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Thematic and Aspectual Relations:  
Striking the Balance

by  
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presented to the University of Ottawa  
in fulfillment of the  
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in

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## 0. Introduction

Stowell (1981) initiated a trend in the Government and Binding framework which seeks to develop a less stipulative theory of grammar by rendering the "base" component of the syntax redundant (cf. Chomsky (1981), Travis (1984), Koopman (1984)).

One of the techniques used to attain this end involves establishing semantic "licensing conditions" on syntactic structures. These licensing conditions are capable of replacing phrase structure rules by establishing a direct mapping between the dominance (and, perhaps, precedence) relations of which a phrase structure tree is composed and semantic relations, which hold of the component categorial elements of a phrase (cf. Higginbotham (1985), Speas (1986)).

This conception of syntactic phrase structure requires access to an accurate account of the semantic relations which hold of the various categories relevant to a grammar. A major part in this semantic theory is currently played by the theory of thematic relations, as developed by Gruber (1965), Jackendoff (1972, 1976, 1983) and others. Thematic relations are made responsible for licensing the phrase structure relation of strict sisterhood holding

between the head of a verb phrase (or any lexical category phrase) and its complement arguments.

The problem is that the theory of thematic relations has (properly) come under criticism as being, in several respects, an inappropriate characterization of the specific semantic relations which are relevant to the syntactic component of a grammar. The critique comes from the proponents of an alternate semantic theory: the theory of aspectual relations, as developed by Dowty (1979), and applied to the concerns of licensing theory by Tenny (1986) and Voorst (1986). What these authors show is that the semantic properties of arguments of a verb--notably of the direct object argument--can best be explained in terms of the aspectual function of arguments, and that the theory of thematic relations is therefore not needed in the grammar.

The two semantic theories make quite different predictions about the kinds of complements which will be licensed in syntax, as well as about the ways in which syntactic variation across languages can be expected to find an explanation in the semantic component. The theory of thematic relations predicts that licensing relations will be derived from the relations associating the cognitive primitives of motion events. The aspectual account predicts that licensing relations will be stated in terms of the roles arguments play in denoting "end points" or "boundaries" of the events signified by a phrasal head. In this thesis, I demonstrate the value of both viewpoints, and show that a synthesis of the two produces the most appropriate semantic framework for a theory of syntactic licensing.

In chapter 1, I introduce the conventional thematic relations model. The Thematic Relations Hypothesis is presented, along with

the properties of some control constructions and the rules of inference which are its primary justification.

In chapters 2 and 3, my goal is to amass evidence for the revisions of the thematic representation developed in chapter 4. I show that the semantic fields of Existence and Possession play a significant role in a number of different modules of the syntactic component: Case theory, licensing theory, binding theory and control theory.

Chapter 4 is where the synthesis of thematic relations with aspectual relations is developed. I discuss the motivation for the specific aspects of the Jackendoff model which lie at the foundation of problems noted by the aspectual semanticists like Tenny (1986) and Voorst (1986). I argue that Jackendoff's system of representation conceals an implicit "terminal predication" which Verkuyl (1978) and Voorst (1986) have shown to play a role in the licensing of complements to event verbs. It is suggested that this implicit predication is the *nexus* of semantic field specification. (In the thematic analysis, field specifications are mere (grammatically insignificant) annotations on the predicates which head thematic representations. In the aspectual analyses, semantic fields are not specified at all.) I propose that licensing theory makes direct reference to terminal predications in an event, so that a set of arguments is licensed if and only if it may be interpreted implicitly as instantiating a terminal predication compatible with the event denoted by the head of the phrase.

In chapter 5, the effects of the proposed synthesis are explored. I show that a number of persistent problems in control theory are naturally resolved in this system.

## 1. Thematic relations

### 1.1 *The thematic relations hypothesis*

Before progress is possible, it is first necessary to understand where we are. And for the theory of lexical semantics, this involves, mainly, understanding the *pros* and *cons* of the dominant framework in lexical semantics: the theory of thematic relations, developed by Gruber (1970), Jackendoff (1972, 1976, 1983, 1987), and others. We begin, therefore, with a quick sketch of this framework.

The first question for any semantic theory is necessarily: where do we start? on what basis may we construct our theory? Gruber's (1970) answer is that sentences which paraphrase each other give us the necessary initial insight into the semantic component. His idea is simply that all the ways of expressing the same "meaning" must share the same semantic atoms in the same relationships. Consider, for example, the sentences in (1.1).

- (1.1) a Helga sent a postcard to Herman.  
 b Herman received a postcard from Helga.

To a large extent, (1.1a) and (1.1b) mean the same thing. They are certainly logically equivalent; there is no way for one of them to be true while the other is false<sup>1</sup>. And neither is a syntactic transform

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<sup>1</sup>Here, and throughout this thesis, the notion of 'logical inference' must be interpreted in the way standard in the thematic relations literature. M.-L. Rivero (personal communication) has noted that this usage does not entirely correspond to the way this term is used in standard logic. For the purposes at hand, the Gruberian terminology seems adequate, as all the difficult philosophical questions which trouble our account are at least equally problematic for the alternative theories we discuss.

of the other, so the paraphrase relation must be a consequence of the fact that (1.1a) and (1.1b) are two distinct ways to express the same "meaning".

It is easy to pinpoint the component of these sentences which must be responsible for the particular syntactic expressions of the "meaning"--it is the verb. So the equivalence of (1.1a) and (1.1b) must be explained by reference to the semantic properties of the verbs send and receive.

When we examine our intuitions, the reason that (1.1a) and (1.1b) are equivalent is obvious enough. Both denote events in which an act of mailing results in a transfer of the postcard from Helga to Herman. In order to state this intuitive explanation in precise terms, Gruber gives labels to the "participants" in the event. The postcard is called the *Theme*, Helga is the *Source*, and Herman is the *Goal*. These labels are intended to characterize the respective functions of the participants in the event in question. A Theme is something which undergoes movement. The Source denotes the initial "location" of the Theme, and the Goal denotes its eventual location. (Jackendoff (1983) supports an even stronger interpretation of such labels. He claims that the labels are elements in the mental representation of the "world" which is shared among all the senses: e.g. vision, touch, balance, and language.)

With these labels, or *thematic roles*, established as elements in the semantic model, it is possible to characterize the difference between send and receive in a way which captures the equivalence of (1.1a) and (1.1b) quite precisely. It is the verb which is responsible for matching thematic roles with the syntactic "arguments" in a sentence. Both send and receive identify the direct object as the Theme. But send identifies its subject as the

Source and its PP complement as the Goal, while receive identifies its subject as the Goal and its PP complement as the Source. Thus send and receive differ only in the grammatical functions to which they *assign* the Source and Goal thematic roles<sup>2</sup>. And any two sentences can be said to be paraphrases of each other if they express the assignment of the same thematic roles to arguments with the same referents.

In the (1.1) sentences, the event denoted involves real movement of an object through space. Movement events inherently involve the kind of relations among "participants" that are reflected in the thematic role terminology, so the Theme, Goal and Source roles will naturally be applicable to any sentences denoting such events. But Gruber's analysis is still of limited interest if it is relevant only to this class of sentences. So the next step in his argument is to show that sentences denoting other kinds of events may fruitfully be analyzed with the same thematic roles. (Jackendoff (1983) calls this position the "Thematic Relations Hypothesis".)

For this extension of the analysis to be viable, it is necessary that the roles Theme, Source, and Goal be allowed to denote very abstract kinds of "locations". Consider the sentences in (1.2).

- (1.2) a Helga sold a cottage to Herman.  
b Herman bought a cottage from Helga.

Again, the (a) and (b) sentences are paraphrases of each other. Given the analysis of paraphrase relations developed for the (1.1) sentences, this means that the same thematic roles are assigned to

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<sup>2</sup>We assume, with Jackendoff (1987) and others, that the "agentive" properties of the subjects are to be explained by mechanisms distinct from those of the 'real' theta-roles, like Theme, Goal, etc.

Helga, Herman and the cottage in (1.2a) and in (1.2b). Under the assumption that the same thematic roles are used in (1.2), as in (1.1), the thematic roles assigned must again be Theme, Source and Goal, for cottage, Helga, and Herman, respectively.

But there is clearly no real movement of the cottage in the (1.2) events. Nor can Helga or Herman be said to be real "locations" of the Theme in any simple (physical) sense. But Gruber maintains that the conceptual notions of "movement" and "location" may be extended (like metaphors) to events like these. More precisely, he proposes that there exist a number of "semantic fields" across which the thematic roles are given semantic content. Each thematic role has its own characteristic properties, which are invariant as far as the syntactic component is concerned, but the semantic interpretation of the thematic roles varies according to the semantic field in which it is interpreted. While Theme, Goal, and Source roles are assigned for any semantic field by verbs associated with it, the "real world" semantics associated with the various thematic roles will be determined by the field itself. Thus thematic roles serve as a bridge between semantics and syntax. Jackendoff (1983) isolates the following set of semantic fields: *Positional*, *Circumstantial*, *Temporal*, *Possessional*, *Identificational*, and *Existential*. Examples of some of these fields appear in (1.3)-(1.7), respectively.

- (1.3) The raft floated from Labrador to Newfoundland  
(Positional)
- (1.4) Luc went from writing sappy sonnets to selling Big  
Macs. (Circumstantial)
- (1.5) The meeting lasted from noon to midnight.  
(Temporal)
- (1.6) The estate traditionally passes from father to  
daughter (Possessional)

The "semantic fields" will play an important part in the argument developed in chapter 4, so it is essential to understand their status in the thematic relations model. The role which "semantic fields" can be said to play in the grammar as a whole is difficult to determine in Gruber's model, based as it is in a Generative Semantics framework. We shall therefore confine our discussion to the interpretation Jackendoff assigns to them: "[he]... is inclined to think of thematic structure not as spatial metaphor but as an abstract organization that can be applied with suitable specialization to any field." (1983: 210) The thematic relations can be "shifted" from one field to another, so that the properties associated with any thematic role or thematic relation will be realized across the set of semantic fields.

It is important to understand that it is not necessary for Gruber's account of paraphrase relations that there be a set of thematic roles which are expressed in every semantic field. In (1.2), for example, it is possible to maintain his explanation by assigning a completely new set of thematic roles to the arguments of sell and buy--let us say, First Owner to Helga, Last Owner to Herman, and Owned Thing to cottage. *As long as the same referents bear the same roles in both sentences, (1.2a) and (1.2b) will qualify as paraphrases.* This condition can be satisfied even in a theory which allows an unlimited inventory of thematic roles.

### *1.2 Evidence for the cross-field applicability of thematic roles*

Jackendoff (1972, 1976, 1983, 1987) recognizes this problem in Gruber's theory, yet he wishes to maintain the idea that the same

thematic roles are found across fields. He provides two supporting arguments in favor of this position. We shall examine each in turn.

### 1.2.1 *Thematic relations and control*

The first of Jackendoff's arguments (1972:214) concerns constructions of obligatory control. In sentences like (1.7)-(1.8), the controller for the infinitival complement is determined by the thematic roles assigned to the various NPs.

- (1.7) a Hagar got to London  
 b Hagar got to do the dishes.
- (1.8) a Helga got Hagar to London.  
 b Helga got Hagar to do the dishes.

The (a) sentences show which NP the Theme theta-role is assigned to in the respective contexts in (1.7)-(1.8). In both cases, Theme is assigned to Hagar. And in the (b) sentences, Hagar is the controller in both cases, although it is subject in (1.7) and object in (1.8).

Jackendoff concludes that the verb get has the property of identifying the Theme argument as the controller for infinitival complements.

Additional evidence for the idea that thematic roles are involved in control is provided by the sentences in (1.9).

- (1.9) a Helga gave [NP instructions [ PRO to say she had left town ] ] to her concierge .  
 b Her concierge got [NP instructions [ PRO to say she had left town ] ] from Helga.

In both (1.9a) and (1.9b), the concierge is the controller for the PRO subject of the infinitival complement. Once again, the control relation cannot be determined on strictly structural grounds, because the syntactic structures of the two sentences are identical. The control relation must therefore be determined by referring to

the thematic roles assigned to the possible controller arguments. In the (1.9) sentences, the nominal instructions defines the Goal as the controller. The Theme role is assigned to the complex NP instructions to say ..., the Goal role is assigned to the concierge, and the Source role is assigned to Helga. The correct control relation follows.

Jackendoff believes that this account of control provides support for the TRH. He is mistaken. The analysis shows quite clearly that the semantic roles assigned to arguments are involved in control relations. But the same facts may be obtained even if each semantic role is unique to the semantic field in which it is interpreted. What the argument does show is simply that lexical semantic relations are somehow implicated in control relations. The thematic analysis is one elegant way to express the relation between semantics and control, but there may be other ways.

### 1.2.2 *Rules of inference*

The other kind of evidence offered in support of the Thematic Relations Hypothesis involves rules of logical implication. Jackendoff claims that "...one of the requisites of an adequate semantic theory is that it provide an account of entailment between sentences." (1976:110) He shows that a theory involving thematic relations generalized across fields is able to provide an elegant account of entailment relations like (1.10).

- (1.10) "José left beer in the fridge" is true at some time  $t$ , and false at any point preceding  $t$ , then "there is beer in the fridge" is true at time  $t$ .

In order to present Jackendoff's account of entailment, we must first introduce his particular model of thematic relations, which is different from Gruber's original model in several respects.

First, Jackendoff emphasizes that thematic role labels on a syntactic "argument" are nothing more than a convenient "shorthand" for the association of that argument with a slot in the predicate-argument structure (PAS) associated with its syntactic predicate. A PAS is a kind of semantic marker, in the sense of Katz and Fodor (1963). Jackendoff defines them as: "...functions of one or more variables  $x_1, \dots, x_n$ . These markers enter into the second kind of combination, 'functional composition', in which a semantic marker  $M$  [associated with a syntactic argument--PB ] takes the place of one of the variables  $x_i$  of the semantic function  $F(x_1, \dots, x_n)$  to form a new marker  $F(x_1, \dots, x_{i-1}, M, \dots, x_n)$ . ... Verbs are the archetypical semantic functions, ..." (1976:92).

Returning to the sentence (1.1a) for illustration, we would associate the PAS (1.11) with the verb send.

(1.1) a Helga sent a postcard to Herman.

(1.11) [Event GO ( [  $x$  ], [Path [Path FROM [  $y$  ] ] [Path TO [  $z$  ] ] ) ]

The PAS (1.11) is the linguistically significant part of the "meaning" of send. The various "arguments" of send are associated one by one with the variables in the PAS (1.11): postcard with  $x$ , Helga with  $y$ , and Herman with  $z$ . (This association is equivalent to the "assignment" of thematic roles in the GB terminology.) The end result of the association of syntactic arguments with PAS slots is the composition of a complete thematic representation, shown as (1.12).

(1.12) [Event GO ([Thing POSTCARD ], [Path [Path FROM [ HELGA ] ] [Path TO [ HERMAN ] ] ) ]

In Jackendoff's model, the thematic representation (1.12) is a fully interpreted semantic representation. It is representations of this sort which are mapped onto "reality" by the various sensory faculties.

The main advantage Jackendoff's formulation has over the more primitive Gruberian model is that it is clear how to relate syntactic constituents and relations to elements of the semantic representation. Jackendoff explicitly claims that every syntactic maximal projection corresponds to a primitive semantic category, and every  $X^0$  predicate corresponds to a semantic PAS.

The set of possible semantic structures is further limited by a set of innate formation rules of "conceptual structure" (which look like PS rules for the semantic component). Such rules are given in (1.13) (Jackendoff's (1987: 375) (10)).

(1.13) a PLACE  $\rightarrow$  [<sub>Place</sub> PLACE-FUNCTION (THING)]

b PATH  $\rightarrow$  [<sub>Path</sub> { TO  
FROM  
AWAY-FROM  
VIA } ( { THING }  
{ PLACE } )]

c EVENT  $\rightarrow$  { [Event GO (THING, PATH)]  
[Event STAY (THING, PLACE)] }

d STATE  $\rightarrow$  { [State BE (THING, PLACE)]  
[State ORIENT (THING, PATH)] }

Our concern is largely with the (a)-(c) rules. A "Theme" thematic role stands for the THING argument slot in rule (1.13c). "Goals" and "Sources" are the THINGS and PLACES which (1.13b) posits as arguments to the 'path-functions TO and FROM, respectively.

The TRH is interpreted in Jackendoff's theory as a claim that the "formation rules" apply generally across semantic fields. Thus the sentences (1.3)-(1.7) (repeated as (1.14a)-(1-17a)) are assigned the thematic representations (b) indicated.

- (1.14) a The raft floated from Labrador to Newfoundland  
(Positional)  
b [Event GO ( [Thing RAFT ], [Path [Path FROM ([Place LABRADOR ] [Path TO ([Place NEWFOUNDLAND ])] ] ] ] ]
- (1.15) a Luc went from writing sappy sonnets to selling  
Big Macs. (Circumstantial)  
b [Event GO ( [Thing LUC ], [Path [Path FROM ([Place WRITING SONNETS ] [Path TO ([Place SELLING GARBAGE ])] ] ] ] ]
- (1.16) a The meeting lasted from noon to midnight.  
(Temporal)  
b [Event GO ( [Thing MEETING ], [Path [Path FROM ([Place NOON ] [Path TO ([Place MIDNIGHT ])] ] ] ] ]
- (1.17) a The estate traditionally passes from father to  
daughter (Possessional)  
b [Event GO ( [Thing ESTATE ], [Path [Path FROM ([Place FATHER ] [Path TO ([Place DAUGHTER ])] ] ] ] ]

Jackendoff's argument is that inference rules can be defined over semantic representations such as the (b) parts of (1.14)-(1.17). From the sentence (1.14a), it is legitimate to infer the truth of a proposition (1.18),

- (1.18) After this happened, the raft was at Newfoundland.

so Jackendoff (1987) proposes the inference rule (1.19) (his (15)).

- (1.19) For an Event of the form  
[Event GO ( X, [Path TO (Y)] )],  
there is a point in time  $t$ , the termination of the  
Event. At  $t$ , the following holds:  
[State BE ( X, [Path AT (Y)] )];

and for some interval of time leading up to but not including  $t$ ,  
 NOT [State BE ( X, [Path AT (Y)])].

By mechanically applying (1.19) to (1.14b), we derive the following inferences (1.20),

- (1.20) There is a point in time  $t$ , the termination of the Event. At  $t$ , the following holds:  
 [State BE ([Thing RAFT ], [Path AT ([Place NEWFOUNDLAND ])]);  
 and for some interval of time leading up to but not including  $t$ ,  
 NOT [State BE ([Thing RAFT ], [Path AT ([Place NEWFOUNDLAND ])]).

which is the thematic representation for (1.18). Application of the same inference rule to the other sentences (1.15)-(1.17) produces similar valid inferences across semantic fields. Jackendoff takes the success of this approach to inference as support for the TRH, because the inference rule (1.19) is formed on the basis of thematic relations which make no reference to "semantic field" specifications.

The particular formalization of the thematic relations theory is not crucial to Jackendoff's point here. What is important is to recognize that rules of inference require access to a semantic representation which has the property of isolating the "thematic" information located in the representation of "Themes" and "Goals" from the "interpretive" information relegated to semantic fields. As the thematic representations developed on the basis of Gruber's arguments do have this property, it is legitimate to take the inference relations discussed as confirmation of the Thematic Relations Hypothesis.

#### *1.4 How to test the Thematic Relations Hypothesis*

The Thematic Relations Hypothesis can be interpreted in a number of ways. In its strongest form, it should claim that "semantic field" information is not relevant to the grammar at any point. Then we should not find any constructions in which the difference between one semantic field or the other determines either its syntactic properties or any semantic regularities, outside of the simple intuitive distinction between e.g. Possession and Location. To our knowledge, no one has attempted to defend an interpretation this strong, so we shall not discuss it further.

A slightly weaker form of the TRH might admit the relevance of "semantic fields" to the semantic component, or even to the functions which map syntactic structures onto semantic representations. This seems to correspond to the actual claims made by both GB theory (cf. Chomsky (1981, 1986)) and Jackendoff (1983,1987). It is not specified in Jackendoff's formulation precisely what the status of semantic field specifications are with respect to the grammar as a whole. What is clear in this model, as in other thematic relations models, is that the semantic fields are subordinated to the thematic relations inasmuch as they determine the syntax-semantics mapping. (This is implicitly indicated by Jackendoff's formalism, which includes semantic fields in the semantic representation only as subscripted annotations to "event-functions".)

Semantic fields seem sometimes to determine the correspondence between arguments of a given syntactic category and their semantic counterparts. The clearest example of this involves the distinction between (1.2i) and (1.22).

- (1.21) Helga sent a parcel to Whitehorse.  
 (1.22) Helga sent her lover a parcel.

In the first case (1.21), the "Goal" argument in the semantic representation is mapped onto a syntactic NP. In the second case, the semantic "Goal" is linked to a syntactic PP. As a rough generalization, we may say that Goal arguments may be linked to NPs if and only if the PAS is interpreted in the "Possession" semantic field, as it is in (1.22). When the thematic relation is interpreted in the "Positional" field, it must be linked to a syntactic PP<sup>3</sup>. But this interpretation of the TRH may still bar "semantic fields" from the syntactic component. It is then predicted that there will be no areas of "pure" syntax, such as Case theory or the Binding theory, in which the distinction between one semantic field or another makes a difference to the syntactic properties of a construction.

The weakest possible interpretation of the TRH would admit "semantic fields" to every component of the grammar. Then "semantic fields" might determine both syntactic and semantic properties of a sentence.

Note that this last, weak, interpretation is tantamount to admitting that the TRH is largely false. If the only areas of the grammar to which semantic fields are not relevant are those involved in control theory and the derivation of logical inferences, the status of the TRH as a core principle of lexical semantic theory is called into question. In fact, if the "weak interpretation" were

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<sup>3</sup> Jackendoff (1983) and Marantz (1984) discuss exceptions to this rule which involve lexical items like home in (i).

(i) Misha sent his lover home.

In this sentence, the Goal thematic role in a Positional semantic field is linked to an NP rather than to a PP.

proved accurate, it would seem necessary to seek to reformulate the foundations of the thematic relations model.

In the next two chapters, we will show that the weak interpretation is, in fact, accurate. The semantic fields of Existence and Possession are shown to determine "purely syntactic" properties of the grammar. This conclusion will lead us, in chapter 4, to attempt a re-evaluation of the thematic relations theory.

## 2. Existence

### 2.1 The "existential" field

The most telling evidence that semantic "fields" must be visible to the syntactic component comes from constructions involving the "existential" field. In Jackendoff (1983), it is shown that sentences which state the *existence* of an object can be classified along the same lines as sentences which assert *location*, *circumstance*, *identity*, *possession*, etc. As such, the existential "semantic field" provides predicates which express STATES and EVENTS, the latter of which contain both GO and STAY event-types.<sup>4</sup> Examples appear in (2.1)-(2.3).

- (2.1) a. There is a Loch Ness monster.  
b. [State BEEexist ([Thing MONSTER ])]
- (2.2) a. A witch appeared.  
b. [State GOExist ([Person WITCH ])]
- (2.3) a. The problem remained.  
b. [State STAYExist ([Thing PROBLEM ])]

The same inference algorithms operate in the existential field as elsewhere. Using the inference rule (1.18), it is possible to infer (2.4) and (2.5) from (2.2), and from (2.3), (2.6) and (2.7) can be concluded.

- (2.4) After this happened, there was a witch.
- (2.5) Before this happened, there was no witch.
- (2.6) At this time, there was a problem.
- (2.7) Before this time, there was a problem.

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<sup>4</sup> In Jackendoff's (1983:202) terms, the existential field is a "degenerate field". Only the Theme thematic role is realized in the existential field; Goal's and Source's have no interpretation.

## 2.2 The thematic representation of "creation" events

Jackendoff mentions "creation" events only in passing (1983:202), but it is evident that these events, too, should be analyzed as involving the existential field. Events involving "creation" bear the same relation to (unaccusative) existential events like (2.2) as a *caused* event like (2.8) bears to its unaccusative counterpart (2.9).

- (2.8) a. Helga sent a parcel to Whitehorse.  
 b. [Event CAUSE ([Person HELGA ], [Event GOLocation ([Thing PARCEL ], [Path TO WHITEHORSE ])))]
- (2.9) a. The parcel traveled to Whitehorse.  
 b. [Event GOLocation ([Thing PARCEL ], [Path TO WHITEHORSE ])]

Like (2.8), creation events have an Agent subject and an accusative Theme object. We see this in (2.10)-(2.12).

- (2.10) Louise built a remarkable log house.  
 (2.11) Harold writes too many autobiographies.  
 (2.12) You-know-who constructed the framework for modern linguistic theory.

Like (2.2), (2.10) carries two implications: (2.13) and (2.14).

- (2.13) Afterwards, there was a remarkable log house.  
 (2.14) Before this happened, there was no such log house.

If creation events do not involve the existential field, then there is no apparent explanation for the fact that the same inference algorithms apply to both existential and creation events. We will assume, therefore, that the correct analysis does identify the two event-types.

As observed by Grimshaw (1988) and Safir (1987), many verbs head sentences which are ambiguous between interpretation

as creation or affect events. These two interpretations are sometimes referred to as the "effectum" and "affectum" readings. Sentence (2.15), for example has the two approximate readings (2.16) and (2.17).

- (2.15) Barry baked a complicated casserole.
- (2.16) There was a complicated casserole already largely prepared and Barry stuck it in the oven to finish its preparation by baking it.
- (2.17) Barry created a complicated casserole by means of an act which involved a baking event.

Such a sentence can be disambiguated in a number of ways. The affect reading is generally compatible with an "activity" aspectual type, while the creation reading must be an "accomplishment". So the affect reading can be forced by the addition of a duration adverbial phrase to the sentence, as is shown in (2.18).

- (2.18) Barry baked a complicated casserole for twenty minutes.

The creation reading, on the other hand, can be forced by adding a Benefactive "argument" to the sentence in a double object construction like those in (2.19)-(2.21).

- (2.19) Barry baked his guests a complicated soufflé.
- (2.20) Helga drew her lover a map to the cabin site.
- (2.21) Spiderman smashed himself a way out of the dungeon.

These sentences have only the creation reading. If a double object construction involving this kind of verb is combined with a duration adverbial phrase, the sentence should be uninterpretable and ungrammatical. Sentences (2.22)-(2.23) show that this prediction is correct.

- (2.22) \* Barry baked his guests a complicated soufflé for twenty minutes.

- (2.23) \* Spiderman smashed himself a way out of the  
dungeon for five minutes.

The question which we want to address at this point is: why is it that the double object construction forces the creation event interpretation? There is no semantic condition against the combination of a Benefactive "argument" with an affect event, as can be seen from (2.24).

- (2.24) Barry baked a complicated casserole for his guests.

So the answer must involve the syntactic expression of this concept. In other words, there is something about the syntactic properties of the double object construction which is compatible only with the creation event reading.

We will show that Case theory is the area of syntax involved in this problem. Both NPs in a sentence like (2.19) must be assigned Case in order to satisfy the Case filter (or the Visibility principle). The initial NP--the Benefactive, his guests--is in the right position to be assigned structural Case by the verb bake. The second NP, a complicated casserole, is not. Following Massam (1986), we conclude that the second NP in an English double object construction must be assigned inherent Case.

The core property of inherent Case is that it is universally assigned to an argument in association with the assignment of a particular theta-role by the Case-assigning predicate. Thus inherent Case is never assigned to an NP which is not an argument of the Case-assigning verb. This is why the subjects of small clauses and exceptionally Case-marked infinitival clauses must be assigned structural Case (Massam 1986).

So consider sentence (2.19). If a complicated casserole is assigned inherent Case by the verb bake, it must also be assigned the particular theta-role associated with inherent Case. Under a thematic analysis, this must be the Theme role. We may then expect Themes to be assigned inherent Case generally in English. But sentences like (2.25a)-(2.27a) indicate that this is not the case.

- (2.25) a. \* Helga put her lover a snake in the bedroom.  
 b. Helga put a snake in the bedroom for her lover.
- (2.26) a. \* Herman carved his daughter a tree stump into a foot stool.  
 b. Herman carved a tree stump into a foot stool for his daughter.
- (2.27) a. \* Lucie moved her patient her operation to Friday.  
 b. ~~Lucie~~ moved her operation to Friday for her patient.

The facts seem to indicate that Themes are in fact assigned inherent Case only when they appear in either the possession semantic field or the existential field. (We discuss the possession field in the next chapter.) So (2.19)-(2.21) and (2.28)-(2.30) are acceptable.

- (2.28) Luke tried to sell me a garbage motorbike.  
 (2.28) Pass, grandma the Brussels sprouts, eh?  
 (2.30) Helga's lover gave her a Mondrian painting.

If this is an accurate generalization, it shows that the identities of the semantic fields of Possession and Existence must be visible to the syntactic component at the point at which inherent Case is determined. (The *source* of the creation reading cannot be the verb bake, as the verb does not in any way imply creation. We propose an explanation for the licensing of this possible interpretation of complements in chapter 4.)

The hypothesis that existential Themes are assigned inherent Case explains the association of creation readings with double object constructions. The Theme of a creation event appears in the existential field, so it may be assigned inherent Case. Therefore the Benefactive NP is at liberty to occupy the position adjacent to the verb in order to usurp the structural Case. The object of an affect verb--i.e. a Patient--is not assigned inherent Case, so it must remain in the position to which structural Case is assigned. Any Benefactive NP in an affect VP must consequently acquire its Case-marking elsewhere--in particular from the preposition for.

### 2.3 Complements to "perception" verbs

It seems to be the rule for most languages that when a verb or other  $X^0$  predicate selects a clausal complement, this complement is generally realized as a syntactic S' category. The reason for this pattern is still not well understood, but to our eyes, the most plausible explanation follows the general program which--by some mechanism or another--associates the presence of the complementizer with the semantic realization of Tense features. This is the view of Stowell (1982), Safir (1982), and Pesetsky (1982), all of who postulate a movement transformation of Infl-to-Comp (at LF). Stowell provides perhaps the strongest argument for this idea by showing that the occurrence of "S'-deletion" effects coincide with the absence of "unrealized, future tense" readings in infinitival complements.

Small clause constructions, which constitute the main class of exceptions to the correspondence of S' to <propositions>, provide a measure of support for the explanation in terms of Tense realization conditions. Small clauses are not instances of S'; they are

projections of the syntactic category of the head of their (XP) predicate (cf. Stowell (1983), Chomsky (1986b))<sup>5</sup>. As well, small clauses lack both complementizers and tense inflection. The simultaneous absence of complementizer and Tense features should not be taken as accidental. It appears, therefore, that we may make the tentative generalization that Tense features may not be syntactically expressed in the absence of a (local) complementizer<sup>6</sup>.

The lack of Tense features in small clauses can be held accountable for one important restriction on their predicates: *to wit*, the predicate may not be headed by an active verb. This constraint is illustrated by the (2.36) sentences.

- (2.36) a Helga believes [AP her lover ambitious ]  
 b Helga believes [VP her lover overworked *e* by her boss ]  
 c \* Helga believes [AP her lover work too much ]
- (2.37) a Herman considered [AP Yumiko rich ]  
 b Herman considered [VP Yumiko seduced *e* by the social climbers ]  
 c \* Herman considered [VP Yumiko lack self-confidence ]

The most natural explanation for the ungrammatical status of the (c) sentences is that the active verb in the small clause predicates requires Tense features to be locally accessible for some reason.

The next question is, of course: why does the verb need access to Tense? And this question dovetails with another question which arises from our account of the grammatical pairing of S' categories

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<sup>5</sup> In the standard GB analysis. My analysis is, of course, incompatible with those analyses which treat small clauses as instances of S or S'.

<sup>6</sup> I am ignoring the problem that "S-bar deletion" constructions pose for this idea. The "S-bar deletion" construction is a highly marked case cross-linguistically, and it is something for which no complete analysis has been developed, to my knowledge.

with <propositions>--why do propositions in general require Tense to be realized?

In order to develop an answer to these questions, it is necessary to consider a small class of constructions in English which violate the small clause pattern. This is the much-discussed construction involving non-tensed clausal complements to verbs of "perception" and "causation", as appear in (2.38).

- (2.38) a Helga heard [vp me shoot the sheriff ].  
 b Everyone watched [vp the deputy laugh ].  
 c The townsfolk let [vp him murder my granny ].

Following Higginbotham (1982), we take the complement to the matrix verbs in (2.38) to form a small clause. Not only does the pair NP + VP form a single semantic (propositional) constituent, but the VP in such a construction may be licensed by a pleonastic element, as in (2.39).

- (2.39) a Did you hear [vp it rain ] last night?  
 b Herman would never let [vp there be a poker party ]  
 without his joining in.

The function of pleonastic elements like it and there is simply to license clausal predicates (Rothstein (1983)), so the complement in this construction must clearly be clausal. And if it is clausal, it can only be a small clause.

Higginbotham discusses a peculiar complex of properties which hold of the "naked infinitive" (NI) complement in this construction. Two of these properties, which Higginbotham takes from Barwise (1981), are: *Veridicality* and *Lack of Scope Ambiguity of Quantifiers*.

Veridicality refers to the fact that the truth value of an NI complement is always the same as that of its matrix clause. Taking (2.38a) as an example: if it is true that "Helga heard me shoot the sheriff", then it is necessarily also true that "I shot the sheriff". This property does not hold of normal S' complements to the same verbs. Take a sentence like (2.39).

(2.39) Helga heard [S' that I shot the sheriff ]

It does not follow from the truth of (2.39) that "I shot the sheriff".

The Lack of Scope Ambiguity of Quantifiers property supplements Veridicality so that: "...all conditionals of the sort of (i) are true:

- (i) If John sees somebody leave, then there is somebody whom John sees leave." (Higginbotham (1982: 105).

Higginbotham proposes an analysis of this construction which crucially involves the interpretation of the NI complements as *events* over which there is *existential quantification*. His proposal entails treating (2.40) as the logical translation of (2.38).

(2.40)  $\exists x: x \text{ is an event \& } x = (\text{I shoot the sheriff}) \& \text{ Helga saw } x$

The properties of Veridicality and the Lack of Scope Ambiguity of Quantifiers can now be derived from simple predicate logic. Veridicality becomes a case of the general logical truth (2.41).

(2.41)  $\exists x: P(x) \& A \supset \exists x, P(x)$

When we apply the Veridicality formula (2.41) to (2.40), we derive the entailment we want with respect to (2.38), as can be seen in (2.42).

$$(2.42) \quad (\exists x: x \text{ is an event} \ \& \ x = (\text{I shoot the sheriff}) \ \& \ \text{Helga saw } x) \supset (\exists x, x \text{ is an event} \ \& \ x = (\text{I shoot the sheriff}))$$

Similarly, the logical translation (b) of the sentence (a) in (2.43) allows us to derive the entailment (d) via the lambda-abstraction transformation (c).

- (2.43) a Helga saw somebody shoot the sheriff.  
 b  $\exists x: x$  is an event and  $x = (\exists y: \text{person } (y), y \text{ shoot the sheriff}) \ \& \ \text{Helga saw } x$   
 c  $\exists z, \lambda y (\exists x: x \text{ is an event} \ \& \ x = (\exists y: \text{person } (y), y \text{ shoot the sheriff}) \ \& \ \text{Helga saw } x) (z)$   
 d There is somebody whom Helga saw shoot the sheriff.

Higginbotham has a number of other arguments to support his analysis, but as the details are not specifically relevant to the discussion at hand, we refer the reader to his text. We adopt his general idea without further explication.

Higginbotham's analysis is deficient in one point. He fails to develop a convincing account of the source of the existential quantification over the NI clause event. He proposes only that the "apparently clausal structure" of the NI complement be interpreted as "the restricted existential quantifier" (107). Higginbotham's own argument from pleonastic subjects is enough to render this explanation unlikely. Like other clauses, the component maximal projections of NI complements must be licensed by the predication relation, and it is this predication relation which is the motivation for the NI "clausal structure". If any non-lexical (semantic or

syntactic) relation is to be associated with the "apparently clausal structure" of the NI complement, it is clearly the predication relation which has the first claim. Moreover, if "clausal structures" were to be associated with existential quantification generally, we would expect to find similar "existential quantification effects" with small clause constructions. No such effects are in fact found, as we see in considering sentences like (2.44)-(2.45).

(2.44) Helga's lover considers [SC her rich ].

(2.45) Hagar believes [SC some castle stormed last night ]

It is not valid to infer from (2.44) the proposition that "Helga is rich". So Veridicality fails. And the Lack of Scope Ambiguity of Quantifiers property is absent as well; we cannot infer from (2.45) that "there is some castle that Hagar believes stormed last night".

Our solution to this flaw in Higginbotham's argument is obvious enough. We will simply equate the "existential quantification" in perception verb complements with the assignment of an "existential Theme" to the object of such a verb. Then the effects which Higginbotham observes become a consequence of the particular "thematic role" assigned to the object clause.

If the "existential Theme" role is assigned to NI complements, the same role is presumably assigned to the other classes of complement to perception verbs. In particular, this role should be assigned to direct object NPs. And in that case, we predict that inherent Case should be assigned to Theme objects of these verbs, so the double object construction should be possible. This prediction seems to be confirmed in (2.46).

(2.46) a I saw me a woodpecker this mornin'.

- b Granny went and heard herself a Def Leopard concert.

Such sentences are typical of caricature of "hillbilly" speech, but they do seem to be grammatical. And although "hillbilly" speech is not our dialect, we accept (2.46) and reject the sentences in (2.47).

- (2.47) a \* I saw me [ my brother shoot the sheriff ] this mornin'.  
 b \* Granny went and heard herself [ Def Leopard sing some tunes ].

The ungrammaticality of the (2.47) sentences follow from the way Case is assigned. The subject of a small clause must be assigned structural Case, but the second object in double object constructions is only assigned inherent Case. So there is no way for the subjects of the NI complements in (2.47) to receive Case.

### 3. Possession

#### 3.1 Possession and English double object constructions

The existential relation is only one of two semantic fields which license the double object construction in English. More commonly, the double object construction expresses a relation of possession, as illustrated in (3.1)-(3.4).

- (3.1) a. Helga gave her lover a new motorcycle.  
 b. Helga's lover has a new motorcycle.  
 c. [Event CAUSE ([ HELGA ], [Event GO<sub>Poss.</sub> ([MOTORCYCLE], [LOVER])])]
- (3.2) a. The last election gave the Tories a ridiculous majority.  
 b. The Tories have a ridiculous majority.  
 c. [Event CAUSE ([ ELECTION ], [Event GO<sub>Poss.</sub> ([MAJORITY], [TORIES])])]
- (3.3) a. Louis slapped his center the puck.  
 b. The center has the puck.  
 c. [Event CAUSE ([ LOUIS ], [Event GO<sub>Poss.</sub> ([PUCK], [CENTER])])]
- (3.4) a. Her cold gave Marie a headache and sniffles.  
 b. Marie has a headache and sniffles.  
 c. [Event CAUSE ([ COLD ], [Event GO<sub>Poss.</sub> ([ HEADACHE ], [ MARIE ])])]

From the (a) sentences in (3.1)-(3.4), with their respective (b) thematic representations, it is possible to validly infer the propositions (b). Therefore, Jackendoff's model necessarily ascribes to the (a) sentences the thematic representations given as (c).

Given the analysis of the double object construction developed in chapter 2, there is only one way to account for the sentences (3.1a)-(3.4a). Just like verbs of creation, verbs which lead to a state

of possession must assign inherent case to the second object. As inherent Case assignment in creation sentences was seen to be assigned only to a Theme argument in the *existential* semantic field, in the *possession* event sentences, inherent Case must be associated with the Theme in the semantic field of *possession*.

### 3.2 French epistemic dative constructions

Ruwet (1982) discusses a construction in French which shares many of the properties of small clauses: the "epistemic dative" construction. Epistemic datives appear as complements in VP in (3.12)-(3.14).

(3.12) Le mari de Helga croyait un amant à sa femme.

(3.13) On lui aurait imaginé beaucoup d'argent.

(3.14) J'ai découvert un excès de lâcheté à mon jeune époux.

As the name suggests the epistemic dative contains a 'dative NP' and it expresses a (stative) proposition.

Ruwet demonstrates a number of similarities between this construction and the small clause construction. The verbs that select predicative small clauses by-and-large select epistemic small clauses as well. Like small clauses, epistemic datives are interpreted as semantic "propositions" selected as an argument by the governing verb. The interpretation of an ED proposition, like that of a small clause, is that some property is predicated of a single argument: the "subject". The à NP phrase is interpreted as the semantic subject--about which something is being asserted--and the direct object NP is interpreted as a non-specific type, the possession of which is a property of the "subject". Significant, too, is

the fact that the direct object NP in this construction must refer to a sort of "natural predicate."

The "subject" of an epistemic dative is responsible for Specified Subject effects on its "property", as illustrated in (3.15)-(62).

- (3.15) a. Michelle leur a trouvé un intérêt l'un pour l'autre.  
 b. \* Ils lui ont trouvé un intérêt l'un pour l'autre.
- (3.16) a. On croyait une maitresse dans chaque port à ce marin.  
 b. \* Une maitresse dans chaque port a été crue e à ce marin.

Given the degree of parallelism between EDs and small clauses, it is apparent that the theoretical analysis of small clause constructions will have significant consequences for the analysis of EDs, as well.

We adopt the analysis of small clauses suggested and implicit in Chomsky (1986a,1986b). Small clauses are formed (at D-structure) by the adjunction of a subject to the maximal-projection of a predicate. The adjunction structure is licensed by the syntactic relation of predication holding between subject and predicate (Branigan 1987). The subject of a small clause is governed by the verb which s-selects the small clause <proposition>, so it is assigned structural Case. The presence of a subject local to the small clause predicate triggers "specified subject" effects within the small clause, so we must say that the small clause is a governing category for an anaphor or pronominal in the predicate.

Under Chomsky's (1986) formulation, the Binding theory makes reference to the Complete Functional Complex of the predicate which (minimally) governs an anaphor or pronominal. In rough terms, Chomsky's (1981) notion of a "governing category" is reformulated as "...the least CFC containing a governor of  $\alpha$ ...." The

CFC (for any given predicate) is the minimal maximal projection in which are contained the set of arguments to which the roles in its theta-grid are discharged<sup>7</sup>. These include the various arguments governed and s-selected by the predicate itself and the external argument(s). An external argument typically licenses and is licensed by the maximal projection headed by its predicate, under the syntactic relation of predication (Rothstein (1983)).

Note that the external argument is unique among arguments by virtue of bearing two semantico-syntactic relations to its predicate. It is assigned a theta-role by the predicate and it is the *subject* of the predicate phrase. It is then possible to ask whether it is the theta relation or the predication relation which is involved in mediating the external arguments inclusion in the CFC of its predicate.

Simple tests with pleonastic subjects show that it is the predication relation which is relevant.

- (3.17) Keith thought it clear to him/\*himself how to improve the song.
- (3.18) Mick and his partner considered it time for them/\*each other to take a vacation.
- (3.19) The band believes there to be pictures of them/??themselves in the morning paper

Pleonastic elements, such as it in (3.17)-(3.18) and there in (3.19), are assigned no theta-roles. Their grammatical function is simply to license a predicate phrase (Rothstein (1983)). Nonetheless, pleonastics trigger "specified subject" effects, so they must qualify as part of the CFC associated with the head of their predicates. We conclude that it is the predication relation which determines the

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<sup>7</sup> But cf. Giorgi (1987), who uses evidence from Italian NPs to show that CFCs may be non-maximal projections.

Binding theory status of external arguments.<sup>8</sup> Furthermore, it seems to be the case that the relation which licenses an argument is the relation which determines its role in the Binding theory.

The concrete realization of this view of the Binding theory with respect to small clauses can be illustrated with the sentence (3.20).

(3.20) Everyone believes [AP [NP Michel] [AP proud of himself] ].

The verb believe s-selects <proposition> complements, so it licenses the maximal AP node in (3.20). The two elements of the small clause, NP Michel and AP proud of himself, are licensed by the predication relation which associates them. Michel is assigned structural Case by the verb believe. The CFC associated with proud is the small clause, which contains the sole internal argument of proud plus the subject. Then the governing category for himself in (3.20) is the maximal AP, in which it must be bound for the sentence to be grammatical.

How far can this analysis be extended to cover the ED construction? Consider the sentence (3.12). The ED complement to croire, un amant à sa femme, is interpreted as a semantic <proposition>, i.e. a single s-selected argument, so the Projection Principle requires that it be represented as a single constituent at all syntactic levels of representation. Then the S-structure of (3.12) must be (3.21).

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<sup>8</sup> This interpretation of the notion of a Complete Functional Complex has the property of rendering Chomsky's (1986) formulation conceptually very similar to Williams' (1980) concept of a Predicate Opacity principle.

(3.21) Le mari de Helga croyait [ $\alpha$  [NP un amant] [ $\beta$  à sa femme ] ].

Now we must decide on the categorial status of  $\alpha$  and  $\beta$  in (3.21). We consider  $\beta$  first. A priori,  $\beta$  could be analysed as either a projection of  $\grave{a}$  or a projection of *sa femme*, i.e. as either PP or NP. As (3.15)-(3.16) show,  $\beta$  will function as a *subject* with respect to the Binding Theory. It is capable both of binding an anaphor inside the object NP and of serving as external argument for the determination of the CFC of the ED. So  $\beta$  must be an NP and  $\grave{a}$  must be a "dummy" Case marker (cf. Rouveret and Vergnaud (1980), Bouchard (1984)).

As for  $\alpha$ , it must be a projection of either the "object" NP or of the dative NP  $\beta$ . Either way, it is an NP. Then the full S-structure of (58) is (3.22).

(3.22) Le mari de Helga croyait [NP [NP un amant] [NP à sa femme ] ].

Of course, discovering the S-structure does no more than lay a foundation for the analysis of the ED construction. A number of questions remain. We know how the ED itself is licensed--it is s-selected as a <proposition>. But it is not yet clear why this is possible, given the lack of an obvious syntactic predicate among the constituents of the ED. The "object" NP in the ED is evidently assigned structural Case by the governing verb. But what is it that enables the dative NP to acquire its dummy Case-marker  $\grave{a}$ ? And what accounts for the semantic interpretation of the ED proposition itself? Where small clauses can be paraphrased by full clauses with the verb be, epistemic datives are paraphrased using the verb have.

So (3.20) is roughly equivalent in meaning to (3.23), while (3.12) is more-or-less synonymous with (3.24).

(3.23) Everyone believes Michel is/to be proud of himself.

(3.24) Le mari de Helga croyait que sa femme avait un  
amant.

Recall that the property which distinguishes small clauses from regular  $\bar{S}$  predicative clauses is the absence of a copula be in the former. With no lexical predicate available, the only way to license the small clause subject and predicate is with a non-lexical licensing relation of predication. The predication relation is only imperfectly linked to a semantic predication relation, as semantically empty pleonastic elements may be required at S-structure to satisfy the demands of syntactic licensing *via* predication (Rothstein (1983)).

The solution we propose for the ED construction extends this analysis along natural lines. The pair of NPs in an ED are also licensed by a non-lexical syntactic licensing relation. But the licensing relation in an ED is a possession relation. Like the predication relation, the possession relation has an imperfect correspondence with the semantic relation of possession. Also like the predication relation, the possession relation isolates external arguments of a head for the determination of CFCs in the Binding theory.

In (3.12), the possession relation licenses the syntactic association of un amant and sa femme as a branching constituent. The entire ED "clause" is mapped onto a semantic <proposition> in which the two arguments of the ED are again associated by a possession relation. Hence, the near synonymy of (3.12) and (3.24).

Disregarding the tense differences, the thematic representation of both must be (3.25).

(3.25) [BE<sub>Poss</sub> ([MARI DE HELGA ], [Proposition BE<sub>Poss</sub> ([ FEMME ], [ AMANT ])))]

As for the source of the dummy à, we suggest that French permits the assignment of inherent dative Case to an argument bearing the role of Goal (or of non-Theme) in the Possessional field. In simpler terms, French allows inherent assignment of dative Case to Possessor arguments.<sup>9</sup> Then the word order in (3.12) follows from Case theory. The ED Theme NP must be adjacent to the governing verb in order to receive Case.

The Binding theory effects in EDs follow from the presence of a non-lexical licensing relation. In small clauses, the subject is associated with the predicate by a predication relation. This relation implicates the subject as an part of the CFC of the predicate, which leads to the proper determination of the governing category as the entire small clause. In the ED, the possession relation has the same effect on the dative NP; it is isolated as the external argument in the CFC associated with the Theme NP. Then the governing category for any anaphor in the complement to the Theme is the ED.

<sup>9</sup> Then the (3.15) sentences are analysed in the following way.

- (3.15) a. Michelle leur a trouvé un intérêt l'un pour l'autre.  
 b. \* Ils lui ont trouvé un intérêt l'un pour l'autre.

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<sup>9</sup>This inherent dative Case assignment seems to be a default case, operative in many languages, cf. van Riemsdijk 1983. It seems likely that this is the same operation of dative Case assumption that takes place in transitive causative constructions, as in (i).

- (i) Ils n'ont pas fait finir sa thèse à Luc.

In both (a) and (b) sentences, the CFC of the Theme un intérêt l'un pour l'autre is the Theme minimal maximal projection itself, plus the adjoined *possessor* : the (cliticized) dative pronouns leur and lui. The adjunction structure is licensed by the non-lexical relation of possession, so the adjoined NP is included in the CFC. This CFC defines the domain in which anaphors must be bound in order to satisfy Binding principle A. The anaphor l'un l'autre is bound in this CFC in (3.15a) but not in (3.15b), so the former is grammatical and the latter is not.

### 3.3 Possession and coindexation: Binding and Control

#### 3.3.1 Possession licensing and binding in NP

The importance of the possession relation for licensing and the Binding theory is not restricted to ED constructions. The possession relation is also centrally implicated in the syntactic properties of NPs with "subjects". Consider a simple NP like (3.26).

(3.26) Laurie's dog.

It is clear that Laurie and dog are in a semantic relation of possession. We have seen in section 3.2 that the possession relation is capable of licensing a subject-"property" pair of arguments. The obvious conclusion is that it is the possession relation which licenses the subject of NP Laurie in (3.26), as well. Then the CFC for the head dog in (3.26) will include the *possessor* Laurie.

We predict thereby that the CFC of any NP with a subject will be the NP itself. Then anaphors in complement position will be

required to be bound within the domain of the subject. This is known to be the case. Examples are given in (3.27)-(3.30)

- (3.27) You have to admire Yoshiko and Harold's love for each other.  
 (3.28) \* Yoshiko and Harold claim to admire your love for each other.  
 (3.29) Everyone enjoys gossip about themselves.  
 (3.30) \* Everyone enjoys your gossip about themselves.

Such an analysis of NP subjects enables us to maintain Williams' (1980) explanation for the exclusion of raising constructions in NP. Williams shows that NPs like (3.31a)-(3.32a) are not possible, even though their sentential counterparts are well-formed.

- (3.31) a. \* [NP Lauren's [N' look healthy ] ]  
           b. [S Lauren looks healthy ]  
 (3.32) a. \* [NP Ivan's [N' likelihood [S t to start singing ] ]  
           b. [S Ivan is likely [S t to start singing ] ]

His explanation for this pattern is that the relation of predication is not licit within an NP. Williams claims that the complement to a raising predicate like look or likely is necessarily the predicate for the subject of the clause. The predicate may be "bare", like healthy in (3.31b), or it may be an infinitival clause with a subject trace, like the complement S in (3.32b). As the predication relation is barred from NP, the (a) phrases are impossible.

Higginbotham (1984) suggests that this property of NPs may follow from the fact that NPs are typically referential, and therefore they may not bear truth values. If the predication relation is necessarily associated with a semantic argument of a <proposition>

type, then the fact that NPs do not allow a predication relation is a natural consequence of properties of the semantic interpretation.

But note that not all predication relations are mapped onto semantic propositions. "Secondary" predicates do not head <propositions>; their interpretative properties are more like those of adverbial phrases (Marantz (1984)). Then if it is indeed the case that the reason the predication relation is excluded from NP is that NPs are not <propositions>, then we should expect to find secondary predicates allowed in NP. Consider (3.33)-(3.35).

- (3.33) a. Luke's mowing of the lawn naked  
 b. Louis mows the lawn naked.  
 (3.34) a. Maria's sale of the combine in good condition  
 b. Maria sold the combine in good condition.

Williams claims that the (a) phrases in (3.33)-(3.34) are unacceptable. Our intuition leads us rather to agree with Safir (1987), who believes that these NPs are grammatical. If so, then Higginbotham's suggested explanation for the exclusion of the predication relation from NPs seems quite plausible.

But while the predication relation is largely illicit inside NPs, the relation of possession is not. And it seems that the possession relation is able to rescue some of the raising construction nominalized forms, as can be seen in (3.35)-(3.37).

- (3.35) a. Helga's appearance of wealth  
 b. Helga appears wealthy.  
 (3.36) a. your daughter's likelihood of success  
 b. Your daughter is likely to succeed.  
 (3.37) a. William's semblance of fatigue  
 b. William seems tired.

The (a) phrases in (3.35)-(3.37) exhibit a semantic relation between the subject of NP and the complement which is very similar to the

relation of predication associating subject and the raising verb complements in the (b) sentences. In both cases, the complement signifies some "property" of the subject. Proceeding along the lines of Grimshaw's (1979) discussion of semantic categories, we can say that the NPs in the complements to the head in the (a) phrases function as "concealed predicates".

But the syntactic relations between the subjects and their "properties" are not the same in the two structures. As the predication relation may not associate two arguments in the NP constructions, it falls to the possession relation to license the association of subject and property.

As for (3.32a), we may say that the problematic relation is not that between a derived subject of NP and its trace, but rather the one between the head of N' and its complement clause. In (3.32a), likelihood needs to be capable of triggering "S bar deletion" effects in its complement CP. Otherwise the trace of the complement clause is separated from its antecedent by both S and S', so the phrase exhibits a subjacency violation (under any analysis). But there is no evidence that nouns can trigger such effects--S-bar deletion seems to be triggered by the [+V] categories V and A alone (Kayne (1984)). Note that appearance and seeming may take CP complements as long as they need not trigger "S'-deletion": (3.38).

- (3.38) a The appearance that all is well is misleading.  
 b It's seeming that church attendance is declining worries few liberals.

Now consider the paradigm: (3.39).

- (3.39) a Helga's abandonment of her lover  
 b Helga's abandonment  
 c her lover's abandonment (by Helga)

In (3.39a), Helga bears the "logical subject" semantic role and her lover bears the "logical object" role. In (3.39b)-(3.39c), the subjects Helga and her lover are necessarily interpreted as the "logical objects". The obvious generalization is that the surface subject of NP may be interpreted as a "logical subject" only if there is a surface object. It is such facts that lead Chomsky (1970), Anderson (1984), and others to conclude that phrases like (3.37b,c) are derived by an application of move-alpha which raises the object argument into surface subject position. Then (3.39b) has the S-structure (3.40).

(3.40) [ Helga;<sub>i</sub>'s [ seduction t<sub>i</sub> ] ]

Williams (1983) challenges this idea on the basis of the analysis we have seen for NPs (3.31)-(3.32). His position is that a trace must be bound (indirectly) by the subject of the predicate which contains it. As there is no predicate in an NP, a trace in NP cannot be properly bound. Therefore, he concludes, the subject of an NP must always be base-generated in subject position.

Under the present analysis, Williams' claim that the predication relation cannot (indirectly) bind traces within NP is no longer relevant<sup>10</sup>. Trace is an anaphoric empty category, so it must be bound in its minimal governing category. We have seen that the governing category in NP is the NP itself if it includes a subject (i.e.

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<sup>10</sup> It is interesting that the analysis in terms of possession is also compatible with a reasonable extension of Williams' own formulation of the Binding theory. Williams requires that a trace be coindexed with the phrase that contains it, which is in turn coindexed with its subject under the predication relation. By allowing the possession relation to coindex *possessor* and *possessum*, a trace in NP would be indirectly bound by the *possessor* subject.

a *possessor* ). In (3.40), the trace of Helga is bound in its governing category, so the phrase is acceptable.

### 3.3.2 Possession and Obligatory Control

Williams (1980) promotes an analysis of obligatory control constructions based on the syntactic relation of predication. The idea is an important one because it solves the problem of how control relations might be acquired by the child--they are simply "piggy-backed" into the grammar on the back of the acquisition, or "grammaticization" in Slobin's terminology, of an innate fundamental concept of cognitive semantics (cf. Jackendoff 1983).

A critical look at Williams' analysis is a good place to begin. His position is that there are a number of constructions involving the control relation which are structurally similar to constructions with the predication relation. Economy demands, then, that the two relations be collapsed, so that a controlled clause becomes some kind of "predicate". Then the PRO that this "predicate" contains is interpreted as a kind of "variable". The clause is an "open sentence"--in the terminology of standard logic --and may be interpreted as a property of a "subject" argument external to it. The following pairs (3.41)-(3.43) illustrate the pattern.

- (3.41) a Joseph left the party [ drunk ]  
       b Joseph left the party [ PRO singing movie tunes ]
- (3.42) a Patti bought her car [ rusted out and bent up ]  
       b Patti bought her car [ PRO to get her to work in  
           comfort ]
- (3.43) a Brian is sometimes [ too obnoxious to tolerate ]  
       b Brian is [ PRO to go home immediately ]

In (3.41a), a predicate adjoined to S is obligatorily predicated of the subject. In (3.41b), a gerundive clause adjoined to S contains

a subject PRO obligatorily controlled by the matrix subject. In (3.42a), a predicate inside VP is predicated of the object. In (3.42b), the purpose clause in VP is controlled by the object. In (3.43), the subject is related to a predicate--in (a)--and an infinitival subject PRO--in (b)--by the copula be.

While Williams is certainly correct in equating the control relation with predication in constructions such as those of (3.41)-(3.43), he attempts to extend the explanation to other cases of control where the theory simply fails. Such is the case in (3.44)-(3.46).

- (3.44) Mark<sub>i</sub> promised Louis [ PRO<sub>i</sub> to take his wife straight home ]
- (3.45) Lev told Pat<sub>i</sub> [ PRO<sub>i</sub> to pick up some celery ]
- (3.46) Susan begged Sarah<sub>i</sub> [ PRO<sub>i</sub> not to throw a surprise party ]

Williams invokes a complex of properties which characterize the predication relation and tries to show that these properties hold of control relations like those in (3.44)-(3.46). The properties are listed in (3.47).

- (3.47) a The controlled clause may not have a lexical subject.
- b The antecedent precedes the controlled clause.
- c The antecedent c-commands the controlled clause.
- d The antecedent is thematically or grammatically uniquely determined.
- e There must be an antecedent.

The problem is that these properties do not all hold for the cases in question. Properties (3.47b)-(3.47d) do; (3.47a) and (3.47e) do not. And the latter are the properties which seem to follow most logically from the definition of a predicate.

Consider first property (3.47a). Williams claims that this accounts for the ungrammaticality of a sentence like (3.48).

(3.48) \* Parr promised Helga [ for Peter to leave ]

But other sentences with the same "control" relation in which the infinitival S has a lexical subject are only marginally bad: (3.49)-(3.50).

(3.49) ? We begged our boss [ for a new mechanic to be hired ]

(3.50) ? Lois tried very hard [ for her husband to be institutionalized ]

And even in (3.48), a semantic source for the ungrammaticality can be found. Where verbs take clausal complements, they often select the mood of the clause. It is well-known that English "for-to" infinitivals express a modal meaning which is expressed in other languages by the subjunctive mood. So it is at least plausible that the verb promise selects an indicative clausal complement when there is a (lexical) subject in the clause, as in (3.51).

(3.51) Nobody promised you [ that syntax would be easy ]

Then (3.48) merely instantiates a violation of a selectional restriction.

We turn next to property (3.47e). Without an antecedent, a predicate may not be interpreted--by definition. So this property must hold of any real predicate. But Manzini (1982) observes that where the object S remains in situ in passive sentences, no antecedent is necessary, as in (3.52)-(3.53).

- (3.52) It was resolved [ PRO to pass the case to a higher court ]  
 (3.53) It was tried [ PRO to raise the capital without going public ], but ...

As well, when the infinitival is selected by a nominal head instead of a verbal one, no antecedent is required: (3.54)-(3.56).

- (3.54) An offer [ PRO to drive their car home ] makes some folks nervous.  
 (3.55) Permission/a permit [ PRO to shoot bison ] is rarely granted.  
 (3.56) Any offer [ PRO to help you cook sashimi ] should be firmly declined.

One of the premises of X-bar theory is that categorial status of a phrasal head should not affect the type of complements that the head selects, so the infinitivals in (3.54)-(3.56) should be predicates, too, in Williams' theory. That they are not is further evidence that their verb-selected counterparts are not predicates either.

There are, however, cases of control of (argument) infinitival clauses for which the predication theory is appropriate. Some examples follow: (3.57)-(3.60).

- (3.57) a Her lover drew Helga [ out of her depression ]  
       b Mozart drew Helga [ PRO to study voice ]  
 (3.58) a Bernice got Marcel [ sober again ]  
       b Bernie got Marsha [ PRO to start drinking ]  
 (3.59) a The scent led Holmes [ into a long hallway ]  
       b The thrill of the chase led Holmes [ PRO to forget his caution ]  
 (3.60) a My fear of heights forced me [ down the ladder ]  
       b My fear of heights forced me [ PRO to abandon skydiving ]

Sentences like (3.57)-(3.60) differ from (3.44)-(3.46) in that the former exhibit an alternation between controlled clauses and (usually locative) predicates which the latter lack. As we would

expect, then, the properties (3.47a) and (3.47e) hold for (3.57)-(3.60).

- (3.61) \* Mozart drew Helga [ for her son to study voice ]  
 (3.62) \* Nothing draws [ PRO to take up tap-dancing like an Astaire movie ]

A partial list of verbs which select this kind of control relation includes: lead, lure, draw, force, compel, pull, push, etc.

Williams accepts that for the clausal complements of some verbs--his want types--the control relation is not equivalent to predication. For these verbs, the control relation does not exhibit the properties of predication (3.47). He decides that in such a case, the control relation is "non-obligatory". Williams includes the verbs want, hate, prefer, arrange, and decide in this class. As we have seen that the same properties do not hold for most of the verbs that Williams would class as "obligatory Control" verbs, the effect of the discussion to this point is simply that the class of want type verbs is significantly enlarged. The basic form of Williams theory is still in place.

But lumping the want type and the promise type verbs together makes it possible to make an important generalization about the relation of complement selection to control. Under Williams' analysis, we would expect the infinitival complements of promise type verbs to alternate with natural predicates. Then (3.63)-(3.64) would be expected to be grammatical.

- (3.63) \* Noel [ promised Nicole [ happy ] ]  
 (3.64) \* Ned [ told Maria [ out of the house by evening ] ]

What actually occurs, of course, is that infinitival complements alternate with finite clausal complements and with NPs, as can be seen in (3.65)-(3.68).

- (3.65) a Frank promised Janet [ PRO to be gentle ]  
 b Frank promised Janet [ that Brad would never know ]  
 c Frank promised Janet [ a good time ]
- (3.66) a Riff hoped [ PRO to take control ]  
 b Riff hoped [ that Magenta could be seduced ]  
 c Riff hoped [ for a cheap thrill ]<sup>1 1</sup>
- (3.67) a Mark told us [ PRO to meet him there ]  
 b Mark told us [ that he would be on time ]  
 c Mark told us [ a fib ]
- (3.68) a Dan is always begging [ PRO to be taken along ]  
 b Dan is always begging [ that he be allowed to bring his dog ]  
 c Dan is always begging [ favors ]

This alternation is a fact for which some explanation must be offered in any theory of control for the want/promise verb class.

As we have shown that this class of verbs belongs to Williams' "non-obligatory control" class, it is necessary to show that his theory of "non-obligatory control" is inadequate to cover the data. Manzini (1983) points out the crucial problem--the referent of PRO in (governed) "non-obligatorily controlled" clauses is generally far from free. In (3.69)-(3.71), for example, PRO must be controlled.

- (3.69) Sharon<sub>i</sub> promised Dave [ PRO<sub>i</sub> to wake him up ]  
 (3.70) Sharon promised Dave<sub>i</sub> [ PRO<sub>i</sub> to be left alone ]  
 (3.71) \* Sharon promised Dave [ PRO<sub>arb</sub> to rain ]

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<sup>5</sup>The source of for in (3.65c) is the the same as it is in "for-to" infinitives. Possibly it is there to assign Case--as Chomsky 1981 claims--or possible it marks some kind of "subjunctive" modality on the NP. But in any case, it doesn't change the categorial status of the NP--so it is probably adjoined.

Williams solution to this problem is to append an interpretive rule of control: the Arb Rewriting Rule (3.72) (his 59).

- (3.72) Arb Rewriting Rule  
 Rewrite arb as coindexed with an NP which commands it, and which it commands.

But rule (3.72) is at once too powerful and too weak. It is too powerful where it would predict coreference where in fact none is found, as in (3.73)-(1.38).

- (3.73) \* Helga<sub>i</sub> said [ PRO<sub>i</sub> to meet her at the Tantric study group ]  
 (3.74) \* Herman<sub>i</sub> signaled [ PRO<sub>i</sub> to run away ]  
 (3.75) \* Mark<sub>i</sub> yelled [ PRO<sub>i</sub> to help him ]  
 (3.76) \* Pam<sub>i</sub> whispered [ PRO<sub>i</sub> to watch out for the aliens ]

On the flip side, (3.72) is too strong because it falsely predicts that an infinitival clause in subject position must be controlled by any NP in VP. Examples (3.77)-(3.78) show that this is false.

- (3.77) [ PRO<sub>arb</sub> to drive fast ] is sometimes scary for one's dates.  
 (3.78) [ PRO<sub>arb</sub> to be able to cook Chinese ] can be worthwhile with frequent guests.

Rule (3.72) is too weak because it fails to restrict the range of referents in sentences which lack a controller expressed in the syntax, as in (3.79)-(3.80).

- (3.79) It was decided [ PRO to hold one last stag for Helga ]  
 (3.80) [ PRO to get together so soon ] was deemed rash.

In (3.79)-(3.80), the referent of PRO is not "arbitrary". PRO may only refer to the syntactically absent agent--in (3.79), it is the

people who made the decision that will be holding the stag; in (3.80), the people who might have got together are the ones who decided such an action to be rash. Rule (3.72), however, leaves the referent of PRO entirely free.

In sum, we find that there are two problems with Williams' theory: he misconstrues the range of application of "obligatory" control (through predication), and his theory of "non-obligatory" control is weak. For the right constructions, however, the predication theory does express important generalizations. What we wish to do, then, is to maintain the theory of predication--with its sub-theory of "obligatory" control--while we improve on the theory of "non-obligatory" control.

We propose that an appropriate solution involves interpreting Williams' predication relation as equivalent to one of the semantic fields over which thematic relations are determined in Jackendoff's (and Gruber's) model. A thematic relation like that which defines a <Theme,Goal> pair is expressed in one of a set of semantic fields including: Possession, Existence, and Location. If the last of these is interpreted as a special case of a Predication "semantic field", then the effects of Williams theory can be seen to be a subset of the effects of a theory of semantic fields.

In that case, it might be expected that the other semantic fields should have roles to play in the determination of obligatory Control relations. This prediction is confirmed with respect to the Possession semantic field. The interpretation of a large class of obligatory Control structures as expressions of Possession relations makes it possible to account for two important generalizations which existent theories of control fail to explain. One is the regular alternation of "non-obligatory Control" infinitival clauses with NPs.

The other is the appearance of obligatory control effects in infinitival complements to verbs of "saying" if and only if the Goal argument is syntactically expressed.

If there is this parallel between the two relations, it should not be surprising that the same rule of interpretation may determine control relations from either predication or possession. Consider (3.81)-(3.82).

- (3.81) a Helga forced her lover [ into the boudoir ]  
 b Helga forced her lover [ PRO to quit smoking ]  
 (3.82) a Herman told his lover [ a silly joke ]  
 b Herman told his lover [ PRO to bring home cigarettes ]

Sentence (3.81a) shows that the complement arguments to force are in a predication relation. The infinitival CP is interpreted as an open sentence, with PRO serving as a variable. A rule of interpretation then identifies the PRO variable in the predicate CP in (3.81b) with the subject of the predication, her lover. In (3.82a), the complements to tell are in a possession relation (cf. section 3.1)-with his lover as the possessor and a silly joke, the possessum. Again we may say that the infinitival clause is an open sentence. Then the same rule of interpretation identifies the possessum CP's PRO with the possessor, only this time the rule operates by virtue of the possession relation.

Nothing more need be said to derive the facts of control in a large class of constructions. Objects of (stative) verbs of possession generally alternate between NPs, "full" CPs--either finite or subjunctive--, and controlled infinitival CPs: (3.83)-(3.87).

- (3.83) a I want a new car, champagne, and caviar.  
 b I want [ for Helga to be happy ]  
 c I want [ PRO to visit Hokkaido ]

- (3.84) a. Helga wished for a new lover.  
 b. Helga wished [ that Serge would call her ]  
 c. Helga wished [ PRO to meet an international spy ]
- (3.85) a. Pam needs constant encouragement.  
 b. Pam needs [ for people to notice her work ]  
 c. Pam needs [ PRO to feel useful ]
- (3.86) a. Yuujiro requires more whiskey  
 b. Yuujiro requires [ that everyone listen to him sing ]  
 c. Yuujiro requires [ PRO to be led to the water closet ]
- (3.87) a. Reiko hopes for a third child  
 b. Reiko hopes [ that Mike will be back by then ]  
 c. Reiko hopes [ PRO to return to work soon ]

In English, the S'-deletion phenomena block control of infinitival complements to verbs like know (Bouchard 1984), but in most languages the pattern of (3.83)-(3.87) is continued with such verbs as well<sup>12</sup>. The French sentences (3.88)-(3.89) illustrate.

- (3.88) a. Michelle ne sait pas la solution.  
 b. Michelle ne sait pas [ que son mari est parti ]  
 c. Michelle ne sait pas [ PRO conduire ]
- (3.89) a. Luc croyait ton histoire.  
 b. Luc croyait [ que Renée l'aimait ]  
 c. Luc croyait [ PRO pouvoir séduire Helga ]

In every sentence (3.83)-(3.89), the matrix verb ascribes a relation of possession to its two arguments. The control relation in

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<sup>12</sup>Although I agree with Bouchard that S'-deletion is the factor which blocks the English counterparts to (2.8c)-(2.9c), I prefer to attribute the final mechanism to the [- tense ] modality of S'-deleted infinitivals (cf. Stowell (1982)), rather than to the idea that Case-marking the empty category PRO results in the appearance of a phonologically visible pronoun or anaphor. In other words, I claim that controlled infinitivals must have a "future" or "unrealized" tense for purely semantic reasons.

the (c) sentences follow from the rule interpreting PRO as bound by the CP's possessor.

The desired generalizations follow from this approach. The alternation of complements is explained--NP and CP are natural possessums. The obligatoriness of control is a consequence of the relation of possession; an uncontrolled PRO is the mark of a "generic" infinitive, and generic anythings are inappropriate possessums. Therefore, in the absence of a local subject, the control interpretation rule must apply to give PRO a referent.

With the basic idea laid out, we can go on to give it more formal expression by generalizing Williams' notion of coindexation of predicates with their subjects. Given a sentence like (3.60b) (repeated here as 3.90),

(3.90) My fear of heights forced me [PRO to abandon skydiving ]

Williams states that the subject me and the predicate to abandon skydiving are coindexed. At some point late in the semantic interpretation, PRO is equated with the index of the clause which immediately dominates it--and consequently with the subject me, as well.

In order to extend this formalism to the demands of control-via-possession, all that need be done is ensure that the possession relation involves coindexation as well. Then PRO will be equated with a possessor in the late semantic interpretation by the same rule that interprets PRO in (3.90). For example, in (3.84c), the possession relation will coindex I and the infinitival clause, as shown in (3.91).

(3.91) I<sub>i</sub> want [<sub>S</sub> PRO to visit Hokkaido ]<sub>i</sub>

And at some point in the interpretation of (3.91), PRO will be assigned the index of the clause which contains it<sup>13</sup>.

Now consider the problem of control inside NP. As possession relations are licit in NPs, this analysis predicts that obligatory control will be found where the head of NP selects a possession relation among its arguments. This is seen to be the case in (3.92)-(3.95).

- (3.92) Pushkin's wish [ PRO to protect his honor/\*one's honor ]
- (3.93) Yesenin's need [ PRO to entertain himself/\*him ]
- (3.94) Socrates's command to his students [ PRO to know themselves/\*oneself ]
- (3.95) Frank's invitation to his guests [ PRO to enjoy themselves/\*himself ]

And where the head of NP selects a predication relation among its complements, there is no felicitous interpretation, as predicted: (3.96)-(3.98).

- (3.96) \* Mozart's drawing of Helen to study voice.
- (3.97) \* The thrill of the chase's leading of Holmes to forget his caution.
- (3.98) \* My<sub>i</sub> forcing t<sub>i</sub> to abandon skydiving

By this point, we have the tools to tackle the alternation between the (a) and (b) sentences in (3.99)-(3.100).

- (3.99) a Larry said to his daughter<sub>i</sub> [ PRO<sub>i</sub> to eat her turnips]
- b Larry said [ PRO to meet him at home ]

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<sup>13</sup> This coindexation relation is probably related to the identification of the external arguments in CFCs. Then control relations may prove eventually to be binding relations, as argued by Bouchard (1984), Manzini (1983), and Sportiche (1983). As our concern here is simply to pile up evidence for the syntactic visibility of semantic field specifications, we forego the pursuit of an appropriate technical apparatus for control relations.

- (3.100)a Lois signalled me<sub>j</sub> [ PRO<sub>i</sub> to pass the hot sauce ]  
 b Lois signalled [ PRO to pass the hot sauce ]

The interesting property of these sentences is that PRO in the complement infinitival is obligatorily controlled if and only if there is a "Goal" argument.

This property of complements to verbs of "saying" follows from the semantics of complement selection. Such verbs typically assign the "Theme" role to their object in either the Existential or the Possession semantic field. In other words, they are either "creation" verbs or "possession event" verbs. When they act as "creation" verbs, they take a single (<proposition>) argument. If that argument is an infinitival CP, then the PRO subject will not be obligatorily controlled because the infinitival CP is in no relation of possession or predication with any other argument. But if the verb denotes an event involving "change of possession", then it will take two arguments: a <proposition> argument and a <possessor> argument (the Goal). In that case, an infinitival CP will be coindexed with its <possessor>, and the PRO which it contains will be obligatorily controlled by the <possessor>.

#### 4. Terminal predications and lexical entries

In chapter 1, we argued that the Thematic Relations Hypothesis is not a necessary part of a semantic theory which accounts for paraphrase relations by decomposing different sentences into identical semantic representations. So semantic theory may plausibly include distinct "thematic relations" for every semantic field. In chapters 2 and 3, it was shown that semantic fields like Existence and Possession must be visible to the syntactic component of the grammar. The conclusion to be drawn at this point is that the Thematic Relations Hypothesis does not accurately characterize the role of semantic relations in the grammar. But then the whole foundation of "theta-theory" is called into question. In this chapter, we will show that the concept of a thematic role is not an appropriate component of a licensing theory for complement arguments, and we will propose a principle of licensing is not dependent upon the validity of the Thematic Relations Hypothesis.

##### 4.1 Jackendovian lexical entries for predicates

But first, a preliminary recapitulation of the current state of affairs is in order. There is an irreducible minimum of semantic information which any theory of meaning must somehow include. We can classify this information as belonging to two classes: (i) information which determines aspects of the syntactic structure and, (ii) information which does not. The primary subject matter of linguistic semantics is generally conceded to be the proper representation and utilization of the class (i) information.

The class (i) information clearly includes the source of argument licensing, i.e. the PAS (or theta-grid) of a phrasal head.

But there is another area in which semantic information is currently allowed to govern syntactic structure: the selection of complement types. This area is discussed by Grimshaw (1979, 1981), Pesetsky (1982), Chomsky (1986a), and Rochette (1988), among others. The conclusion drawn in this research--with which we concur--is that the syntactic categories of complement arguments are primarily determined by the categories of the arguments in the semantic representation onto which they are mapped.

To illustrate, consider a simple proposition like (4.1).

(4.1) Hagar said something to his wife.

Using the GB terminology, we may say that in this sentence, the complement something is licensed as an object by virtue of being assigned a ("Existential theme") theta-role by the verb say. A verb like say, moreover, does not admit all types of arguments as objects, as shown in (4.2).

- (4.2) a Hagar said that his cousin was a bully.  
 b \* Hagar said his cousin's torment of him.  
 c \* Hagar said painful.  
 d \* Hagar said in a depression.

The verb say imposes clear selectional restrictions on its object. The object must be something like a semantic <proposition>, as in (4.1) and (4.2a). Semantic <events> and <predicates> like (4.2b-d) are excluded.

Pesetsky shows that the properties of selectional restriction make it unnecessary to have  $X^0$  heads "subcategorize" for the syntactic categories of their complements. It is the semantics of say which excludes the AP and PP complements in (4.2c)-(4.2d).

This explanation crucially relies on the fact that there is a regular correspondence between semantic and syntactic categories.

In Grimshaw's terms, every semantic category has a syntactic category as its "canonical structural realization" (CSR). For example, <propositions> typically correspond to syntactic S's, <things> to NP, <places> to PP, and so on. And while the mapping from semantic types to syntactic ones may diverge from that dictated by the CSR principles, the divergence seems to be highly constrained. So only some idiosyncratic NPs, like home, outside, and downtown, may be mapped onto semantic <place> arguments. Similarly, while a semantic <question> may map onto any [+wh] CP, the set of "concealed question" NPs onto which it may map seems to be limited to those which denote the natural set of restrictions on wh-quantifiers, such as the time, the place, the way to do this or that, and so on.

Thematic relations and selectional restrictions define two types of class (i) information which we must incorporate into the model. A question which can be put to the various theories, then, is: what is the relation between these two varieties of semantic information? Jackendoff's model and the GB account provide slightly different answers to this question.

Jackendoff (1983, 1987) takes the most natural approach. He includes selectional and thematic information in the same location in a lexical entry. For say, for example, a Jackendovian lexical entry is like (4.3).

(4.3)        say, [+V, -N]

[Event CAUSE  
       (x, [ GO ([Proposition y], [Path TO ([Place z ])])])]

The simultaneous representation of both types of information results in an important property of Jackendoff's model: the linking

of syntactic complement to PAS slots can be explicitly shown to be governed by the semantic categories of each. This follows from the representation of thematic structures in the lexical entry of a predicate. In (4.1), for example, the PP to his wife is mapped onto a semantic category Path (or <path>). It is the categorial identity between this element and that of the "Goal" slot in the lexical entry (4.3) that governs the linking of argument to thematic function.

But this model has problems. The main one is how to avoid over-specification in the lexical entry of a predicate. Just as it is intuitively clear that the semantic properties of arguments govern their association with thematic roles/PAS slots, it is clear also that the thematic grid/PAS associated with a given predicate places limits on the possible semantic types of its complement arguments. So a lexical predicate should not redundantly select argument types which are implicit consequences of its thematic properties. It is a consequence of Jackendoff's representations that the lexical entry of a phrasal head is burdened with a great deal of redundant information. Consider the sentences in (4.4a)-(4.6a), with their associated thematic representations (4.4b)-(4.6b).

- (4.4) a Helga put beer in the lake.  
 b [Event CAUSE ( [ HELGA ], [ BE ( [Thing BEER ],  
 [Place IN LAKE ] ) ) ] ] ]
- (4.5) a Helga put her second lover in a penthouse.  
 b [Event CAUSE ( [ HELGA ], [ BE ( [Person LOVER #2 ],  
 [Place IN PENTHOUSE ] ) ) ] ] ]
- (4.6) a Helga put it<sub>i</sub> in her lover's mind [s<sub>i</sub> that she was  
 planning to murder her secretary ]  
 b [Event CAUSE ( [ HELGA ], [ BE ( [Proposition THAT SHE  
 WAS PLANNING etc. ], [Place IN LOVER'S MIND ] ) ) ] ] ]

The "Theme" arguments in (4.4)-(4.6) are of various semantic categories: <thing> in (4.4), <person> in (4.5), and <proposition> in

(4.6). Yet we do not wish to say that the thematic relation selected by put differs from one sentence to the next. Rather, this evidence shows that put does not place selectional restrictions on its "Theme", i.e. that there is no s-selection of the categorial type of the "Theme".

As the Jackendovian representations incorporate selectional restrictions directly into the thematic representation, it is therefore necessary to void the lexical source of such representations of redundant selectional information. The way to do so is by eliminating the specification for categorial type from the PAS which is selected lexically. The PAS for put must therefore be (4.7).

(4.7) [Event CAUSE ( x , [ GO ( y , [Path z ] ) ] ) ]

The representation (4.7) is in accordance with Jackendoff's (1987) model. But even (4.7) is too specific. Recall that Jackendoff postulates a set of well-formedness conditions on thematic representations, including (1.12c), repeated here as (4.8).

(4.8) EVENT →  $\left\{ \begin{array}{l} \text{[Event GO (THING, PATH) ]} \\ \text{[Event STAY (THING, PLACE) ]} \end{array} \right\}$

By (4.8), a GO "event-function" may only select <thing> and <path> type arguments. So the selectional specification <path> for the "Goal" argument slot in (4.7) is redundant. So we delete it.

In removing this redundancy from the lexical entry, we depart from Jackendoff's precise formulation. This change in the model will be seen to have important consequences as we proceed. For now, we merely note that the revised lexical entry of put is given as (4.9).

(4.9) [Event CAUSE ( x , [ GO ( y , z ) ] ) ]

The combination of the lexical PAS with its arguments must eventually be subject to the rule (4.8), so any derived representation which violates (4.8) will be filtered out as a selectional restriction. Instances of such semantic filtering can be seen at work in sentences (4.10)-(4.11).

(4.10) \* Hagar sent outside away.

(4.11) \* Helga put the cat the room.

The VP in (4.10) contains two complements arguments: an NP outside and a PP away. These arguments are both mapped onto semantic <place> or <path> categories--outside by virtue of an idiosyncratic lexical property; away by virtue of the CSR for PP categories. The result of associating the two arguments with the argument slots in the PAS for send is that the "Theme" interpretation is assigned to one of them and the "Goal" interpretation is assigned to the other. No matter which argument is associated to which slot, there will be a violation of the rule (4.8), because (4.8) requires that the "complement" to GO includes a <thing> category and the derived representation can have no such category. Similarly, in (4.11), the cat and the room are both mapped onto <thing> categories by the CSR for NPs, leading to a violation of the <path> requirement in (4.8).

But now consider the status of verbs which are more restrictive than put. We take up the case of say once more. We have seen that "say" places selectional restrictions on its "Theme" complement. Apart from these restrictions, say has the same PAS as put, i.e. the PAS (4.9). So the question is how much the "bare" PAS (4.9) must be reinvested with categorial specification. The answer is that only the selectional information which does not

follow from the thematic properties of the PAS--which follow, ultimately from the "well-formedness rules" of Conceptual Structure--should be put back. So the PAS for say should be (4.12).

(4.12) [Event CAUSE ( x , [GO ( [PropositionY ], z ) ] ) ]

Note that this modification of Jackendoff's system has the property of excluding redundant selectional information from the lexical entry of X<sup>0</sup> predicates. At the same time, we preserve the essentials of Jackendoff's system for linking arguments to argument slots *via* category matching.

## 4.2 Semantics of complement "selection"

### 4.2.1 Selection of semantic fields

In the immediately preceding discussion, we discussed two particular classes of "selectional restriction" effects: those which were derivative of thematic properties of the X predicate, and those which formed a part of its idiosyncratic lexical properties. We must yet consider a third class of "selectional restrictions", which involves the "semantic fields" in which thematic relations are interpreted.

It is clear that predicates may exclude some "semantic fields" from entering into the interpretation of the thematic roles assigned to their complements. We see this in the paradigms shown in (4.13)-(4.17). (In (4.13)-(4.17), the (a) sentences involve the *Possessional* field; the (b) sentences, the *Circumstantial* field; (c), the *Possessional*; and (d), the *Existential*.)

- (4.13) a Hagar put his guests in the dungeon.  
 b ? Hagar put his guests to peeling potatoes.  
 c \* Hagar put his car to his son-in-law.  
 d \* Hagar put a cake.

- (4.14) a \* Hagar gave his guests in the dungeon.  
 b \* Hagar gave his guests to peeling potatoes.  
 c Hagar gave his car to his son-in-law.  
 d Hagar gave a giggle.
- (4.15) a Hagar forced his guests into the dungeon.  
 b Hagar forced his guests to peel potatoes.  
 c Hagar forced his car on his son-in-law.  
 d Hagar forced an awkward smile.
- (4.16) a ?? Hagar introduced his guests into the dungeon.  
 b Hagar introduced his guests to peeling  
 potatoes.  
 c \* Hagar introduced his car to his son-in-law.  
 d \* Hagar introduced a problem.
- (4.17) a \* Hagar made his guests in the dungeon.  
 b Hagar made his guests peel potatoes.  
 c \* Hagar made his car to his son-in-law.  
 d Hagar made a cake.

As the verb may clearly "select" a semantic field, it must be the case that this semantic field specification is listed somewhere in its lexical entry. The question then is: where?

#### 4.2.2 The subscript notation for semantic fields

Jackendoff chooses to specify the semantic field of a given semantic representation as a subscripted annotation on the event-function which "heads" the thematic relation which is involved. In such a representation, the lexical entry for put becomes (4.18).

(4.18) [Event CAUSE ( x , [ GO<sub>Positional</sub> ( y , z ) ] ) ]

It is important to appreciate the significance of the subscript to GO in (4.18). Otherwise, the consequences of this representation are impossible to grasp. But we cannot proceed further until we have a clear picture of the status and roles of the event-functions themselves.

We will concentrate on the GO and STAY "event-functions", to begin with. GO and STAY play two roles in Jackendoff's model. As predicates in the semantic representation, they seem to effect a structural parallelism between the syntactic structure and the semantic structure. Given the "event-functions", there is a near one-to-one mapping relation between arguments and maximal projections, heads and functions. But this parallelism is no more than a rhetorical trick, in one sense. What really corresponds to the syntactic predicate is the entire PAS which determines the compositional semantics of the proposition derived by associating argument slots and arguments.

The real role of the event-functions is to distinguish between two types of events: those which involve a change of state (GO) and those which involve a persistence of state (STAY). (States themselves are headed by BE and ORIENT predicates, about which we postpone discussion.) This is how Jackendoff is able to indicate the difference between (4.19) and (4.20).

- (4.19) a Helga put beer in the lake.  
 b [Event CAUSE ([ HELGA ], [ GO<sub>Positional</sub> ([ BEER ], [Path TO ([Place IN THE LAKE ])]))] ]
- (4.20) a Helga left beer in the lake.  
 b [Event CAUSE ([ HELGA ], [ STAY<sub>Positional</sub> ([ BEER ], [Place IN THE LAKE ]))] ]

### 4.3 Event structure

The important result of the work of Voorst (1986) is that he demonstrates that Jackendoff's account of aspectual distinctions, like that between STAY and GO, is impossible to maintain. He does this by showing that the aspectual class of any given sentence cannot be determined by the lexical properties of its head verb.

The strongest of Voorst's arguments involves "resultative" complements in English and Dutch.

- (4.21) Helga blushed herself out of a jam.  
 (4.22) Hagar snores the whole town awake every night.  
 (4.23) My granny drank those men under the table.  
 (4.24) Herman danced himself giddy.

The peculiar property of "resultatives" is that they seem to ignore the "licensing" conditions which are supposed to govern the syntax of complements. In particular, the complements in a resultative construction do not bear the semantic relations to their verbal governors which are expected.

The normal verb-complement relations for the verbs blush, snores, drink and dance are illustrated in the non-resultative sentences (4.25)-(4.28).

- (4.25) a Helga blushed.  
       b \* Helga blushed herself.  
 (4.26) a Hagar snores.  
       b \* Hagar snores the whole town.  
 (4.27) a My granny drinks.  
       b My granny drinks gin.  
       c \* My granny drank those men.  
 (4.28) a Herman danced.  
       b Herman danced the Freddie.  
       c \* Herman danced himself.

Blush and snores, in their normal contexts, are intransitive verbs. They have no argument slot for any complements in their PAS, i.e. they assign no internal argument theta-roles. Therefore, no complement to blush or snores may be licensed. We see the effect of the licensing condition in the (b) sentences in (4.25)-(4.26), where the presence of an object makes the sentences ungrammatical.

Similar properties hold of the optionally intransitive verbs drink and dance. These verbs may optionally license complements, as shown in the (a) and (b) sentences in (4.27)-(4.28). But when they do, they impose clear selectional restrictions on its complement. The verb drink in (4.27) requires that its object be a liquid substance, for example. This restriction is violated in (4.27)c, so the object those men may not be linked to the object argument slot. The object is again not licensed, so the sentence is ungrammatical. And dance selects only types of dances, so (4.28)c is ruled out, too.

As Voorst observes, the resultative sentences (4.21)-(4.24) are a dilemma for this standard analysis. The direct object complements in these sentences are exactly the same as those which are seen not to be licensed in (4.25)-(4.28). What is more, there appears to be an additional unlicensed argument in each of the resultative sentences, so they should be doubly ungrammatical. Yet they are perfectly acceptable.

Voorst's solution to this puzzle crucially involves the aspectual relation which holds between a verb and its complements. In order to present this solution, it is therefore necessary to review some elementary aspect semantics. As we do not intend to review the entire literature on the semantics of aspect and *aktionsart*, we will settle for a brief discussion of what we consider to be the most robust and relevant results of this wealth of work.

### 4.3.1 Aspectual Semantics

The easiest way to begin to conceptualize the aspectual relation between a verb and its complements is with a spatial metaphor, as Voorst does. We start with the simplest case: a transitive verb which assigns the "Patient" role to its object.

Consider the sentence (4.29).

(4.29) I shot the sheriff.

The verb shoot denotes a kind of event which normally involves the discharge of some gun or something else which launches projectiles. When this verb is part of a finite clause like (4.29), it forms part of a proposition which must have a truth value. And the truth value of the proposition is roughly equivalent to the existence of a "shooting" event in which the subject I denotes the agent who "causes" the event and the object the sheriff denotes the "object" affected by the event (cf. Davidson (1967), Kamp (1984), Higginbotham (1985)).

As a general tendency, in natural language, existence is predicated of objects in some location or another, as occurs in sentences like (4.30)<sup>14</sup>.

(4.30) There is a hippo in the kitchen.

It is plausible then to suggest that the "shooting" event in (4.29) should be ascribed to some location, too. What we will say is that

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<sup>14</sup>There are certainly sentences in which no location is indicated, as well. For example:

(i) There is a Santa Claus.

But the text observation is merely meant to be "suggestive at this point.

the object of the verb shoot denotes the location of the event to which the verb refers<sup>15</sup>. This notion of "location" will be clarified as we proceed.

Now consider the sentences (4.31) and (4.32).

(4.31) Helga broke her mother's heart.

(4.32) Helga broke hearts.

These two sentences denote events belonging to different aspectual classes. The (4.31) event is an "accomplishment"; the (4.32) one, an "activity", in Vendler's terms. Some standard tests confirm this judgement. Accomplishments may not be qualified by duration adverbial phrases, and they form natural complements to the phrase "it took X time for ...". Activity sentences have the reverse properties. The patterns shown in (4.33)-(4.34) result.

(4.33) a \* Helga broke her mother's heart for a year.

b Helga broke hearts for a year.

(4.34) a It took a year for Helga to break her mother's heart.

b \* It took a year for Helga to break hearts.

The conclusion to be drawn is that sentences which denote accomplishment events when the object of the verb is definite may only denote activities when the object is indefinite (cf. Verkuyl (1972), Dowty (1979), Voorst (1986)).

A slightly modified version of Dowty's explanation for this is the one we shall adopt. In non-technical terms, what he says is that

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<sup>15</sup>Voorst (1986) argues that both subject and object are involved in locating the event, by functioning as the two end-points of a time-line. For the purposes at hand, the aspectual status of the subject is not important, so we simplify the discussion to exclude the subject.

there is existential quantification over the indefinite complement objects in sentences like (4.32). Moreover, the existential quantifier "lies within the scope of the time quantifier of the surface sentence in which [it] arises." (80) In the (4.31) sentence, the complement her mother's heart is not bound by any such existential quantifier. (Such NPs may well be subject to quantification, but then the quantifier is a definite determiner, which will always take wide scope.)

If the object serves to denote the location of the event denoted by the verb, then any quantification over the object will indirectly function as quantification over the event itself. This is what occurs in (4.35).

(4.35) Helga broke three hearts last week.

As the object three hearts denotes three different locations (i.e. the respective hearts), there will be three different heart-breaking events. This is parallel to the indirect quantification over hippos in (4.36).

(4.36) There is a hippo in three gardens.

Now it can be seen how Dowty's solution accounts for the aspectual properties of these two types of sentences. We assume that the meaning of a duration adverbial phrase is that the proposition is true for all temporal instants contained within the time the adverbial denotes. For example, in (4.37),

(4.37) Hagar sang for five minutes.

the sentence is true only if Hagar is actually singing at all instants in the five minutes referred to<sup>16</sup>. A logical translation of (4.37) is something like (4.38).

(4.38)  $\forall t: t \in \text{five minutes, Hagar sings at } t$

Now consider (4.33a) once more. Giving the duration adverbial the same interpretation as before, we obtain the logical form (4.39).

(4.39)  $\forall t: t \in \text{one year, Helga broke her mother's heart at } t$

A mother's heart, once broken, cannot be re-broken--or so seems to be the natural language assumption. So the proposition "Helga breaks her mother's heart at  $t$ " can only be true, for one value of  $t$ . Then (4.39) is logical impossible as long as there are more than one instants in a year. This is the source of the anomaly.

The indefinite status of the complement hearts in (4.33b) saves the sentence. The logical form is (4.40).

(4.40)  $\forall t: t \in \text{one year, } \exists x: \text{heart } (x), \text{ Helga broke } x \text{ at } t.$

In this case, the sentence may be true as long as there is a sufficient quantity of hearts that Helga may break one at every (psychologically relevant) instant  $t$  in the year. There is no logical anomaly here, so the sentence is semantically well-formed.

While the core of Dowty's analysis is certainly correct, there are a few reasons to modify the technical formulation of his explanation. For one thing, the presence of an existential quantifier

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<sup>16</sup> As Dowty points out, the interpretation of the concept "instant" in this case must be understood to be variable according to the type of event which is going on. This variability is largely pragmatic in nature.

in the formula (4.40) is misleading with respect to the relation which holds between instants and event locations. In (4.40), the ultimate effect of the narrow scope existential quantification is that a one-to-one correspondence between broken hearts and instants in the year, simply because each of the hearts involved may be broken only once.

It is necessary that this biunique relation be expressed somehow, as it does lead to the correct interpretation of sentence (4.33b). The sentence is not true for a situation where there is a single heart which is continually re-broken at every instant of the year. Dowty's formulation makes the necessary multiplicity of hearts a pragmatic matter. Yet if we refer to events in which the action is something which may be repeated with the same object, the one-to-one correspondence of objects to instants does not disappear.

(4.41) Helga kissed strangers all afternoon.

The sentence (4.41) is not true if there is a single stranger who Helga kissed over and over again--there must be a (more-or-less) unique stranger for every instant in the afternoon. So the pragmatic explanation for the biunique relation can not be the right one.

But the relation between instants and event locations calls to mind the quantification effects notoriously found in "donkey sentences" like (4.42a), which has roughly the logical form (4.42b).

- (4.42) a Every woman who kissed a stranger frightened him.  
 b  $\forall x$ : woman (x) &  $(\exists y$ : stranger (y), x kissed y) , x frightened y.

The interesting property of such sentences is that their logical translations should be ill-formed, because they contain free variables. (In (4.42b), the free variable is the boldfaced  $y$ .) The most convincing current analyses of donkey sentences all develop some way to bind this free variable by establishing a biunique relation between the variable bound by the universal quantifier and the variable which is bound by the existential quantifier (cf. Kamp (1984), Heim (1982), Haik (1983)). Without argument we shall adopt Haik's elegant notation to indicate this relation--it is not important for us which of the different analyses of this construction is most accurate.

We now re-formulate (4.40) as (4.43).

(4.43)  $\forall t_{ij}: t \in \text{one year, Helga broke [ heart } (x_j) \text{ ] at } t_i$ .

The way to read (4.43) is as a statement that the universal quantifier binds a pair of variables which are coindexed with the subscripted pair of indices borne by the quantifier. This binding relation produces the biunique correspondence between instants and hearts which we require.

As we are supposing that indefinite NPs contain free variables, we make the prediction ~~that~~ every indefinite NP must somehow be (indirectly) bound by a quantifier in order for the sentence which contains it to be well-formed. What then of (4.32)?

⊗ (4.32) Helga broke hearts.

We suggest that there must be some form of duration adverbial-like modification supplied by the discourse in which (4.32) appears. Note that the sentence is actually quite awkward with no contextual

support, but when it is embedded in a discourse like (4.44), it becomes perfectly proper.

- (4.44) What did your sisters do for fun when they were young? Well, Karen raced motorcycles, Linea practiced epistemology, and Helga broke hearts.

In this particular context, the period for which (4.32) is affirmed is the period when they were young. (We have no a clear understanding of the mechanism by which a variable may be (indirectly) bound in such a discourse. It seems, however, that some aspects--perhaps even extra-linguistic ones--of the larger context may play a role in the logical interpretation of indefinite NPs. One likely model of the process at work in (4.32) and (4.44) is that developed in Kadmon (1987) and Roberts (1987), in which information may be "accomodated" into a Discourse Representation Structure in order to isolate the correct interpretation.)

In order to account for the (4.34) sentences, it is necessary to better develop the notion of an event's "location" in more detail. Events and things share a range of grammatical and logical properties (cf. Davidson 1967), but they differ in the (metaphysical) medium in which they are situated. Things are located in space; events, in time. Both things and events vary in size. Just as a thing may be infinitely small (e.g. the center of a circle) or indefinitely large (e.g. ten kilometres long), an event may occupy a durationless moment or it may fill a certain span of time.

We can isolate at least one boundary of the location of the event denoted by (4.31). It is that point in time at which the object her mother's heart undergoes a "change-of-state" (in Dowty's terms). In this particular event, the change-of-state involves the

heart's going from being whole to being broken. Once the heart is broken, the event is over.

Following Voorst, we will refer to this (temporal) event boundary as the termination point. Accomplishments may be simply defined as events for which there is a termination point specified. Activities are events which lack specification for termination.

For the classification of some event as an activity, it does not matter why there is no specific termination point specified. In (4.37), sing denotes a type of event which does not intrinsically require termination. One can go on singing forever. So the absence of a termination point is a consequence of the meaning of sing. In (4.31), though, the break event necessarily involves effecting a "change-of-state" (in the object). This "change-of-state" defines the termination point for the event--the event is over at precisely the instant at which the change occurs. So the only way that break events may become activities is through being indirectly bound by the universal quantifiers found in duration adverbials and their ilk, as in (4.43).

It is the bounding, terminating quality of objects which is responsible for the grammatical status of (4.34a)-(4.34b).

- (4.34) a     It took a year for Helga to break her mother's heart.  
           b     \* It took a year for Helga to break hearts.

The meaning of (4.34a) seems to be that the accomplishment in question was not completed in less than one year. We can express this meaning by treating the phrase "it took X time etc." as a statement about the temporal "size" of the event in question. As

one limit of the event is its termination point, its size must be measured in terms of the amount of time preceding the termination point during which the event is occurring. In (4.34a), then, the sentence is true if the event of heart breaking actually occurs for the year preceding the instant at which the heart breaks.

The (4.34b) sentence is ill-formed because the sentence predicates a specific temporal size of something which has no size at all. The embedded event Helga breaks hearts does not refer to an accomplishment--it refers to a set of accomplishments, as a result of the (implicit or "accomodated") universal quantification it is subject to. There is no way to measure the size of this set, as its number is determined, if at all, by the unspecified number of instants in the period over which the event takes place. Therefore there is no way to determine the size of the sum of accomplishments contained in the event. The truth of (4.34b) is logically impossible to determine, so the sentence is semantically anomalous.

Now consider sentences which denote motion events, like (4.45)-(4.46).

- (4.45) a Hagar tossed his boots into the closet.  
 b \* Hagar tossed his boots into the closet for five minutes.  
 c Hagar tossed boots into the closet for five minutes.
- (4.46) a The rafts drifted t onto the beach.  
 b \* The rafts drifted t onto the beach for several days.  
 c Rafts drifted t onto the beach for several days.

The distinctions between the (b) and (c) sentences parallel those of (4.29a)-(4.30a). The definiteness of the objects his boots and the rafts force an accomplishment interpretation on (b)-(b). This aspectual class is incompatible with the duration adverbials for five

minutes and for several days, so the sentences are unacceptable. In the (c) sentences, the indefinite objects boots and rafts are susceptible to existential quantification, so the sentences may denote activities, rendering them grammatical.

The motion events in (4.45)-(4.46) differ from the break events in (4.28)-(4.31), however, because the object is not subject to a "change-of-state" in the former. This means that the locations and termination points for the motion events may not be defined in terms identical to those we used to analyse the break sentences. What identifies the termination point in a motion sentence is the arrival at some location of the object in motion (Voorst 1986). In (4.45a), the event is terminated at the point where his boots are in the closet; in (4.46a), it is over when the rafts are all on the beach.

We may say that the termination point for a motion event is that point in time when it becomes true that the direct object has the location denoted by the locative object. In other words, the termination point is defined by a locative predication which associates the two arguments of the verb.

Returning to the "resultative" construction shown in (4.21)-(4.24),

- (4.21) Helga blushed herself out of a jam.
- (4.22) Hagar snores the whole town awake every night.
- (4.23) My granny drank those men under the table.
- (4.24) Herman danced himself giddy.

we discover that the aspectual properties of change-of-state and motion events are found in resultatives, too. The "resultative" sentence (4.22) denotes an accomplishment event. As such, it shares the definiteness effects we have seen in other accomplishments, as shown in (4.47).

- (4.47) a. Hagar snored the whole town awake.  
 b. \* Hagar snored the whole town awake all night.  
 c. Hagar snored people awake all night.

As it denotes an accomplishment, the (a) sentence is logically incompatible with a duration adverbial phrase. So the (b) sentence is unacceptable. And once again, we find that an indefinite object may be subject to existential quantification so that the event is interpreted as an activity, as in (c). And in this case, the sentence is again grammatical with a duration adverbial phrase.

We have seen two ways that the termination point in an accomplishment is identified. In verbs like break, which denote events involving a "change-of-state" in the object, it is the instant of the "change of state" which defines the termination point. In motion events, the termination point is defined by a locative predication which becomes true as a result of the event. The question now is: which pattern do the resultative sentences conform to?

At first glance, the answer would seem to be that "change-of-state" sentences and resultatives belong together. In three of the sentences in (4.21c)-(4.24c), the object can be said to undergo some sort of internal change. In (4.21c), those men become drunk; in (4.22c), Herman himself becomes giddy; and in (4.24c), the whole town awakens.

But this apparent similarity is misleading. In a normal "change-of-state" sentence, the specific change which takes place in the object is determined by the governing verb. In a "breaking" event, the object is broken; in a "shooting" event, the victim is shot. In the resultative sentences, the change undergone by the object is determined, not by the governing verb, but by the "oblique" object

instead. This is exactly what we have seen to happen in motion sentences, where the locative object and the direct object are associated by a predication. In short, there is a predication relation which associates the two objects in a resultative sentence, and it is this predication which defines the termination point.

The aspectual properties of the resultatives differ from those of the motion sentences only in the nature of the predication which defines the termination point. The predication for motion verbs always concerns a locative relation between two arguments. The predication for resultatives may establish virtually any kind of relation between the direct and oblique objects. In (4.22c) and (4.24c), the predication concerns an "experienced" property: giddy and awake. In (4.21c) and (4.23c), it is difficult to label the type of predication involved, but it clearly concerns something other than a locative relation.

#### 4.3.2 Licensing theory and Spray/load alternations

Now that the aspectual properties of resultatives have been clarified, we can review their thematic properties in a new light. Mirabile dictu, the latter turn out to be a consequence of the former. Consider again the resultative sentence (4.21).

(4.21) Helga blushed herself out of a jam.

The Jackendovian (and GB) analyses presume that the licensing of a complement is dependent on a linking relation associating it to some argument slot in the PAS of the verb which governs it. But we have seen that there is no such relation for the complements herself and out of a jam in (4.21). So the presumption must be incorrect.

We know now that there is an aspectual relation between the verb blush and its complements in (4.21). And since there is no thematic relation while there is an aspectual relation, it must be the aspectual relation which governs the licensing of complements (Voorst 1986). What is more, as we obviously do not wish to have licensing conditions for the resultative construction complements which have radically different properties from the licensing conditions for "regular" transitive verb constructions, the "regular" verb complements must also be licensed through aspectual relations.

We postulate the following licensing condition (4.48),

- (4.48) In a structure [ $\gamma \dots \alpha \dots \beta \dots$ ] or [ $\gamma \dots \beta \dots \alpha \dots$ ], where  $\beta$  is an  $X^0$  predicate,  $\alpha$  is a maximal projection, and  $\gamma$  immediately dominates both  $\alpha$  and  $\beta$ ,  $\alpha$  must identify the termination point of the event denoted by  $\beta$ .

to replace the idea that thematic roles are what license arguments of a verb. We supplement (4.48) with the following definition (4.49).

- (4.49)  $\alpha$  *identifies* the termination point of event  $\beta$  iff<sub>def</sub>:
- i.  $\alpha$  denotes an individual which undergoes a change-of-state resulting from  $\beta$  at the termination of  $\beta$ ,
  - or
  - ii.  $\alpha$  denotes an argument in a predication which becomes true at the termination of  $\beta$ .

There is a certain cost to adopting the licensing condition (4.48) in place of the standard thematic account. The latter makes do with a simple, elegant principle of requiring a one-to-one correspondence between syntactic and semantic arguments. In comparison, (4.48) is rather clumsy; it requires two separate clauses--(4.49)i. and (4.49)ii.--to identify the full range of

complements which are licensed by verbal predicates. Voorst's argument from resultatives leaves little doubt that aspectual semantics are involved in licensing, but perhaps the particular formulation we have proposed could use some further evidence to counter-balance the effect of its split personality.

We find the evidence we need in the same place Tenny (1986) finds it--in the "spray/load alternation". (Although we owe a debt to Tenny's work, her formulation of the issues is different enough from ours that it does not seem necessary to review her specific findings. We simply note that her conclusions are similar to ours and leave it at that.) Examples are given in (4.50)-(4.53).

- (4.50) a The guests stuffed their bellies.  
 b The guests stuffed cheeseburgers into their bellies.  
 c The guests stuffed their bellies with cheeseburgers.
- (4.51) a Spiderman punched Electro.  
 b Spiderman punched the shit out of Electro.  
 c Spiderman punched Electro through the window.
- (4.52) a Karen washed the van.  
 b Karen washed the mud from the van.  
 c Karen washed the van of its mud.
- (4.53) a Yumiko loaded the dishwasher.  
 b Yumiko loaded the plates into the dishwasher.  
 c Yumiko loaded the dishwasher with plates.

The problems such alternations pose for a simple thematic theory of licensing are both obvious and well-known (cf. Rappaport and Levin (1985), others), so we will not dwell on them. Our goal at this point is rather to show how the licensing condition (4.48) can deal with the facts.

The (a) sentences clearly pattern like the heart-break sentences. In (4.50)a, for example, their bellies are affected by the

stuffing event, so their bellies identifies the termination point and is thus licensed by (4.48).

The next group--the (b) sentences--behaves like the resultative examples. While the cheeseburgers in (4.50)b are certainly affected by the stuffing event, it is not the case that the cheeseburgers get "stuffed", so they do not identify the event termination point by themselves. Rather, the termination point is identified by the pair {cheeseburgers, into their bellies}, which defines the (locative) terminal predication. So in this case, the pair of complements are licensed by virtue of clause (ii) in (4.49).

The (c) sentences share properties with both the (a) and (b) sentences. In (4.50)c, the object their bellies is affected by the stuffing event, just as in (4.50)a. But the pair {their bellies, with cheeseburgers} must define the terminal predication which identifies the termination point--otherwise, the PP with cheeseburgers would not be licensed. So which clause of the (4.49) definition applies to license the complements here?

We suggest that both clauses are applicable. There is no contradiction in the idea that an object may be licensed twice. And the idea that both clauses apply independently to such sentences turns out to have appealing consequences.

Anderson (1971) and others have observed a difference in the degree to which a given object is "affected" by an event which is dependent upon the grammatical function borne by the argument that denotes it. A direct object is said to be "wholly" affected, while an argument which does not enjoy direct object status may play the same part in the event yet be affected only "partitively". Anderson gives the examples (4.54) (his (7)).

- (4.54) a        John smeared paint on the wall, but most of  
                   the wall didn't get any paint on it.  
           b        & John smeared the wall with paint, but most of  
                   the wall didn't get any paint on it.

The (b) sentence is logically inconsistent, because the direct object the wall must be understood to be "holistically" affected by the painting event, a proposition which is contradicted by the qualifying clause.

Analyzing the (4.54) sentences in terms of the licensing condition (4.48), we see that the pair of arguments {the wall, paint} is licensed by virtue of clause (ii) of (4.49), as the pair defines a (locative) terminal predication for the spreading event. This terminal predication does not require any "affectedness" in either of its component arguments. But observe that the argument the wall in (4.54b) is also licensed by virtue of clause (i), as evidenced by (4.55),

(4.55) John smeared the wall

and clause (i) does require that the licensed argument be affected. In the (a) sentence, the wall cannot be licensed in this way simply because it is not an argument of the verb smeared; it is the entire PP on the wall which is the argument.

The effects Anderson discusses can thus be attributed to the licensing condition (4.48) if we interpret the notion of "holistic" affect as equivalent to licensing by virtue of (4.49) clause (i). So the holistic/partitive distinction can be taken as evidence for the biclausal definition (4.49), because both kinds of licensing must be

simultaneously operative in order to derive these semantic effects<sup>17</sup>.

#### 4.4 Inference and the TRH

##### 4.4.1 Deriving inferences without rule

Now how does Jackendoff's model compare to the licensing theory (4.49)? Not very well, it seems. Aside from the fact that only the aspectual theory is capable of accounting for resultative constructions, we can show the aspectual account to be superior on Jackendoff's own turf: the generation of logical inferences.

Consider once more the resultative sentence (4.47a).

(4.47a) Hagar snored the whole town awake.

This sentence allows us to validly infer (4.56).

(4.56) After this happened, the whole town was awake.

Now recall that Jackendoff proposes to account for inference relations like this with the aid of the rule (1.18). ✓

- (1.18) For an Event of the form  
 [Event GO ( X, [Path TO (Y)] )],  
 there is a point in time  $t$ , the termination of the  
 Event. At  $t$ , the following holds:  
 [State BE ( X, [Path AT (Y)] )];  
 and for some interval of time leading up to but not  
 including  $t$ ,  
 NOT [State BE ( X, [Path AT (Y)] )].

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<sup>17</sup>It may be necessary to impose an additional condition on the licensing process which states that clause (i) must be satisfied whenever possible, as the direct object in (4.54b) is licensed independently by virtue of clause (ii). We might attribute this condition to a processing effect on the interpretation of ambiguously licensed arguments.

But in order for this rule to apply, it is necessary to first generate a thematic representation of the form (4.57).

(4.57) '[Event GO ( X, [Path TO (Y)])]

And this kind of representation is generated only by linking arguments to argument slots which are present in the lexical PAS of a predicate. In (4.21), there can be no such argument linking because there are no argument slots for objects in the PAS of snore. So Jackendoff's rule cannot apply.

Given the licensing condition (4.48) and the definition of termination point identification (4.49), inference relations like that which associates (4.47a) and (4.56) are automatic consequences of the theory. In (4.47a), the complement pair { the whole town, awake } may be licensed just in case it identifies a termination point for the "snoring" event. By clause (ii) of (4.49), the pair identifies a termination point by defining a predication which becomes true at the point when the event is terminated. In this case, the predication is one which says that "the whole town is awake". So the complements to snore in (4.47a) may simply not be licensed unless the inference (4.56) is a valid one.

The second half of Jackendoff's rule is designed to explain the validity of inferences like (4.58) from (4.47a).

(4.58) Before this happened, the whole town was not awake.

But this inference, too, follows from the definition (4.49), which states that the predication which identifies the termination point must become true at that point. In order for a predication to become true, it must have been false previously. So the inference

(4.58) must also be true for the pair { the whole town, awake } to identify the termination point of the event.

↑ As for the non-resultative sentences which Jackendoff's rule is capable of working with, the aspectual account is superior simply because no rule is required. In (1.13a), for example, we have a sentence which denotes a motion event.

(1.13) a The raft floated from Labrador to Newfoundland

And it has been shown that motion events license complements which define locative predications to identify their termination points. So the inference (1.17) is valid--again, by virtue of the licensing condition (4.48).

(1.17) After this happened, the raft was at Newfoundland.

#### 4.4.2 Locating semantic field specification

Now it is time for the punch line. The main justification for the TRH has been said to involve control relations and the application of the rule of inference (1.19). Control relations are discussed in chapter 3, and will be taken up once more in chapter 5, where we show that the supposed TRH effects follow from other aspects of the theory developed here. And now we will show that by replacing the thematic licensing theory and the rule (1.19) with the aspectual licensing condition (4.48), the other argument for the TRH disappears.

Remember that the inference rule (1.19) is supposed to support the TRH by operating on the (a) sentences in (4.59)-(4.62) to derive the (b) inferences.

- (4.59) a Hagar sent his son to Tuktoyaktut.  
 b After this happened, his son was in Tuktoyaktut.

- (4.60) a Helga drew her lover into drug smuggling.  
 b After this happened, her lover did drug smuggling.
- (4.61) a My cousin gave me a job.  
 b After this happened, I had a job.
- (4.62) a Karen built a log cabin.  
 b After this happened, there was a log cabin.

We have shown that these inferences are better understood as consequences of the licensing conditions on complements, which involve the derivation of a true predication which incorporates the licensed complements. But we have not yet paid attention to the properties of the predication itself.

The (b) inferences tell us what the various semantic relations expressed by the predication are. In (4.59), the predication associates a location and a person, just as in the previous sentences involving motion events. In (4.60), it associates a person her lover and an activity (being) in drug smuggling. In (4.61), the predication states that the person I is the possessor of the thing a job. And in (4.62), it states that the thing a log cabin exists. The semantic relations which associate the two arguments in (4.59)-(4.61) are clearly identical to those defined by the Positional, Circumstantial, and Possessional semantic fields. And the predication over the single argument in (4.62) is the same as found in the "degenerate" Existential semantic field.

As we have seen, in Jackendoff's model, the information which specifies semantic fields is treated as a subscripted annotation on the event-functions GO, STAY, BE, etc. If we wished to characterize the terminal predication in these terms, the formulation would of necessity be that exemplified by (4.63).

- (4.63) [ BE<sub>Possessional</sub> (Thing, [Place Person ] ) ]

With this treatment of the terminal predication, the TRH could be maintained; just as Jackendoff does, we could identify the Thing as the Theme and the second argument as Goal, Location, etc.

But the definition (4.49), which specifies the relation that the predication bears with respect to the event does not make any reference to the internal structure of the predication. In particular, it does not require that one of the arguments of the predication be designated as a Theme. So it is unnecessary to impose any ordering relation on the arguments of the predication. More significantly, it follows that there is no function to the BE "event-function" in (4.63)--the semantic field specifications are the only information necessary in the representation. We therefore eliminate BE from the representation, and leave the semantic field specification in its place, obtaining (4.64).

(4.64) [ Possess (Thing, Person) ]

The representation (4.63) differs from (4.64) primarily in one respect: the former always includes a Location argument and the latter will have one only sometimes. The (4.63) representation follows from a theory which constructs all "thematic" relations from the same template, i.e. the well-formedness conditions of "Conceptual Structure"; this is the main reason to include the BE event-function in the representation. We have yet to determine the well-formedness conditions for the latter.

The optimal assumption is that the structure of the terminal predication is determined by its "head": the semantic field. (Jackendoff's model makes the same assumption; it is the nature of the "head" which is different.) We know the categorial types

associated with the various semantic fields, so we can establish the following templates: (4.65)-(4.66).

(4.65) Possess predication  $\rightarrow$  Possess-function ( Person,  $\left. \begin{array}{l} \text{Person} \\ \text{Thing} \\ \text{etc.} \end{array} \right\}$  )

(4.66) Position predication  $\rightarrow$  Locative-function (  $\left. \begin{array}{l} \text{Person} \\ \text{Thing} \\ \text{etc.} \end{array} \right\}$ , Place)

(4.67) Identity predication  $\rightarrow$  Identity-function (  $\left. \begin{array}{l} \text{Person} \\ \text{Thing} \\ \text{etc.} \end{array} \right\}$ ,  $\left. \begin{array}{l} \text{Person} \\ \text{Thing} \\ \text{etc.} \end{array} \right\}$  )

(4.68) Existence predication  $\rightarrow$  Exist-function (  $\left. \begin{array}{l} \text{Person} \\ \text{Thing} \\ \text{etc.} \end{array} \right\}$  )

It seems apparent that these "templates" are no more than a way of expressing the "meaning" of each of the semantic field types. In (4.65), for example, the fact that the arguments include a Person and one other argument (which is unspecified for semantic type) follows from the fact that possession is a relation which relates people to things in the world.<sup>18</sup> Existence is something which is predicated of virtually any object, so the template (4.68) puts no restrictions on the single argument to the Exist-function. Similar observations can be made with respect to the (4.66) and (4.67) templates. The (4.65)-(4.68) templates should not, therefore, be taken to be primitives of the theory--in contrast to those of Jackendoff's model. But they will be useful in the discussion which follows.

Now recall that we identified two vital properties of the (modified) thematic model:

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<sup>18</sup> Johnson-Laird's (1985) observation that possession is essentially a moral relation is not irrelevant to this point.

- i. the existence of semantic well-formedness conditions on derived representations allow underspecification of lexical PAS entries, and
- ii. the linking of syntactic arguments to thematic slots is governed by matching (semantic) category types.

The pair of properties leads to the right kind of mechanism to explain the fact that several semantic types may play the same "thematic" role. This result is something we need to maintain. So it is necessary to show that the model we are developing is compatible with a similar mechanism.

We use the same examples as before: (4.4).

- (4.4) a Helga put beer in the lake.
- (4.5) a Helga put her second lover in a penthouse.
- (4.6) a Helga put it; in her lover's mind [S; that she was planning to murder her secretary ]

In the thematic model, put was said to place no selectional restrictions on its Theme, as we see in (4.4)-(4.6). It does, however, restrict the semantic fields available to its complements, as shown in (4.13).

- (4.13) a Hagar put his guests in the dungeon.  
(Positional)
- b ? Hagar put his guests to peeling potatoes.  
(Circumstantial)
- c \* Hagar put his car to his son-in-law.  
(Possessional)
- d \* Hagar put a cake. (Existential)

For the (4.4) sentence, we say that the pair {beer, the lake} is licensed by virtue of identifying a locative terminal predication for the putting event. We will express this notion with the semantic representation (4.69).

- (4.69) [ CAUSE ( [Person HELGA], [Event PUTTING ] – Locative  
( [Thing BEER ], [Place IN THE LAKE] ) ) ].

The interpretation of (4.68) should be fairly transparent. In the absence of a better treatment, we adopt Jackendoff's CAUSE function to indicate the relation between Helga and the "putting" event. The arrow - indicates that there is an aspectual relation of termination which associates the event and the Position predication.

We can now derive the lexical entry for put in several steps. We wish to keep the idea that linking of arguments to semantic roles is determined by category matching. So first, we subtract the information which is a result of the linking of syntactic arguments to the lexical entry in this way. We replace the individuals in (4.69) with variables, to obtain (4.70).

(4.70) [ CAUSE ( [Person x], [Event PUTTING ] → Locative ([Thing y], [Place z] ) ) ].

Next we subtract the information which follows from the template (4.66). This gives us (4.71).

(4.71) [ CAUSE ( [Person x], [Event PUTTING ] → Locative (...) ) ].

We cannot remove the specification for semantic field in the entry for put because this verb selects only locative terminal predications. So (4.71) is the final form of the lexical entry for put.

Not all verbs will be as restrictive as put with respect to the terminal predication. The (4.15) paradigm shows that force is more liberal.

- (4.15) a Hagar forced his guests into the dungeon.  
 b Hagar forced his guests to peel potatoes.  
 c Hagar forced his car on his son-in-law.  
 d Hagar forced an awkward smile.

Following the same steps as before, we can obtain a lexical entry (4.73) for force from the semantic representation (4.72) for (4.15)a.

(4.72) [ CAUSE ( [Person HAGAR], [Event FORCING ] → Locative ([Person GUESTS ], [Place IN THE DUNGEON] ) ) ].

(4.73) [ CAUSE ( [Person x ], [Event FORCING ] → ) ]

In this case, even the terminal semantic field can be eliminated from the lexical entry. The arrow is sufficient to indicate that there must be a terminal predication.

Finally, consider the verb blush, which we find in resultative sentence (4.21) and the intransitive case (4.25a), one last time.

(4.21) Helga blushed herself out of a jam.

(4.25) a Helga blushed.

The resultative sentence gets the semantic representation (4.74).

(4.74) [ CAUSE ( [Person HELGA], [Event BLUSHING ] → Locative ([Person HELGA ], [Place OUT OF A JAM] ) ) ].

In this case, the existence of the intransitive sentence (4.25a) tells us that there need not be any termination point to a blushing event. So we are able to eliminate even the arrow from the lexical entry for blush: (4.75).

(4.75) [ CAUSE ( [Person x ], [Event BLUSHING ] ) ]

This theory of licensing shares one interesting property with Voorst's account. As the licensing of complements is tied to their aspectual functions, it appears to be necessary to presume--in the absence of evidence to the contrary--that such aspectual functions are uniquely associated with complements. Consequently, we must assume surface subjects to be derived from D-structure complements whenever they play a part in identifying a terminal predication for the head. Take a sentence like (4.75) for example.

(4.75) Hagar received a love letter.

The terminal predication for (4.75) is the Possession predication (4.76).

(4.76) POSSESS ([Person Hagar ], [Thing a love letter ] )

Then the D-structure for (4.75) should directly reflect this terminal predication, as it does in (4.77).

(4.77) [S [Infl+past] [VP received Hagar a love letter ] ]

In brief, it appears that the "possessor" argument in a Possession predication should behave much like the "theme" argument in a Position predication. When there is no (Agent) subject, for either lexical or syntactic reasons, a verb with complements licensed by a Possession predication should behave like locative unaccusative verbs--it should fail to assign Case to the direct object (the "possessor") and thereby trigger NP-movement to subject position, just as in (4.75) (cf. Guéron (1986), for similar conclusions). The verb get is a completely regular verb under this analysis. A get event may be terminated by a Possession predication. It may optionally take either single or double object complements: (4.78)-(4.79).

(4.78) Helga got her lover a new job.

(4.79) Helga got a new job.

In (4.78), the surface form is essentially equivalent to the D-structure. Helga is the "agent" of the "getting" event which is terminated by a Possession relation. The second object a new job is assigned inherent Case, according to the analysis developed in chapter 3, and the direct object her lover is assigned structural Case. In (4.79), there is no D-structure ("agent") subject, so the verb get

may not assign structural case to the D-structure direct object Helga. Move-alpha therefore applies to raise the object into the surface subject position.

Our intention in this chapter has been to develop an account of complement licensing which improves on the thematic relations account by eliminating the conceptual problems found in Jackendoff's analysis of logical implication. And as the implicature relations are the main form of evidence for the TRH, it has turned out that by removing the (stipulative) inference rule from the theory, the TRH is seen to lack support.

It follows that the various "semantic fields" may be acknowledged to play their own independent roles in the relation of syntactic structure to semantics. This has been demonstrated already by the arguments put forth in chapter 2 and 3, but now, it is to be hoped, we have a clearer picture of the precise mechanism by which this semantic relations effect an entry into the syntactic component.

## 5. More Control theory

### 5.1 Control in clauses

Recall that Jackendoff's theory claims that the notion of a thematic role is supported by the facts of control relations, since in a range of cases, the controller is determined by the semantic roles instead of grammatical functions. In this chapter, we will show that the alternative we are proposing is able to explain the same facts as well or better than the thematic account does.

#### 5.1.1 Theme and Goal linked control

We begin with the cases in which the controller is said to be linked to the Theme thematic role. These include the sentences (1.7)-(1.8) (repeated as (5.1)-(5.2)).

- (5.1) a Hagar got to London  
       b Hagar got [ PRO to do the dishes ].
- (5.2) a Helga got Hagar to London.  
       b Helga got Hagar [ PRO to do the dishes ].

The a sentences show that Hagar is what moves in (5.1)-(5.2). It is therefore the thematic Theme. And in the b sentences, it is always Hagar who is identified with the controlled PRO, no matter what grammatical function is assigned to Hagar.

We have already seen the alternative analysis for this type of sentence in section 3.3.2. It is a form of Williams' (1980) theory of control via predication. But the notion of a terminal predication which licenses the set of complements to a verb enables us to make this analysis slightly more explicit.

Assuming the unaccusative nature of the verb get (as discussed in chapter 4), the S-structure of (5.1a) is (5.3).

(5.3) Hagar got t to London.

The pair of complement arguments in (5.3) can only be licensed by identifying a terminal predication for the "getting" event. In this case, the predication relation must be a locative one, but get allows any terminal predication other than the existential, as we see in (5.4).

- (5.4) a Hagar got (his daughter) a job. (Possessional)  
 b Hagar got (his daughter) angry.  
 (Identificational)  
 c \* Hagar got. (Existential)

The (5.2a) sentence has an S-structure roughly identical to its surface form. There is no movement of the D-structure direct object, as the verb has a D-structure subject (cf. Hale and Keyser 1985). Again, the complement pair is licensed by identifying a terminal (locative) predication.

The complement pairs in the b sentences in (5.1)-(5.2) must be licensed in the same way. That is, the infinitival CP and the object Hagar must identify a terminal predication of some sort. There are only two possible predications--the existential is incompatible with the verb get, and the identificational is impossible because a Person category cannot sensibly be equated with an Event category. So the terminal predication must be one of Position or Possession. Then the semantic representation of (5.2b) must be either of those in (5.5).

- (5.5) a [ CAUSE ( [Person HELGA], [Event PUTTING ] →  
 Locative ([Person HAGAR ], [Event PRO to wash  
 dishes] ) ).  
 b [ CAUSE ( [Person HELGA], [Event PUTTING ] →  
 Possess ([Person HAGAR ], [Event PRO to wash  
 dishes] ) ).

It is not clear which type of predication is actually found in the semantic representation of (5.1)b and (5.2)b--it is not even clear that the question is meaningful<sup>19</sup>. In either case, the terminal predication is of the form (5.6).

(5.6) { Possession, Position } function ( Person, [Event PRO does ... ] )

We can now hypothesize that the semantic environment (5.6) triggers obligatory coindexation of PRO with the Person argument. Then no matter which relation terminates the "getting" event, the environment for obligatory control by Hagar will be found in the semantic representation.

Of course, there are also verbs for which the terminal predication is not ambiguous. These include the force class verbs discussed in chapter 3. Examples include (3.57)b-(3.60)b, repeated here as (5.7).

- (3.57) a Mozart drew Helga [ PRO to study voice ]  
 b Bernie got Marsha [ PRO to start drinking ]  
 c The thrill of the chase led Holmes [ PRO to forget his caution ]  
 d My fear of heights forced me [ PRO to abandon skydiving ]

In each of the (5.7) sentences, the event in question is terminated by a predication of the form (5.8),

(5.8) Position ( Person, [Event PRO does ... ] )

so the PRO of the infinitival complement is obligatorily coindexed with the direct object Person.

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<sup>19</sup> I have the intuition that Hagar in these sentences is reluctant to do the dishes, which suggests that the terminal predication is the locative, rather than the possessive.

Now what of the Goal control cases. We will, of course, claim that these are largely instances of a terminal Possession predication. Examples (3.99)a-(3.100)a from chapter 3 are repeated in (5.9).

- (5.9) a Larry said to his daughter [ PRO to eat her turnips ]  
 b Lois signalled me [ PRO to pass the hot sauce ]

Once again, the proper environment for obligatory control is found in the terminal predication--in this case (5.10).

- (5.10) Possession ( Person, [Event PRO does ... ] )

### 5.1.2 Agent linked control

There is a class of sentences in which the controller is said to bear the Agent thematic role. This class includes the notorious promise-type verb complements, as in (5.11).

- (5.11) a Joan<sub>i</sub> promised Ted<sub>j</sub> [S<sub>i</sub> PRO<sub>i/\*j</sub> to buy him a new coat ]  
 b Joan<sub>i</sub> promised Ted<sub>j</sub> [S<sub>i</sub> PRO<sub>i/j</sub> to be bought a new coat ]

The PRO in the complement to promise must be controlled by the matrix Agent argument if the infinitival is in the active mood. If it is a passive infinitival, the controller may be either the matrix subject or the matrix object<sup>20</sup>. Jackendoff (1972,1987) and Cattell

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<sup>20</sup> For many people, the controller for PRO in a sentence like (4.1b) may only be the matrix subject Joan (P. Hirschbuhler and H. Goodluck: personal communication). I myself have little difficulty in finding the alternate reading. For those speakers who do not accept object-control readings in such a sentence, I suppose that the meaning of promise is such that the subject must obligatorily be involved in the event denoted by the complement infinitival clause. Interestingly, Abrahams (1981) and Comrie (1985) point out that the German facts are unambiguously in accordance with the judgements indicated in the text.

(1984) discuss the same kind of control facts in the nominalized "composite predicate" counterparts to (5.11): (5.12).

- (5.12) a Joan<sub>i</sub> gave Ted<sub>j</sub> [ a promise [ PRO<sub>i/j</sub>\* to buy him a new coat. ] ]  
 b Joan<sub>i</sub> gave Ted<sub>j</sub> [ a promise [ PRO<sub>i/j</sub> to be bought a new coat ] ]

We assume that Ted is a "possessor" in (5.11)-(5.12); the "promising" event in (5.12) is terminated by a Possession predication, as shown in (5.13).

- (5.13) [ CAUSE ( [Person JOAN], [Event PROMISING ] → Possess ([Person TED ], [Event PRO to buy him a new coat ] ) ).

The analysis we have proposed for the (5.9) sentences suggests that terminal "possessors" should be controllers. The question we face with (5.11)-(5.12) then is: why is Joan a possible controller, and why is Ted excluded as a controller in the (a) sentences?

Apparently, the answer must involve the special causative relation between the subject and the controlled infinitival clause. It is part of the meaning of promise that the verb's subject--the "promissor"-- undertakes to ensure the accomplishment of the event denoted by the Theme argument. When the accomplishment of the Theme event can only be ensured by entering into the action itself, the "promissor" must logically become the "Agent" of the infinitival complement. The intuitive value of such an analysis has been clear at least since Jackendoff (1974) (cf. also Comrie (1985), Fauconnier (1974), Farkas (1988), Ruzicka (1983)). What is difficult is to develop an appropriate formal expression of the idea.

We will base our analysis on two properties of the semantic representations we have proposed. First, we observe that the role

of Joan in (5.13) is to "cause" the event terminated by the indicated Possession predication. And it seems intuitively clear that if Joan causes an event, then it must also be the case that Joan causes the state of affairs which results from that event. Then in (5.13), we may say that Joan causes the terminal predication for the "promising" event.

Second, it seems that promise is like the spray/load verbs of section 4 in one important respect. It has been shown that the property of a verb like load is that it optionally licenses a resultative predicate, as seen in the (4.53) sentences.

- (4.53) a Yumiko loaded the dishwasher.  
 c Yumiko loaded the dishwasher with plates.

We claimed that in the c sentence, the point of termination is simultaneously identified by both the "change of state" (or affect) located in the direct object the dishwasher and the complement pair { the dishwasher, with plates }, which identifies a terminal predication. Now consider the sentences in (5.14).

- (5.14) a. Henry promised [ PRO to put the dishes away ]  
 b. Henry promised his daughter [ PRO to put the dishes away ]

The semantic role of the infinitival complement seems to be the same in both the a and the b sentence, just as the semantic role of the dishwasher remains the same in the a and c sentences in (4.53). We can account for this similar behavior by assuming that the infinitival complement in (5.14) enters into two distinct terminal predications. It makes little sense to claim that the event denoted by the infinitival complement is "affected" by the "promising" event as the infinitival event has no prior existence. We propose then

that the infinitival S' in (5.14)a identifies an Existential predication which terminates the "promising" event. And in (5.14)b, the "promising" event is terminated simultaneously by a Possession predication and the Existential predication.

We are claiming that the subject of a promise event "causes" its terminal predication. Then in (5.16)a, Henry must "cause" the Existential terminal predication for the infinitival S'. Now consider the internal semantic structure of the infinitival clause: (5.15).

(5.15) [ CAUSE ( [Person PRO], [Event PUTTING ] → Position  
([Thing DISHES ], [Place AWAY] ) ) ].

An accomplishment event like (5.15) can only exist if its terminal predication becomes true at some point. So if Henry is to bring about the existence of the event (5.15), it follows that Henry must "cause" the terminal predication for this event to become true. Notice now that the role of PRO in (5.15) is also to "cause" the terminal predication to become true. On the assumption that there is a unique "agent" for the "putting" event, it is then logically necessary that Henry and PRO be coreferential. Hence, Henry is the controller for PRO in (5.14)a.

The semantic representation for (5.14)b is (5.16).

(5.16) [ CAUSE ( [Person JOAN], [Event PROMISING ] →

Exist ([Event CAUSE ( [Person PRO], [Event  
PUTTING ] → Position ([Thing DISHES ],  
[Place AWAY] ) ) ) &

Possess ( [Person HIS DAUGHTER ], [Event  
CAUSE ([Person PRO], [Event PUTTING ] →  
Position ([Thing DISHES ], [Place  
AWAY] ) ) ) ).

By the same reasoning we may conclude that in (5.16)b, the infinitival event is again brought into existence by Henry, even though it is "possessed" by his daughter. And this is apparently the reason that Henry is the controller. By bearing the role of "causer" of the event, Henry is able to preempt the control relation from the event's "possessor".

Returning to the (5.12) sentences, we find the same process in action. In (5.13)a, Joan brings about the existence of the "promising" event, so she is indirectly the causer of the terminal predication for the "buying" event. As such, Joan must be coreferential with PRO. The b sentence has a significantly different semantic representation: (5.17).

(5.17) [ CAUSE ( [Person JOAN], [Event PROMISING ] →

Exist ( [Event BUYING ] → Possession ( [Person PRO ], [Thing NEW COAT] ) ) &

Possess ( [Person TED ] [Event BUYING ] → Possession ( [Person PRO ], [Thing NEW COAT] ) ) ).

In (5.13)b, the infinitival clause is in the passive, so it has no "logical subject", i.e. there is no causer specified for the "buying" event. In this case, Joan need not be coreferential with the subject PRO. Note however that it is still necessary that Joan bring about the terminal predication of the "buying" event. Joan may accomplish this either as a direct participant in the event or at a distance. If Joan is a participant in the event (i.e. the recipient), she may be the controller of PRO; otherwise PRO will necessarily be controlled by Ted, the "possessor" of the event.

Verbs like ask and beg are also sometimes said to trigger control by an Agent argument. Such an analysis is supported by sentences like (5.18).

- (5.18) a Hagar<sub>i</sub> asked his daughter<sub>j</sub> PRO<sub>i/j</sub> to drive him to the airport.  
 b Hagar<sub>i</sub> asked his daughter<sub>j</sub> PRO<sub>i/j</sub> to be driven to the airport.

When the control clause is in the active, as in (5.18)a, the subject PRO must be coreferential with the matrix object. When the controlled clause is passive, either matrix subject or object may control PRO. It is the obvious parallelism with the promise verb properties which make it tempting to use the same mechanism to explain the ask construction.

It is impossible to adopt this approach in the system we are proposing. Objects are licensed aspectually, and not by bearing roles like "Agent", so the control relation in (5.18)a cannot be explained in this way. Yet the analogy with the promise construction cannot be ignored.

The first step in finding a solution is again to investigate the properties of simpler types of complements to ask, such as those found in (5.19)-(5.20).

- (5.19) a Yujiro asked that his sister fix his motorcycle.  
 b Yujiro asked for his sister to fix his motorcycle.  
 c Yujiro asked for a new motorcycle.

- (5.20) a Yumiko asked who the Carps had lost to:  
 b Yumiko asked a question.

It seems like ask selects two distinct types of complements. In (5.19), the complements can all be loosely characterized as irrealis objects. In (5.19)a, the complement clause is in the subjunctive

mood, which is the marker of irrealis finite clauses. The "for-to" infinitival clause in (5.19)b is the non-finite version of an irrealis clause (Pesetsky, talk given at MIT Lexicon Project conference on Complementation, Spring 1988). And the for NP complement in (5.19)c can best be understood as an irrealis version of the semantic <thing> category.

Now we must determine which type of complement the controlled clauses belong to. In fact, both types of infinitival complement can be found: (5.21)-(5.22).

- (5.21) a ? Leo asked [ PRO to shoot the sheriff ]  
 b Leo asked [ when [ PRO to shoot the sheriff ] ]
- (5.22) a Larry asked the bartender [ PRO to shoot the sheriff ]  
 b Larry asked the bartender [ when [ PRO to shoot the sheriff ] ]

The a sentences contain irrealis complements to ask; the b sentences, interrogative complements. And we observe that only the irrealis complements trigger object control.

With this in mind, consider the paradigm shown in (5.23).

- (5.23) a ?? Helga asked [ PRO to fire her manservant.  
 b ? Helga asked [ PRO to go to Whitehorse ]  
 c Helga asked [ PRO to be seated next to the chairman ]

What these examples show is that the subject of ask may not be coreferential with an "agent" subject of an irrealis complement, even when there is no object controller. We should be able to exploit this observation to explain the facts found in (5.18).

Now consider what semantic relation licenses the complements in sentences like (5.23). There are only a few

possibilities. In (5.24), we see that ask accepts double object complements,

(5.24) Peter asked Laurie a favor

so the terminal predication must be either Possession or Existence. In (5.23), it can only be Existence. Then the semantic representation for (5.23)a must be (5.25).

(5.25) CAUSE ([Person HELGA ], [Event ask ] →  
Exist ( [Event, [-real] for PRO to fire her  
manservant ] ) )

The only real difference between (5.25) and the semantic representation for a promise control construction lies in the [-real] feature of the complement clause in the former. Somehow, the [-real] feature triggers disjoint-reference between the matrix subject and the control clause PRO when the latter is a non-derived subject.<sup>21</sup>

A possible explanation for this effect is that the matrix subject must not perform a causative role in the irrealis event because the event would then no longer be irrealis. Then the obviation effect is forced in order to satisfy the selectional restrictions on the event complement.

Whatever the source, the presence of this obviation effect is what forces object control in (5.18)a. For if PRO must be disjoint from the matrix subject, then it must find its antecedent elsewhere. Then the obligatory control environment (5.10) can take charge of supplying an antecedent--the "possessor" object.

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<sup>21</sup> This effect must clearly be related to the obviation of subjects in subjunctive clauses in Romance (Valois, personal communication).

By linking subject "obviation" of PRO to the irrealis mood in infinitives, we predict that no such obviation effects will appear in the case of infinitival interrogative complements to ask. The (5.26) sentences confirm this prediction.

- (5.26) a Ted asked [ which tie [ PRO to wear ] ]  
 b Helga asked her lover [ whether [ PRO to bring beer or wine ] ]

Control of PRO in interrogative complements follows the pattern established for promise complements.

## 5.2 Control in nominal events

Finally, we must show that our analysis will also account for control relations in nominal complements. For example, alongside a sentence like (5.27), we find the nominal control cases in (5.28) (example (1.9), repeated from chapter 1).

- (5.27) Helga instructed her concierge<sub>i</sub> [ PRO<sub>i</sub> to say she had left town ]  
 (5.28) a Helga gave [NP instructions [ PRO<sub>i</sub> to say she had left town ] ] to her concierge<sub>i</sub>.  
 b Her concierge<sub>i</sub> got [NP instructions<sub>i</sub> [ PRO to say she had left town ] ] from Helga.

We analyze such constructions with the help of two borrowed ideas. The first comes from Boons (1985), who discusses constructions like (5.29).

- (5.29) a The cook stuffed the turkey with walnuts.  
 b The saboteurs seeded the ground with explosives.  
 c We have to load the truck with cement bags.

Boons notes that such sentences must be interpreted in such a way that there is a metaphorical equivalence established between the

with complement and the nominal form of the verb. For example, in the a sentence, the walnuts must be a form of stuffing. In (5.28)b, the explosives are equated with seeds. And in the c sentence, the cement bags must constitute a load.

The other notion we will adopt is a common one in recent literature (cf. Stowell (1981), Higginbotham (1983), Grimshaw (1988)). This is the idea that clausal complements to nominal heads are not real complements, at all--instead they are typically relative clauses, which predicate something of the nominal head.

By extending Boons' idea to the (5.27) construction, we may say that there is a relation of equivalence which associates the verbal head instruct and the controlled clause. This same relation of equivalence is found in the complex NP instructions to say ... in the (5.27) sentences. Then the control facts in the latter follow automatically from the terminal Possession predication which associates her concierge and the complex NP. The semantic representation for (5.27)a is (5.30).

(5.30) CAUSE ([Person HELGA] , [Event give] →

Possess ([Person CONCIERGE],  
[Thing instructions ]  
[Event PRO to say that ... ]

The concierge thus possesses the infinitival event, and thereby controls PRO.

## 6. Conclusion

It is time for a quick review of the claims and argumentation set out in this work. We began with Gruber's thesis that synonymous sentences must express the same semantic relations holding of the same individuals. We argued that this thesis does not entail the validity of the "Thematic Relations Hypothesis", i.e. the idea that lexical semantic relations should be factored into semantic fields and the "thematic relations" which are transparently expressed in motion event sentences.

Next, we demonstrated the significance of the semantic relations of Possession and Existence in the application of various modules of the syntactic component: Case theory, licensing theory, Binding theory, and Control theory. The point of this demonstration was to show that the "semantic field" specification in a Predicate-Argument structure could not be relegated to a purely interpretative role. "Semantic fields" must be visible to the syntactic component. Consequently, we can say that the factoring of lexical semantic relations into semantic fields and thematic relations is simply an arbitrary way to classify the various relations. Nothing interesting accrues from this ordering.

Then, in chapter 4, we proposed a principle of licensing complements which does not rely on the thematic relations vocabulary. This theory of licensing complement arguments incorporates the insights of Dowty, Tenny, and Voorst, but rephrases them in order to better account for the selection of "semantic fields" in complement relations. Finally, we showed that a range of implicature facts and control relations follow from the proposed licensing theory in a principled way.

The goal of this work has been to synthesize the thematic and the aspectual approaches to lexical semantics. The synthesis has been shown to be possible only if the set of primitives available to the theory is expanded to include a limited set of semantic relations: Possession, Existence, and a few varieties of "predication" (i.e. locative, identificational, etc.) All of these relations can be plausibly argued to satisfy Chomsky's (1981) condition of "epistemological priority". The semantic relation of possession is known to play an important role in the earliest stages of child language. And a "Cartesian" theory of language can hardly deny the prior status of existence.

What then are the consequences of this approach for the theory of grammar as a whole? The main thing seems to be that the semantic interpretation of a phrase is less dependent on lexical properties than the standard GB model suggests. The Projection Principle must be a constraint on derivations, rather than something which relates the different syntactic structures to lexical Predicate-Argument structures. A related result is that, since the lexicon is a weaker determinant of syntactic structure in this model, theories which explain syntactic variation in lexical terms become much less attractive. This model requires that such variation be dealt with in the syntax proper.

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## Abstract

This thesis addresses the question: what are the semantic relations which determine the linguistic relation between a phrasal head and its complements? The thematic relations theory of Gruber (1970) and Jackendoff (1972, 1976, 1983) is discussed, and it is shown that this theory predicts that semantic fields, like Possession, Existence, and Location, must have a very limited role in the model of grammar. It is demonstrated that this prediction is incorrect, and that such semantic fields play a part in Case theory, Binding theory, and Control theory. An alternative to the thematic relations model is then developed, which finds the basic semantic relations of complementation in the aspectual relation between a head and its complements. The model proposed allows the free exploitation of semantic field information by the various modules of grammar. Several problems in Control theory are resolved by use of the proposed model.