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# On Jackendoff's Conceptual Structure*

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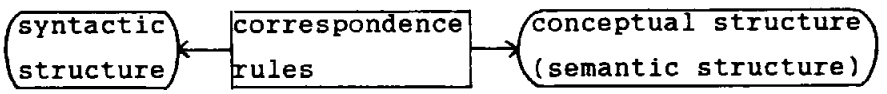
## 1. Introduction.

Jackendoff (J) has been developing the theory of conceptual structure (Conceptual Semantics) on the assumption that meaning is a mental representation, and his theory is surely of interest to everyone concerned with the study of natural languages. Although few serious attempts have been made to uncover the nature of conceptual structure in the literature, I believe it worth the efforts to do so. In this paper I will address myself to the clarification of the spirit behind J's argumentation, which will give us insights into the organization of conceptual structure. I begin with the basic assumptions of Conceptual Semantics, mainly focussing on the version described in *Semantics and Cognition* (S&C).

J claims that the organization of grammar includes three autonomous levels of structure: phonological, syntactic, and semantic/conceptual. These three levels are linked by sets of correspondence rules. J's main thesis is that semantic and conceptual structures collapse into a unified level, and that syntactic form is mapped directly into conceptual structure as in (1).

(1) 


J argues that there are two hitherto unmentioned criteria on semantic theory: the Grammatical Constraint and the Cognitive Constraint. The Grammatical Constraint (GC) specifies a close connection between form and meaning. Note, however, that the GC is not meant to require a perfect match between syntax and semantics. Although the GC is likely to be taken as an isomorphism thesis, it cannot be.

> 'The point of the Grammatical Constraint is only to attempt to minimize the differences of syntactic and semantic structure, not to expect to eliminate them altogether.' (S&C:14)

The Cognitive Constraint, on the other hand, specifies conceptual unity.

> The Cognitive Constraint
> 'There must be levels of mental representation at which information conveyed by language is compatible with information from other peripheral systems such as vision, nonverbal audition, smell, kinesthesia, and so forth. (S&C:16)

From the Cognitive Constraint, J derives the following hypothesis:

> *The Conceptual Structure Hypothesis*
> 'There is a *single* level of mental representation, conceptual structure, at which linguistic, sensory, and motor information are compatible.' (S&C:17)

So the conceptual structure is the semantic structure that is constrained by the two constraints just seen. Among the set of conceptual primitives are ontological category features, which include [THING], [PLACE], [DIRECTION], [ACTION], [EVENT], [MANNER], [AMOUNT] etc. Each of these categories may be associated with either the [TYPE] or the [TOKEN] feature. The [EVENT] and [STATE] features are further associated with (a) semantic functions such as GO, STAY, and BE, and (b) field modifier (Spatial, Identificational, Possessional, etc.). For instance, (2a) will have the conceptual structure (2b).[1]

(2) a. The coach turned into a pumpkin.

b. $$\left[\begin{array}{l}\text{TOKEN} \\ \text{GO}_{\text{Ident}}\left(\left[\begin{array}{r}\text{TOKEN} \\ \text{Thing COACH}\end{array}\right], \left[\begin{array}{r}\text{TYPE} \\ \text{Path TO}(\left[\text{Thing PUMPKIN}\right])\end{array}\right]\right)\end{array}\right]$$

Among these conceptual primitives, it is the semantic function that has played a central role in J's theory. So in the next section, we will examine what the semantic function is originally intended to be.

## 2. Functional Structure

Since his earlier works J has been constantly utilizing functions based on thematic relations such as GO, STAY, and BE, and thematic analysis is characteristic of J's conceptual structure. So let us begin with thematic analysis. In S&C(p.188), J formalizes his thematic analysis in terms of the Thematic Relations Hypothesis (TRH):

> *'Thematic Relations Hypothesis (TRH)*
> In any semantic field of [EVENTS] and [STATES], the principal event-, state-, path-, and place-functions are a subset of those used for the analysis of spatial location and motion. Fields differ in only three possible ways:
> a. what sorts of entities may appear as theme;
> b. what sorts of entities may appear as reference objects;
> c. what kind of relation assumes the role played by location in the field of spatial expressions.'

The insight behind the TRH is that the semantics of motion and location provide the key to a wide range of further semantic fields (this insight is originally due to Gruber). In fact, J demonstrates that the same function applies to several semantic fields that a priori have nothing to do with

each other. For instance, all the sentences in (3) are instances of GO and thus have the representations in (4).

(3) a. The dog ran from the door to the table. (Spatial)
b. Harry gave the book to Bill. (Possessional)
c. The coach changed from a handsome young man into a pumpkin. (Identificational)

(4) a. $[_{Event}\ GO_{Spat}\ ([DOG],[FROM\ DOOR\ TO\ TABLE])]$
b. $[_{Event}\ GO_{Poss}\ ([BOOK],[FROM\ HARRY\ TO\ BILL])]$
c. $[_{Event}\ GO_{Ident}\ ([COACH],[FROM\ MAN\ TO\ PUMPKIN])]$

The representations in (4) neatly illustrate the relevance of spatial concepts in the organization of non-spatial concepts. J calls this phenomenon *cross-field generalization* (Jackendoff 1987a: 156).

This is not the whole story, however. Two qualifications need to be made, which I believe make J's thematic analysis distinct from other theories that also attach much importance to the parallelism between spatial and non-spatial concepts. First, the TRH does not claim that all the concepts are to be reduced to thematic relations. Since J's semantic functions have been centered on thematic ones, one might have the impression that J tries to analyze everything in terms of thematic relations. But never once has J said that they are exhaustive. On the contrary, J has been ready to admit that the semantic functions are not limited to thematic ones.[2]

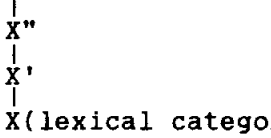
> 'Similarly, it is not implausible that there are other functions we have missed. The important thing is that there should be a rather small set of state- and event-functions ..., among which are the fundamental functions GO, STAY, and BE.' (S&C: 204)

In this respect, the TRH is different from the (strong) localist hypothesis that admits only distinctions relevant to

the description of spatial relationships as semantic relations. (See Anderson 1987:115)

The next, and the most important point is that the TRH is responsible for the thematic relations encoded in the functional structure of a verb. This follows from the mechanism of syntactic-conceptual correspondence within J's theory. J assumes that every major phrasal category (S, NP, AP, and PP) has the following tree structure.[3]

(5) major phrasal category




Back to the above statement of the TRH, notice that it mentions the relevance of spatial concepts for organizing the semantic fields of [EVENTS] and [STATES]. [EVENTS] and [STATES] correspond to Ss, which are assumed to be projections of Vs. Since the lexical head X of a major phrasal constituent is assumed to correspond to a function in conceptual structure, a verb corresponds to a function in conceptual structure. Consequently, what is relevant for the TRH is the functional structure of a verb; thematic relations closely related to clause-level syntax are within the realm of the TRH.

This second point is of particular importance, in revealing the leading idea behind semantic functions: Verbs are regarded as semantic functions, the readings of syntactically associated noun phrases providing semantic values for the variables. Seeing that the TRH is not an attempt to reduce everything to thematic relations, it naturally follows that what is most important is the correspondence between the semantic function and a verb, not thematic analysis. If a verb's functional structure is based on thematic relations, then the TRH comes into play,

capturing cross-field generalization. But verbs whose functions are not thematic are not within the realm of the TRH.

At the same time, an important consequence follows from this second point concerning the argument/non-argument distinction. Because a function corresponds to a verb, arguments of the function correspond to phrasal categories subcategorized by the verb. Therefore, only the subcategorized elements are relevant for thematic analysis, and non-subcategorized elements are to be represented differently. To illustrate, let us consider J's treatment of the Temporal field. In exploring the organization of the temporal concepts, J points out the parallelism between spatial and temporal PPs (S&C: 189-90).

(6) a. In 1976, Max met a cockroach.
b. In Cincinnati, Max met a cockroach.

Certainly, *in* in (6a) defines a pseudo-space just parallel to *in* in (6b). J thus defines the Temporal field according to the TRH:

(7) Temporal field:
a. [EVENTS] and [STATES] appear as theme.
b. [TIMES] appear as reference object.
c. Time of occurrence plays the role of location.

The TRH correctly predicts that verbs asserting temporal location appear in patterns parallel to those of spatial verbs as seen in (8). Consequently (8a) will be represented as in (9), so J argues.

(8) a. The meeting is at 6:00.
b. The statue is in the park.
(9) $[_{State}\ BE_{Temp}\ ([_{Event}$ MEETING],

$[_{Place}\ AT_{Temp}\ ([_{Time}\ 6{:}00])])]$

But this analysis is not a legitimate application of the TRH. The above analysis makes essential reference to the parallelism between spatial and temporal expressions, but the parallelism observed in (8) is different in nature from that in (6); in (8) the PPs are arguments of the verb *be*, and the representation (9) elegantly captures the parallelism. On the other hand, *in* in (6a) is clearly not an argument of the verb *meet*. What's worse, *in* in (6b) is not an argument, either. Both of them are non-subcategorized elements and can cooccur in a single sentence.

(10) Max met a cockroach in Cincinnati in 1976.

The TRH is concerned with the parallelism expressible in terms of the function-argument structure, but J wrongly resorts to the parallelism of non-argument PPs. If anything, they are attached to sentences as modifiers. Hence *in 1976* ought to be represented as the modifier of the event, not as the argument of the verb. Since *in* expresses a temporal concept independent of any other category, the marker 'temporal' is to be attached to the P. As a result, the correct representation for (6a) will be:*

(11) $[_{Event}$ MAX MET COCKROACH]
$[IN_{Temporal}$ 1976]

It has been shown that thematic analysis crucially involves the argument/non-argument distinction, which corresponds to the subcategorized/non-subcategorized distinction. Since the function-argument relation has a syntactic parallel, we can arrive at a correct functional structure by resorting to some syntactic tests. In Jackendoff 1977, J proposes several syntactic tests identifying

subcategorized complements (omissibility, *do-so*, quantifier scope, etc.), and certainly these criteria are useful. In addition, I believe that there is at least one good criterion available in J's theory. One of the main objectives of J's system has been to unify various uses of the same morphological verb (lexical generalization). For instance, the verb *keep* can express both maintenance of position (12a) and continued possession (12b).

(12) a. Bill kept the book on the shelf.
b. Bill kept the book.

In both uses the verb remains fundamentally the same, which can be expressed by claiming that the functional structure is the same, the sole difference being the semantic field modifier attached (Spatial/Possessional). Thus the semantic function is pivotal in capturing lexical generality. Based on the premise that a correct thematic analysis can capture lexical generalization, I conjecture that lexical generalization is possible only when the TRH is correctly applied to the functional structure i.e. arguments are correctly distinguished from non-arguments. For instance, consider *remain*.

(13) The coach remained in the driveway.(Spatial)

It is not perfectly clear whether the PP *in the driveway* is to be analyzed as an argument or as a modifier of the event by looking at (13) alone. But there is a way out, for *remain* can be used in another sense.

(14) The coach remained a pumpkin. (Identificational)

Consideration in terms of lexical generalization suggests the following conceptual structures, indicating the PP *in the*

driveway to be an argument.

(15) a. [STAY$_{Spat}$ ([COACH],[IN DRIVEWAY])]
b. [STAY$_{Ident}$ ([COACH],[AT PUMPKIN])]

Another point worth emphasizing is that the functional structure constitutes a purely linguistic representation. Culicover (1987:68-69) claims that in J's thematic analysis it is not clear when an event is to be decomposed into subevents and when it isn't. For instance, the verb *put* corresponds to CAUSE(X, GO(Y, TO Z)), which consists of two event-functions. But consider (16).

(16) The men rented the paintings to each other for $1000(at different times).

With *rent*, change of possession is not permanent, so that the same item can easily be rented to any number of individuals. If there are *n* men, then at least one reading involves *n(n-1)* instances of renting and a corresponding number of instances of transferring $1000. Why should we decompose *put* into two events, and not decompose (16) into numerous events in conceptual structure?

The answer immediately suggests itself; The putative subevents of *rent* are required to occur for the sentence to be true, but they are not part of the functional structure, which is in close correspondence with syntactic structure. On the other hand, those of *put* constitute the functional structure, although not in one-to-one correspondence with syntactic structure. Events are decomposed into subevents when these subevents form the functional structure of the verb.

The foregoing discussion has revealed several requirements constraining the form of conceptual structure, and a correct representation ought to meet all these

requirements. Consider in this light J's analysis of *hit*. In Jackendoff 1987b, J analyzes *hit* as in (17).

(17) Sue hit Fred with the stick.
[CAUSE([SUE],[GO([STICK],[TO FRED])])]

In the described event, the stick moved to Fred. So J treats the *with*-PP as Theme.

But this analysis is untenable. First, the *with*-PP in (17) is clearly an instrument. An instrument PP is not a subcategorized element and must be attached to the event as a modifier in conceptual structure.[5] This invites a second flaw. The sense of the moving stick is included in the functional structure, but this aspect of meaning is just part of the described event, not the functional structure of the verb *hit*. This becomes particularly obvious in the face of the next use of *hit*:

(18) The words hit him hard.

The relatedness of the *hit*s in (17) and (18) is beyond doubt, but how can the above analysis unify the two uses? What would be the moving object in (18) corresponding to the stick in (17)? This is the third flaw: failure to achieve lexical generality.

What is the correct analysis of *hit* then? Notice that the *hit* in (17) can be paraphrased as "to give an impact". Thus the following representation obtains, which overcomes the first and second flaws:

(19) [CAUSE([SUE],[GO([IMPACT],[TO FRED])])]
[WITH STICK]

At the same time this decomposition analysis can be easily extended to the *hit* in (18), which can be paraphrased as "to

give a mental impact."

(20) The words hit him hard.
[CAUSE([WORD],[GO([MENTAL IMPACT],[TO HIS MIND])])]

Thus all the considerations converge on (19).

One final point. The semantic function is originally intended to express lexically determined meaning of the verb. Indeed there are various semantic properties exhibited in linguistic phenomena, which ought to be properly distinguished. Above all, it is crucial to distinguish between context-free and context-sensitive semantic content. To illustrate, consider (21).

(21) a. The rock rolled down the hill.
b. John rolled down the hill.

Both *the rock* and *John* are asserted to move. Obviously this motion sense can be expressed by the GO-function. As is well-known, however, (21b) has a reading in which *John* deliberately rolled down the hill. This reading does not come from *roll down* alone. If anything, the subject *John* is responsible for this reading, adding the volition sense to the motion sense. Thus what is to be represented in the conceptual structure for *roll down* is the motion sense, which is independent of extra-lexical factors. And (21) will be represented as:

(22) a. [GO([ROCK],[DOWN HILL])]
b. [GO([JOHN],[DOWN HILL])]

As a matter of fact, meaning has a multitude of sources, which can be most clearly illustrated with volition. It may be marked by the verb, in which case it is a lexical meaning (cf.(51)). But even with verbs that are not so specified

lexically, volition may be superimposed extra-lexically: by the adverbials (a), by the modals (b), by the imperative (c), or by the higher verb (d).

(23) a. Willy was examined by the doctor in order to prove to his uncle that he didn't have rickets.
b. Bill will not (i.e. refuses to) be examined by Dr. Gronk.
c. Be taller by next year.
d. John tried to know the answer by the next morning. (Jackendoff 1972:219-20)

Now the nature of semantic function has become obvious: It is a functional structure of a verb, and is therefore closely linked to syntactic structure; It plays a central role in capturing lexical generalization; And it is a lexically determined meaning of the verb.

We conclude this section by pointing out the central role the semantic function has played in J's semantic theory. Since Jackendoff 1972, great emphasis has been laid upon the ability to express significant generalizations about the language, and this is easily discernible in the initial statement of the GC:

'The *Grammatical Constraint* says that one should prefer a semantic theory that explains otherwise arbitrary generalizations about the syntax and the lexicon.'
(S&C: 13)

What is meant by 'generalizations' are to be found in Chapter 9 in S&C (206-207). There, J claims that there are two pieces of justification for thematic analysis. First, it captures lexical generalization, as already seen. Second, thematic relations are useful for explaining grammatical phenomena that lack a structural basis (e.g. reflexivization, control,

and quantification). These two issues correspond to 'generalizations about the lexicon and the syntax' in the above quote, respectively. Of these two, J's conceptual structure is quite successful in capturing lexical generalization, and the function plays a significant role. In fact, elements of conceptual structure are devised so as to capture lexical generalization. As shown in Section 1, there are four fundamental distinctions in conceptual structure: (a) semantic function, (b) semantic field, (c) [EVENT]/[STATE], and (d) [TYPE]/[TOKEN]. Various uses of the same verb can be elegantly unified by keeping the semantic function intact and attributing the difference to one of the other three distinctions. For instance, *turn into* has both Spatial and Identificational uses.

(24) a. The coach turned into a driveway.(Spatial)
b. The coach turned into a pumpkin.
(Identificational)

The two uses differ only with respect to the field modifier.

(25) a. $[_{\text{Event}}\ \text{GO}_{\text{Spat}}\ ([_{\text{Thing}}\ \text{COACH}],[\text{TO}([\text{DRIVEWAY}])])]$
b. $[_{\text{Event}}\ \text{GO}_{\text{Ident}}\ ([_{\text{Thing}}\ \text{COACH}],[\text{TO}([\text{PUMPKIN}])])]$

Next, several motion verbs can also be used as verbs of extent. In (26a) the subject is asserted to have traversed the path, but in (26b) the subject is asserted to occupy the entire path at a single point in time.

(26) a. Amy went from Denver to Indianapolis.
b. Highway 36 goes from Denver to Indianapolis.

The difference between traversal and extent interpretation depends only on whether the GO-function is a feature of an [EVENT] or a [STATE].[6]

(27) $[_{State}\ GO_{Ext}\ ([_{Thing}\ X],[_{Path}\ Y])]$ (S&C: 173)

And the various uses of the verb *be* can be unified by claiming that only the [TYPE]/[TOKEN] feature of the subject and the predicative NP varies between them.

(28) a. Clark Kent is a reporter. (Ordinary
[TOKEN] [TYPE] categorization)
b. Clark Kent is Superman. (Token-identity)
[TOKEN] [TOKEN]
c. A dog is a reptile. (Generic
[TYPE] [TYPE] categorization)

3. Consequences

Section 2 has revealed several points concerning the nature of semantic function, all of which are supposed to be mutually compatible in conceptual structure. Several consequences follow from these points, two of which will be dealt with in this section. First, the thematic structure is to be understood as quite abstract, distinct from concrete motion and location. This is because the semantic function is a quite abstract entity. For instance, coupled with the field modifier, the GO-function can express a variety of meanings which are not limited to concrete motion. All the sentences in (29) are instances of GO, and are represented as in (30).

(29) a. The dog ran from the door to the table.
b. Harry gave the book to Bill.
c. The coach changed from a handsome young man into a pumpkin.

(30) a. $[_{Event}GO_{Spat}\ ([DOG],[FROM\ DOOR\ TO\ TABLE])]$
b. $[_{Event}GO_{Poss}\ ([BOOK],[FROM\ HARRY\ TO\ BILL])]$
c. $[_{Event}GO_{Ident}([COACH],[FROM\ MAN\ TO\ PUMPKIN])]$

Even in the Spatial field, there are traversal and extent GOs, which correlate with the [EVENT]/[STATE] contrast.

(31) a. Amy went from Denver to Indianapolis.
b. Highway 36 goes from Denver to Indianapolis.

What is common between these various GOs? Certainly they cannot be reduced to concrete motion in a Spatial sense.

The same is true of CAUSE. The prototypical image of causation involves a volitional Actor who brings about an event dynamically, thereby affecting a Patient. But the CAUSE alone is not responsible for this image. Just like the GO, the CAUSE is not limited to events. Consider (32).

(32) a. John struck Mary.
b. John strikes Mary as being honest.

The two *strike*'s are fundamentally the same. They can be paraphrased as 'to give an impact' and 'to give a particular impression', respectively. With respect to the [EVENT]/[STATE] distinction, the psychological *strike* in (32b) is stative because it occurs in the simple present tense. Hence, (32) will be represented as in the following:

(33) a. $[_{Event}$ CAUSE([JOHN],[GO([IMPACT],[TO MARY])])]
b. $[_{State}$ CAUSE([JOHN$_i$],[GO([i HONEST],[TO MARY])])]

This is an instance of a stative CAUSE. (See Iwata 1988, 1989)

Noguchi (1989) also alludes to a stative CAUSE in the analysis of the middle verb. There is a class of verbs called *middle verbs* in the current GB literature, which alternate between transitive and intransitive uses as in (34).

(34) a. John sold the book.

b. The book sells well.

One of the characteristics of middle verbs is that while the transitive use is eventive, the intransitive use is stative. This means that the process relating the two uses involves either the conversion of events into states or that of states into events. Noguchi analyzes the middle alternation in terms of conceptual structure, characterizing it as a morphological process deriving the intransitive use from the transitive use. Thus the middle alternation is expected to involve the conversion of erstwhile eventive functions into stative functions, which is explicitly shown in the formulation of this process (p.163):[7]

(35) $[_{\text{event}}$ CAUSE$([X]_1,[_{\text{event}}$ GO$([Y]_3,[\ ])])]$ ->
$[_{\text{state}}$ CAUSE$([X], [_{\text{event}}$ GO$([Y]_1,[\ ])])]$

So here is another instance of a stative CAUSE.

Furthermore, in Jackendoff (1989, Ch.4.: 15-16), J analyzes the following sentences as involving a stative CAUSE.

(36) a. This fence constrains the cattle.
b. This hole lets the water out.
c. This highway leads (you) to Tucson.
d. The windowshade blocks the light.

The existence of a stative CAUSE indicates that the dynamic aspect often associated with the CAUSE is in fact not due to the CAUSE-function itself.

Now that the dynamic aspect does not count, what is left for the CAUSE? Let us turn to the sense of a volitional Actor affecting a Patient. Careful examination suggests, however, that this sense cannot be ascribed to the CAUSE, either. This is shown by consideration in terms of the lexical/extra-lexical distinction. In section 2, I have shown that

volitional Actor is largely determined extralexically. This is also the case with Patient. The volitional Actor-Patient relation is quite fluid and is largely determined extra-lexically. Consider the following sentence.

(37) He hit a stick against Mary.

The *hit* with NP-PP complements asserts that an entity denoted by the direct object comes into forceful contact with the place denoted by the PP complement. So (37) has the following thematic structure:

(38) [CAUSE([HE],[GO([STICK],[TO MARY])])]

Everyone asked to mark volitional Actor and Patient in (37) will invariably assign volitional Actor to the subject and Patient to the PP complement, respectively. This volitional Actor-Patient relation appears to belong to the CAUSE, but it is not true. Consider (39).

(39) She hit her head on the table.

The relevant thematic relation is the same, so that the representation is as in (40).

(40) [CAUSE([SHE],[GO([HER HEAD],[TO TABLE])])]

Notice that in (39) the described event may have been either on purpose or by accident. In the former reading it appears safe to say that the subject is Actor and the PP complement Patient, just parallel to (37). But things are quite different in the latter reading. The subject *she* had no intention of bringing about the event and was only a passive participant, and cannot be called volitional Actor. And it makes little sense just to call the PP complement Patient.

Which is felt to be more affected by the action, *the table* or *her head*? Probably everyone will agree that what is affected is not *the table* but the direct object *her head*, or for that matter, the subject *she*. [8, 9]

All this shows is that the volitional Actor-Patient relation is largely determined by the meanings of the arguments and is not lexically specified by the CAUSE. Abstracting away from both the dynamic aspect and the volitional Actor-Patient relation, what is left for the CAUSE? Certainly it is 'causal relation' in an abstract sense.

Another consequence concerns the directions in which research should proceed. Section 2 has made explicit the kind of meaning that the functional representation is originally intended to capture: the lexically determined meaning of a verb that is closely linked to syntactic structure. However, this is a very limited range of meaning; There are aspects of meaning that are not thematic or lexically determined, but can be represented in functional form. These extralexically determined, non-thematic meanings ought to be expressed as well. And I contend that the conceptual structure has to consist of multiple functional representations for that purpose. To illustrate, let us consider the familiar example once again; In one reading of *roll down*, the volition sense is superimposed on the motion sense. In section 2 it was argued that the motion sense ought to be represented.

(41) Bill rolled down the hill.
[GO([BILL],[DOWN HILL])]

But this does not mean that the volition sense is exempt from being represented, either in functional form or otherwise. Both the motion and volition senses constitute essential parts of the meaning of the sentence, so both of them must be represented in conceptual structure. There is no reason to

call either of them as *the* meaning of the sentence and neglect the other. And the volition sense can be properly represented in functional form. Consequently, the functional representation must be enriched to cover the volition sense as well. What is the adequate way to represent both senses, then?

There are two possibilities; One is to represent both of them in a single level, and the other is to posit two independent levels, one of which is devoted to volitional Actor and the other to the thematic structure. As a matter of fact, both possibilities have been pursued by J; in Jackendoff 1972 the former approach was chosen as in (43a), but in Jackendoff 1987 it was abandoned in favor of the latter approach as in (43b), which consists of the thematic tier (=GO) and the action tier (=ACT).

(42) Bill rolled down the hill.

(43) a. [CAUSE([BILL],[GO([BILL],[DOWN HILL])])]

b.
$$\begin{bmatrix} \text{GO}([\text{BILL}],[\text{DOWN HILL}]) \\ \begin{bmatrix} \text{ACT} \\ \text{VOL} \end{bmatrix}([\text{BILL}]) \end{bmatrix}$$

I maintain that the latter is the correct approach. First and foremost, action and thematic relations are different in nature. In the above case volitional Actor is superimposed on Theme, but this is not peculiar to *roll down*. In fact, volitional Actor can be superimposed on the lexically determined thematic role extralexically in many cases. What's more, the superimposition is possible on any thematic role, at least in principle. In S&C (p.181), J observes that Actor is superimposed on thematic roles in (44a) and (44b). The relevant thematic structures are as in (45a) and (45b), showing that superimposition is possible on Agent (=the first argument of CAUSE) and Theme.

(44) a. The man put the book on the table.
b. What the rock did was roll down the hill.

(45) a. [CAUSE([MAN],[GO([BOOK],[TO ON TABLE])])]
b. [GO([ROCK],[DOWN HILL])]

J further goes on to say that Actor is superimposed only on Agent and Theme, based on the impossibility of *receive a letter* to appear after 'what X did was ...' (a diagnostic for [ACTIONS], and the one who is performing the [ACTION] is Actor).

(46) What Fred did was

| | |
|---|---|
| put the book on the table. | ACTION |
| *receive a letter. | non-Action |

But J is rash to conclude that volitional Actor cannot be superimposed on Goal by just looking at (46). On closer examination, it turns out that superimposition is possible on Goal and, for that matter, even on Source. *Receive* and *lose* have the following thematic structures, indicating the subject to be Goal and Source, respectively.

(47) a. Beth received the doll.
[GO([DOLL],[TO BETH])]
b. Beth lost the doll.
[GO([DOLL],[FROM BETH])]

Now observe (48), where the subjects assume the additional volitional Actor role, although the thematic structures are as in (49)

(48) a. We warmly received the stranger.
b. John lost patience. (Ikegami 1975)

(49) a. [GO([STRANGER],[TO WE])]
b. [GO([PATIENCE],[FROM JOHN])]

Thus the superimposition is possible on any thematic role, indicating that Actor and thematic roles are independent and essentially separate notions, and are not mutually exclusive. The two-level representation correctly handles this meaning composition.

Another reason to favor the multi-level representation is that it preserves the close correspondence with syntactic structure. In both (43a) and (43b) there are two functions, and the reading of *Bill* appears twice. The proliferation of functions and arguments might appear to pose a challenging problem in that it distorts a close connection between form and meaning required by the Grammatical Constraint. But (43b) provides a solution to overcome this apparent problem, in that it is more true to the spirit of the Grammatical Constraint. The GC is originally intended to capture the correspondence between the NP and the conceptual argument position which is *lexically determined by the verb*. The thematic tier in (43b) preserves just this aspect of the correspondence, thus meeting the GC. That is, (43b) clearly separates the representation into the parts that are subject to the GC and the parts that are not. Consequently, the spirit of the GC can be retained. On the other hand, such a separation is quite difficult with (43a).

Thus all the considerations converge on the position that the multi-level representation is the right way to pursue. As the attentive reader may have already noticed, the thematic tier is just what the functional structure is originally intended to be: the thematic tier is characterized as the level where the thematic structure is the functional structure, which is lexically determined, and also the level that meets the GC.

Notice, however, that we are still halfway; in addition to the multi-level representation, the lexical/extralexical distinction has to be incorporated in conceptual structure.

Although in the case of *roll down*, volitional Actor happens to be extralexically determined, it is not always the case that non-thematic relations are superimposed on thematic relations extralexically. *Sell* is a candidate that takes lexically determined volitional Actor, for example. Thus the following representations emerge:[10]

(50) John deliberately rolled down the hill.
lexical: [GO([JOHN],[DOWN HILL])]

extra-lexical: $\left[\begin{bmatrix}\text{ACT}\\ \text{VOL}\end{bmatrix}\ ([\text{JOHN}])\right]$

(51) John sold the book to Mary.
lexical: [CAUSE([JOHN],[GO([BOOK],[TO MARY])])]

$\left[\begin{bmatrix}\text{ACT}\\ \text{VOL}\end{bmatrix}\ ([\text{JOHN}])\right]$

## 4. Related issues

Having examinend what is the functional representation in conceptual structure and how it is to be organized, we are now in a position to see how Conceptual Semantics is related to other theories by finding out the parallels with the semantic function in these theories.

First, let us consider the thematic properties in GB theory. In the current GB literature, a θ-role tends to be treated as though it were a purely syntactic notion. But the θ-role as originally conceived in LGB is just the thematic role in the sense of Jackendoff; Chomsky begins his discussion of the θ-theory by first identifying θ-role as "the status of the term in a thematic relation" (Chomsky 1981: 34). Furthermore, it is quite doubtful whether θ-role can radically depart from this original conception in any meaningful way. The fundamental assumption concerning θ-role is that two factors enter into its determination: intrinsic

lexical properties of lexical items which are heads of phrase categories (as the verb is the head of VP), and grammatical relations. So θ-role is characterized as the aspect of meaning that is responsible for the correspondence with an NP in syntactic argument position, this correspondence being lexically determined by the verb. Clearly this is just what the semantic function is intended to be. Therefore, θ-role cannot be entirely different from thematic roles in the sense of Jackendoff, to the extent that the above characterization is valid in GB theory. In fact, the validity of this characterization is best seen in the attempt to reduce categorial-selection (c-selection) to semantic-selection (s-selection) (Chomsky 1986: 90). This attempt is essentially reducing subcategorization properties to θ-roles. For the reduction to be possible at all, then, θ-role must be such that it is associated with subcategorized position by the lexical property of the verb. This is just the θ-role in the conception in LGB.

One thing that might seem to stand in the way between thematic properties in GB theory and thematic relations in conceptual structure is the "biuniqueness requirement".[11] The θ-criterion (52) requires biuniqueness between θ-roles and NPs in argument positions:

(52) Each argument bears one and only one θ-role, and each θ-role is assigned to one and only one argument. (Chomsky 1981: 36)

As already seen, however, an NP in syntactic structure may have multiple argument positions in conceptual structure; For instance, in "John deliberately rolled down the hill", *John* assumes a dual role. Thus the theory of conceptual structure, which admits a multiple θ-role, seems to be in conflict with the θ-criterion.

However, this conflict is only apparent, and not real.

First, the biuniqueness requirement is not the primary insight of the θ-criterion, although only this aspect has been emphasized in the literature; The objective of the θ-criterion is to make sure that NPs do not acquire additional θ-roles in the course of a derivation, as stated in the following passage.

> 'The additional requirement that each θ-role must be filled by one argument will, for example, exclude the possibility that a single trace is associated with several argument antecedents, a possibility ruled out in principle under the Move-alpha theory.'
> (Chomsky 1981: 139)

Next, the mere fact that an NP has a multiple θ-role does not invalidate the θ-criterion. Admitting the possibility of a multiple θ-role, Chomsky observes:

> 'We are concerned here with the assignment of θ-role within the basic system of grammatical relations: verb-object, verb-subject (or VP-subject), etc.'
> (Chomsky 1981: 139)

In other words, what is relevant is the θ-role assigned to an NP in argument position by virtue of the very fact that the NP occupies that position. θ-roles assigned outside this system are irrelevant to the θ-criterion.

Obviously, then, the θ-role relevant to the θ-criterion is just what is expressed by the semantic function in conceptual structure. The enriched conceptual structure makes it possible to identify the relevant θ-role. Back to *roll down*, it has the representation:

(53) John deliberately rolled down the hill.
lexical: [GO([JOHN],[DOWN HILL])]

extra-lexical: [[ACT] ([JOHN])]
[VOL]

Here, *John* is both Theme and volitional Actor. But it is Theme that is invariably assigned to subject position. So the relevant θ-role is Theme. Next, consider *strike---as*. The NP in direct object position denotes a person who experiences a mental state, so it can be said to be Experiencer. This information can be accommodated by introducing a further function [EXP([x],[y])], where the first argument stands for the person experiencing a mental state and the second argument the object of experience. Thus the following representation obtains:

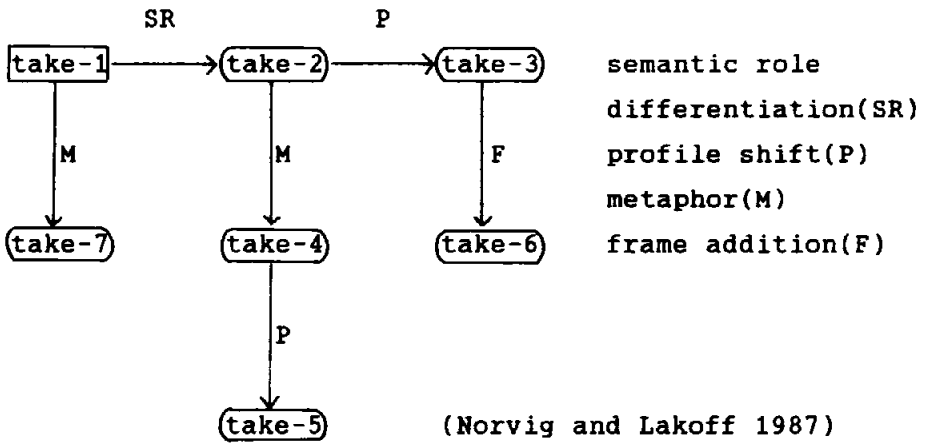
(54) John strikes me as being pompous.
lexical: [CAUSE([JOHN$_i$],[GO([i POMPOUS],[TO MY MIND])])]
[EXP([I],[JOHN POMPOUS])]

The direct object is both Goal and Experiencer, and both roles are lexically determined. But it is the CAUSE-function that establishes a correspondence with syntactic structure. Therefore, it is Goal that is the relevant θ-role.

Let us consider next the theory of conceptual metaphor developed by Lakoff. Here metaphor does not mean a poetic or rhetorical device, nor is it just a matter of language. Lakoff and Johnson claim that 'metaphor is pervasive in everyday life, not just in language but in thought and action.' (Lakoff and Johnson 1980: 3) Lakoff's study deals with a wide range of linguistic phenomena, but in order to get a clear idea how Lakoff's theory is related to conceptual structure, let us focus on the study of verb meanings. Norvig and Lakoff (1987) present a network analysis of the various senses of the verb *take*.

(55) a. John took the book from Mary. take-1
b. John took the book to Mary. take-2
c. John took the book to Chicago. take-3
d. John took a punch at Harry. take-4
e. John took a punch from Harry. take-5
f. John took Mary to the theater. take-6
g. John took a whiff of the coffee. take-7

They argue that among these seven senses, take-1 is central and that each of the other senses can be seen as a minimal variation either of the central sense or of another sense in the network.




(Norvig and Lakoff 1987)

This network approach neatly captures the fine details of the various senses. At the same time, however, it must be noticed that this analysis crucially rests on the assumption that these senses have something in common; all of them share the valency and syntactic correspondence. This is just the aspect the semantic function is to capture in conceptual structure. In fact, the seven senses can be represented as in the following:

(56) a. John took the book from Mary.
[CAUSE([JOHN],[GO([BOOK],[FROM MARY TO JOHN])])]

b. John took the book to Mary.
[CAUSE([JOHN],[GO([BOOK],[TO MARY])])]

c. John took the book to Chicago.
[CAUSE([JOHN],[GO([BOOK],[TO CHICAGO])])]

d. John took Mary to the theater.
[CAUSE([JOHN],[GO([MARY],[TO THEATER])])]

e. John took a punch from Harry.
[CAUSE([JOHN],[GO([PUNCH],
[FROM HARRY TO JOHN])])]

f. John took a punch at Harry.
[CAUSE([JOHN],[GO([PUNCH],[TO HARRY])])]

g. John took a glance at Mary.
[CAUSE([JOHN],[GO([GLANCE],[TO JOHN])])]

So the functional structure serves as an interface between the theory of conceptual metaphor and the theory of conceptual structure. It is to be expected then that the insights gained in the theory of metaphor can be incorporated and formulated in conceptual structure. Let us consider the metaphorical mapping in the above case. Norvig and Lakoff argue that take-4 is linked to take-2 by the metaphor that APPLYING FORCE IS TRANSFERRING AN OBJECT, accompanied by the following changes in semantic roles in (58).

(57) a. John took the book to Mary. take-2
b. John took a punch at Mary. take-4

(58) Source domain: taking
Target domain: performing a quick forceful action
Agent -> agent
Patient -> quick, forceful action
Recipient -> patient

On the other hand, within the theory of conceptual structure, they will be represented as follows:

(59) a. John took the book to Mary. take-2
[CAUSE([JOHN],[GO([BOOK],[TO MARY])])]
b. John took a punch at Mary. take-4
[CAUSE([JOHN],[GO([PUNCH],[TO MARY])])]

These conceptual structures share the semantic function, and the number of arguments is the same. In fact, even the syntactic correspondence is the same. What distinguishes between the two are the contents filling in the argument slots. Notice that these differences just correspond to the changes in the three semantic roles in (58). That is, they are the terms assigned to the contents filling in the three argument slots in (59). This indicates that the metaphorical mapping can be characterized as the process of changing the contents of arguments in conceptual structure.

Let us consider metonymy next. Metonymy is using one entity to refer to another. Norvig and Lakoff argue that take-6 is a minimal variant of take-3.

(60) a. John took the book to Chicago. take-3
b. John took Mary to the theater. take-6

In (60a) the book went to Chicago. But (60b) means that Mary not only went to the theater, but also she did what a member of the audience typically does there. Here emerges one scenario: A person went to the theater and then took part in the activity that normally takes place there. What is said in (60b) is only part of the scenario (going to the theater), but the entire scenario is actually meant. Thus the going there part of the scenario is metonymically standing for the entire scenario. Norvig and Lakoff resort to the following schema:

(61) The Going-to-D Schema

C=a conventional activity with a conventional purpose

D=public establishment where C takes place.

METONYMY: Going to D stands for doing C.

The metonymical process does not lend itself to being represented in functional form. It is characterized as an extralexical process that operates on the functional structure to yield further information in conceptual structure.

I conclude my discussion by pointing out the significance of the correlation between the theory of conceptual structure and the theory of conceptual metaphor. As has already been shown, the theory of conceptual structure starts with the lexical meaning of a verb. In order to achieve expressive power, it must be further developed to cover extralexically determined meanings as well. Notice that both metaphor and metonymy just seen create extralexical meanings depending upon the contents of the arguments. Both of them are characterized as extralexical general processes in conceptual structure. On the other hand, the theory of conceptual metaphor cannot neglect the theory of conceptual structure, either; As shown above, the metaphorical mapping rests upon the crucial assumption that *take* takes three arguments, which is explicitly represented in conceptual structure. In this sense, the theory of metaphor is implicitly admitting the existence of something very similar to the conceptual structure. Although the two theories might appear to be exploring entirely different domains, both theories are just focussing different aspects of the linguistic phenomena and are complementary.[12]

NOTES

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[1] There are some minor terminological differences among J's works. In Jackendoff 1987a, J uses [OBJECT] and Positional field to refer to [THING] and Spatial field in S&C, respectively. In this article, I will keep to the terminology in S&C.

[2] This passage is drawn from the context where J alludes to the WANT-function. Other non-thematic functions that have been suggested so far include ACT and EXP, which will be discussed later.

[3] The GB syntax adopts a different version of X-bar theory, but this is immaterial to J's theory. J's goal is to establish the relative contributions of syntactic structure, conceptual structure, and correspondence rules to the grammatical patterns of the language. The GB theory, on the other hand, places too much expressive power in the syntax.

> 'Accordingly, I will assume a more or less generic version of the Extended Standard Theory, and will not appeal to any of the more sophisticated devices of contemporary GB. For the most part, my neutrality on syntactic issues will make it possible to translate my results equally into LFG or GPSG or RG without appreciable strain; I leave the translation to interested practitioners.' (Jackendoff 1987c:2)

[4] Despite the difference in argumenthood, the PPs in (6) and (8) are similar in that in both sentences [EVENTS] are located in time. One may wonder how this similarity can be expressed in (9) and (11), which are built on different conceptual relations. But I don't suppose it a very difficult

task to derive this similarity. The PP functions as a restrictive modifier to the sentence in (6), whereas the PP is predicated of the subject in (8). Note that modification and predication create very similar semantic readings. This can be best seen with the adjectives: *A sick horse* (attributive use) and *a horse which is sick* (predicative use) are synonymous. Thus the similarity between the two PPs are expressible in the semantic readings of (6) and (8) in any way. (I am indebted to Nobuhiro Kaga for bringing this point to my attention).

[5] It is true that some verbs subcategorize a *with*-PP. *Load* is a case in point, which allows two *with*-PPs to cooccur.

(i) He loaded the wagon with hay with a fork.

[6] J proposes three linguistic tests for the [EVENT]/[STATE] distinction: 'What happened was', simple present, and progressive aspect. Sentences that occur after 'what happened was (that) ...' are events.

(i) What happened was that

| | |
|---|---|
| Bill flew around the pole. | EVENT |
| ?Max was in Africa. | STATE |

With states, simple present can be used to express present time. With events, however, present time must be expressed by present progressive aspect.

(ii) a. Max is in Africa. STATE
b. Bill is flying/*flies around the pole. EVENT

[7] The great advantage of this transitive-based approach is that it explains the occurrence of instrumental PPs.

(i) This bread cuts easily with any knife.

The instrumental *with*-PP is predicated of the first argument of CAUSE, i.e. X, in conceptual structure, although this argument is not syntactically realized. (See Noguchi for details)

[8] So *hit* is lexically neutral with respect to volition, although in the literature *hit* is generally regarded as a typical action verb incorporating volition. The same is true of verbs of hurting in general. These verbs allow both volitional Actor and Patient readings when the direct object denotes a body part of the subject.

(i) a. I cut my foot with a rock.
b. I cut my foot on the rock. (Fillmore 1977:99)
(ii) a. John scratched himself.
b. John hurt himself. (R. Lakoff 1971:158)

[9] One might still argue that there is a notion of "affectedness" that is insensitive to the content of the argument NPs, by resorting to syntactic positioning. Thus, an NP can be construed as "affected" in direct object position, but not in indirect object position. However, the "affectedness" under this construal is entirely different from that of (37) or (39) intended in the discussion. So even this possibiliity does not invalidate my claim. On the contrary, it supports my claim that CAUSE expresses quite abstract meaning, for this "affectedness" cannot but be a quite abstract notion.

[10] My interest in the lexical/extralexical distinction was originally inspired by Nakau's 1986 distinction between ACTOR and AGENT. Nakau defines ACTOR as a basic semantic role and AGENT as a pragmatically determined role. ACTOR and AGENT in this sense correspond to lexical and extralexical Actor in my discussion.

[11] I owe much of the following discussion to footnote 7 in Jackendoff (1987b: 381), where J points out that biuniqueness is not the primary insight of the θ-criterion.

[12] As shown in this section, the correlation between the two theories manifests itself most clearly in the analysis of verb meanings. Specifically, the TRH discussed in section 2 seems to be just the metaphorical mapping in spatial terms. But there are differences between them; First, the TRH deals with the lexical meaning, but Lakoff's analysis is mainly concerned with the extralexical meaning. Second, the TRH regards the verb itself as being responsible for the parallelism between spatial and non-spatial concepts. So the semantic field modifier is attached to the function. Yet in the analysis of *take*, the parallelism can hardly be said to be due to the verb. Rather, the argument NPs are to be regarded as responsible for the parallelism, as indicated above.

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