class</td>
<td>EXTERNAL CAUSE</td>
</tr>
<tr>
<td>come, go, depart</td>
<td>'roll' class</td>
</tr>
<tr>
<td>fall, return</td>
<td>slide, move, swing</td>
</tr>
<tr>
<td>descend</td>
<td>spin, rotate</td>
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<tr>
<td>PROTAGONIST CONTROL</td>
<td></td>
</tr>
<tr>
<td>'run' class</td>
<td>walk, gallop, jump</td>
</tr>
<tr>
<td>hop, skip, swim</td>
<td></td>
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</tbody>
</table>

3. a. 'arrive' \([\text{EVENT GO(THING,PATH)}]\)
   b. 'roll' \([\text{EVENT CAUSE(X, E\{EVENT MOVE\text{\_manner}(THING)\})}]\)
   c. 'run' \(\{\text{EVENT ACT(\alpha)}\} \text{MOVE\text{\_manner}(THING^{\alpha})}\)

4. a. \(X(\text{THING}_{\text{animate}}, Y) \Rightarrow X(\text{THING}^{\alpha}, Y)\)
   b. \(\text{PATH} \Rightarrow \text{GO(THING,PATH)}\)
   c. \(X \ Y \Rightarrow Z(X, Y)\)
   d. \(Z(X, Y) \Rightarrow \text{AND}(X, Y)\) if \(X\) and \(Y\) are of the same type.

Verbs of the \textit{roll} class do not have the predicate GO in their lexical conceptual structure, since they need not involve travel along a path, as shown in (5).

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(5)  a. The steel balls rolled smoothly inside the freshly-oiled bearing.
b. Judith stayed in her chair, but she didn't stop moving the whole time.
c. The top spun crazily in the middle of the table.

When there is a path expression in the sentence, rule (4b) applies to derive the conceptual clause containing GO, and rules (4c) and (4d) incorporate that clause into the sentence.

The same thing happens with verbs of the run class. They need not involve travel along a path, as shown in (6), but can cooccur with a path expression.

(6)  a. Katie can dance for an hour in a phone booth.
b. Judith hopped in one place for three minutes.

Jackendoff (1990) proposes a rather similar analysis, with the predicates GO and MOVE, and with a rule deriving the representations containing GO in the relevant cases. His analysis differs in an important way from mine, however. For him, rules such as these are lexically triggered, and in some cases are redundancy rules. In some instances he provides a lexical entry with optional material, or with disjunctive choices.

Clearly, if we are to maintain a strong monosemy position such as the one stated in (1), this aspect of Jackendoff's analysis cannot be maintained. The rest of this paper will argue that it is indeed possible to maintain the theory of thematic underspecification, and that rules operating on conceptual structure need not refer to lexical items directly, or even to classes of lexical items, but only to properties of conceptual structure itself. It seems obvious that this position is a priori preferable to the one taken by Jackendoff.

Let us now take another look at the analysis outlined in (3) and (4), in particular rule (4b). (4b) was originally proposed as a productive conceptual structure rule of English, projecting the function GO whenever a path function required it. French, Italian and many other languages lack this rule, with the consequence that verbs of the roll class cannot be used to express travel. Sentences like "He rolled down the hill" in these languages require two verbs, one expressing the predicate GO and the other expressing the manner of motion.

There is a fairly serious problem with (4b), however. It predicts that any verb can become a verb of travel, by the simple addition of a path expression. This is false, as the data in (7) show.

(7)  a. *Katie laughed to school.
b. *Marie ate her dinner to Toronto.

It is data like these which led Jackendoff to claim that the rule creating the GO clause is lexically governed.

I would like to suggest a third approach. Notice that it is not an arbitrary class of verbs, but rather the verbs containing the conceptual predicate MOVE, which undergo this rule. What is required, then, is some way of making this generalization follow, without stipulating it directly. The following is an initial approximation of such an account.

Recall that conceptual structure is organized in tiers. Jackendoff proposes a thematic tier, which contains predicates corresponding to the traditional thematic roles of goal, source, theme, location and causer, and an action tier, which carries information corresponding to the notions of agent and patient. What I would like to do is to enrich this structure somewhat, so that the tiers correspond to more narrowly defined areas in semantic space. I propose that there is a movement tier, and that the predicates GO and MOVE, as well as all path expressions, must be on this tier.

I assume, I think reasonably, that the conceptual structure of a sentence is derived primarily from the conceptual structure of the main verb. I implement this assumption by claiming that the verb, with its direct arguments, exhaustively determines which tiers are
present in the conceptual structure of the sentence. Adjunct material must be placed on a tier in order to form part of the sentence, but adjuncts cannot create new tiers.

Consider in this regard the sentences in (8).

(8)  
  a. Mary rolled down the hill. 
  b. *Susie giggled down the hill. 

Since roll contains the predicate MOVE, (a) will have a movement tier in its conceptual structure. The path expression down the hill will be placed on that tier. Rule (4b) can now be seen as a rule applying, not to a path expression in a vacuum, but to a path function in a conceptual structure. As such, it applies only on the movement tier, and will derive the appropriate reading for (8a). (8b), on the other hand, lacks a movement tier, since giggle contains neither MOVE nor GO in its lexical conceptual structure. The path expression thus cannot attach to the conceptual structure and remains, as it were, adrift. Rule (4b) will not apply, and the sentence will not be assigned a coherent conceptual representation.

Let us now look at an interesting variation on this sentence type. This is the so-called way- construction, discussed in recent months by Jackendoff, and also by Marantz. While (8b) is ungrammatical as it stands, it can be repaired by the modification in (9).

(9) Susie giggled her way down the hill.

Here, we have a direct object NP, the way, which on its own expresses some kind of path or travel. Suppose that the lexical conceptual structure of way contains a movement tier, and possibly also the predicate GO. As a direct argument of giggle, the way will add its movement tier to the conceptual structure of the sentence, providing a place for the path expression down the hill, and engendering the correct interpretation. I propose (10) as a tentative lexical conceptual structure for way.

(10) \[ \textit{THING} [\textit{EVENT GO(THING, PATH)}] \]

If the foregoing is correct, then the alternation between the travel and non-travel interpretations of motion verbs can be handled without violating thematic underspecification.

Let us turn now to another case which Jackendoff claims requires an explicit lexical alternation. This is the verb climb. Jackendoff notes that climb can be used to describe both upwards and downwards motion, and can take either an NP or a PP as its complement. This is illustrated in (11).

(11)  
  a. Sue climbed up the mountain. 
  b. Sue climbed down the mountain. 
  c. Sue climbed the mountain. 

What is important here is that (11c) can only mean that Sue climbed upwards. Jackendoff gives (12) as the lexical conceptual structure for climb.

(12) CLIMB: GO (THINGi, \{PATH \{j\} \{ TO \{ \{PLACE TOP-OF (THINGj)\}\}\})

Note the two sets of brace brackets in the representation, one set enclosing the index j on the path itself, and the other set enclosing the contents of the path. This is a notation proposed by Jackendoff to express complementary distribution between pieces of structure in different places in the representation. When there is a PP complement, it is coindexed with the path as a whole, and the TOP-OF reading disappears. When there is an NP complement, it is coindexed with the THING in the path, and the j index on the path.
expression disappears. While this notation certainly describes the possible complements of climb and their interpretations, it should be noted that it is essentially identical to paired sets of angle brackets in SPE phonological rules, with the added feature that the sets of brackets here would be contra-indexed rather than coindexed. Angle brackets have long been held to be too high a price to pay for a generalization in phonology, and it is at least arguable that the brace brackets in (12) are too high a price to pay for a generalization in conceptual semantics. Before looking at alternatives, however, let us at least take note of why the notation was proposed. Climb exhibits an interesting contrast with verbs like enter. The verb enter, like climb, can occur with either an NP or a PP complement, although it only expresses abstract motion when it takes a PP. Consider the sentences in (13).

(13)  
   a. Martha entered into a long discussion with George.  
   b. *Martha entered out of the original agreement.  
   c. Martha entered the room.

Jackendoff's lexical conceptual structure for enter is given in (14).

(14) ENTER: GO (THINGi, [PATH TO (PLACEIN (THINGj)])]

The difference between climb and enter is that whereas the normal upwards direction of climb can be overridden by a path expressing downward motion, the inwards direction of enter cannot be overridden. This difference is captured by the presence of the brace brackets in (12), and their absence in (14).

Now, thematic underspecification explicitly forbids optional material and disjunctions such as those in (12). If something is part of the conceptual structure of a lexical item, then that aspect of the meaning must always be present. Climb can therefore contain in its lexical conceptual structure nothing referring to upwards motion, nor anything about reaching the top of the thing climbed. These two notions must be derived by some other means.

I will begin my treatment of climb by considering sentences in which climb takes an object NP. I disagree with Jackendoff's statement that (11c) means that Sue necessarily climbed to the top of the mountain. If it did, then (15) ought to be contradictory.

(15) I've climbed dozens of trees, but I never go to the top -- the branches are too thin up there.

What (11c) really means is that Sue completed the climbing of the mountain. Depending on the mountain, this might mean that she reached the top, or that she reached some point generally agreed to be the end of the climb — perhaps the highest mountaineering hut, or the end of the hiking trail. The sense of completion follows straightforwardly from work by Carol Tenny. She points out that direct objects have an aspectual effect on the meaning of their verbs, in that the direct object measures out, or delimits, the activity described by the verb. This is true in general, not just for motion verbs.

For example, while (16a) describes a process without an end point, (16b) describes an accomplishment.

(16)  
   a. Katie sang.  
   b. Katie sang a lovely song.

Having disposed of the TOP-OF material, let's now look at the up versus down problem. This one is slightly less obviously tractable. One possibility might be that climb means to traverse a vertical path in an effortful manner. It might then be thought that effortful vertical motion is pragmatically interpreted as upwards, in the absence of evidence
to the contrary. However, as pointed out to me by Diane Massam, climbing down is quite often just as effortful as climbing up. This approach doesn’t seem sufficiently clear-cut to account for the strength of the upwards reading. Another possibility, reminiscent of work by Haj Ross, is that there is some universal markedness convention which gives up as the default direction for vertical motion. This approach doesn’t work either, since climbing is not necessarily vertical. One can climb horizontally across a rock face, and I know from frequent personal experience that children climb horizontally from chair to chair around the kitchen. Verticality is therefore not part of the core meaning of climb. If up is the default direction for climb, it will also be the default direction for go, clearly an absurd result.

The answer, I believe, lies in a more careful consideration of what climb means. To bring it out, let us compare climb with a similar verb, namely lift. Consider (17).

(17)  
  a. Ruth lifted the doll up out of the basket.  
  b. Judith lifted the book down from the shelf.  
  c. Jessie lifted the piano.  
  d. We lifted the children across the gap in the stone wall.

Lifting, like climbing, can be done up, down or sideways, but unless otherwise specified, the direction is up.

What the actions of climbing and lifting have in common is that effort is exerted against the force of gravity. If one did not oppose the force of gravity while climbing down, it would be called falling. If one did not oppose gravity while lifting something down, it would be called dropping.

If opposing the force of gravity is part of the core meaning of climb and lift, then it is obvious why the default direction is up. Down, in fact, can be defined as ‘in the direction of the force of gravity. Up is simply the opposite of down.

All this said, we can state the lexical conceptual structure of climb as in (18).

(18) \[
\begin{array}{c}
\text{GO (THING}^{\alpha} \text{, PATH)} \\
\text{EVENT ACT}^{\text{manner}} (\alpha)
\end{array}
\]

Manner in (18) is an abbreviation for an index to another level of representation proposed by Jackendoff. This level is where visual, kinesthetic and other non-propositional sorts of knowledge reside. For example, the differences between verbs like spin, turn, rotate and revolve are to be found on this level. I suspect that the ‘against gravity’ aspect of the meaning of climb and lift is properly located on this level.

We have seen, then, that it is apparently possible to maintain thematic underspecification for motion verbs. I now turn to another case where Jackendoff argues for optionality in lexical conceptual structure. Although it does not involve motion verbs, it is worth including because it is one of Jackendoff’s strongest cases.

Consider the prepositions in and under, shown in (19) and (20). Both are basically locative, but can be extended to express paths. The problem is that in does not exhibit the same range as under.

(19)  
  a. The socks are under the bed.  
  \[\text{PLACE UNDER (THING)}\]  
  b. The mouse ran under the stove.  
  \[\text{PATH TO (PLACE UNDER (THING))}\]  
  c. The airplane flew under the bridge.  
  \[\text{PATH VIA (PLACE UNDER (THING))}\]
(20) a. The socks are in the suitcase.
   \[\text{PLACE IN (THING)}\]

   b. I put the socks in the suitcase.
   \[\text{PATH TO (PLACE IN (THING))}\]

   c. *The train roared in the tunnel. (and out the other end)
   \[\text{PATH VIA (PLACE IN (THING))}\]

Jackendoff claims that if the path readings were derived by productive rules, then in ought to have the VIA reading, just as under does. He points out that VIA IN is expressed in English by the preposition through. He concludes that under has the representation in (21), while in has the representation in (22).

(21) UNDER:
\[
\{
\text{PATH TO (PLACE UNDER (THING))}
\}
\]

(22) IN:
\[
\text{PATH TO (PLACE IN (THING))}
\]

The notation to note here is the underlining. This is proposed by Jackendoff as a means of marking discontinuous optional material, and is identical in interpretation to coindexed sets of angle brackets in SPE phonological rules. Again, it can be argued that this is too high a price to pay for the generalization. The solution here is to be found in the notion of blocking. It is not a coincidence that in lacks the reading of VIA IN while through has precisely that meaning. While there are valid questions to be answered about the generative power of a mechanism such as blocking, the phenomenon is widely attested. Just as morphological derivation is blocked if it produces a word identical in meaning to a basic lexical entry, apparently conceptual structure rules are blocked if they produce a structure identical to the lexical conceptual structure of a basic lexical entry.

To sum up, then, I have shown that it is possible, with an enriched theory of conceptual structure tiers, and with a more precise examination of the meanings of words, to eliminate the major cases of disjunction and optionality in lexical conceptual structure, and to retain the strong claim made by the theory of thematic underspecification.

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