

esting morphosyntax. First, the unique and privileged status of the subject/“topic” and the plausibility of the verb phrase as a surface constituent—that is, the classical distinction between “subject” and “predicate”—can be attributed to the pragmatic structure, which requires that one referent be “the” primary referent and that the other participants and modifying material be subsumed under a predication unit headed by the verb. The semantic structure of the clause, however, attributes equal status to every argument and also argues for the predicate (normally, the main verb) as the head of the clause. Thus, in other morphosyntactic respects argument phrases are treated alike, in particular, in their internal (phrasal) morphosyntactic structure, while the verb as head of the clause attracts the “sentential” inflections such as tense, modality, speaker attitude, and speech act type.

From the point of view of pragmatic structure and semantic structure, there is the need to distinguish multiple semantic arguments. This is accomplished by the strategies of case marking and agreement as well as by word order. I argued in chapter 1 (and in Croft 1988) that, of these surface-structural strategies for indicating grammatical relations, case marking is the strategy that represents or denotes the relation itself that holds between the main verb and its arguments. Hence, it is most likely that the semantics and pragmatics of case marking will hold the key to a semantic and pragmatic analysis of clause-level grammatical relations. This analysis is developed in the next three chapters.

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Thematic Roles, Verbal Semantics, and Causal Structure

4.1 Introduction

The analysis in the preceding chapters demonstrates that a prototype approach to cross-linguistic grammatical patterns (the typological markedness patterns) allows us to develop a universal definition of the major syntactic categories that is not constrained to the quirks of a particular language, as a purely structural analysis would be. The acceptance of the prototype approach permits us to account for the existence of numerous boundary cases, a perennial difficulty for the formalist approach. In keeping with the functionalist goals in linguistic explanation, the analysis revealed a pattern based on the meanings of lexical roots and suggested a motivation for this pattern in cognitive conceptualization and pragmatic function.

In this and the following chapters, I will examine a problem that emerged directly from the syntactic category analysis: accounting for the ways of distinguishing different arguments of a predicate, in particular, those arguments other than the subject. This is directly related to a major issue in contemporary linguistic theory: the status of the grammatical relations “subject,” “object,” and “oblique” in universal grammar. In this section, I will restrict myself to a narrower topic that sheds considerable light on the issue: the function of case marking (prepositions, postpositions, and case affixes; chap. 5) and the closely associated verbal forms (voice, causatives, and applicatives; chap. 6). The reason for doing so is a principled one: to examine the domain of application of a single rule, or rather a single closely related pair of rules, case assignment and voice. As I noted in chapter 1, generative arguments for subjecthood have utilized an array of constructions, most of which involve interclausal relations—control of nonfinite complements, deletion of coreferential arguments in conjoined clauses, the relation between a relative clause and its head noun in the main clause, reflexivization across clause boundaries, etc. From the functionalist point of view, each construction has its own semantic and pragmatic conditions governing its domain of application, though the domains of application will coincide to the extent that they refer to the same

functional concept (e.g., topicality). However, the first stage of analysis is determining the domain of application of an individual construction.

I have chosen to focus on case marking and voice for two reasons. First, case marking and voice constitute one of the fundamental ways in which a clause is organized grammatically: they characterize predicate–argument relations. Second, as I will argue, case marking and voice are closely related to lexical meaning, particularly, verbal semantics. Nevertheless, as with syntactic categories, the relevance of verbal semantics to grammatical structure is motivated by conceptual and pragmatic factors. Also as with syntactic categories, the pragmatic factors are logically independent of the semantic ones: just as almost any concept can be expressed as a noun, almost any argument can be expressed as a subject (or object), depending on the choice of verb and voice. Unlike the preceding chapters, however, this chapter will concentrate solely on the semantic and conceptual consequences of pragmatic choices of subject and object. The pragmatics of subject and object choice is a well-researched area and will be briefly summarized in 4.2. However, the relation of pragmatics to semantics in this area has been a vexing problem, and it is this problem that I will address here.

4.2 Pragmatic and Conceptual Factors in Subject and Object Choice

Actually, the ability to express any argument of a predicate as the subject of a clause appears to be more limited than the ability to express any concept as, for example, a noun. Flexibility in subject and object selection is dependent on two major factors: the existence of a verb that allows the relevant NP to be the subject or the object and the existence of a construction type such as the passive that allows a “reassignment”¹ of argument NPs from the unmarked configuration of grammatical relations to the desired one. Thus, the ability to make the NP referring to a hole the subject of a clause describing a digging event is dependent on both the existence of a verb *dig* that makes *the hole* the direct object and the existence of the passive voice construction that allows a “reassignment” of *the hole* to subject:

- (1) The hole was dug by a stray dog.

In some languages, inflexibility in the assignment of an NP to subject or object is gotten around by flexibility in word order, so that a similar pragmatic function to, say, passive or “dative shift” is achieved through reordering the NPs without reassignment of case relations or verbal voice (cf., e.g., Givón 1984: 158; or the “topicalization” in En-

glish described by Prince 1981a). In languages such as English in which both NP reordering and NP reassignment (“relation-changing”) constructions exist, there is most likely a pragmatic differentiation. In this chapter (and the following ones), however, I will concern myself only with reassignment constructions, or as they are popularly called, “relation-changing rules.”

Whenever there is flexibility in the assignment of NP to subject or object, one may compare constructions that differ only in NP assignment in order to determine the pragmatic conditions underlying subjecthood and objecthood. Most discourse analysts agree that, when a choice for subject is involved, topicality governs the choice, and that, when a choice is not involved, the NP that is grammatically required to fill the subject slot is a “natural topic” (Hawkins and Hyman 1974). That is, the active voice construction is used when the agent is more topical than the patient, but the passive voice construction is used when the patient is more topical than the agent (Givón 1984a: 177). “Natural topicality” refers to the preference to assign topicality to NPs higher in the animacy hierarchy (Silverstein 1976; Dixon 1979), a ranking that includes NP type as well as animacy proper: first/second person < third-person pronoun < proper name < human common noun < animate common noun < inanimate common noun. Also, topical NPs are generally definite, as are subject NPs (Givón 1979: 51). Before turning to definitions of “topicality,” it is worth pointing out that, where there is a choice available between (zero-marked) object and (case-marked) oblique, it appears that the more topical NP is assigned to object position (Trithart 1979; Givón 1984a). Thus, the grammatical relations hierarchy, subject < object < oblique,² is a topicality hierarchy: subjects are more topical than objects, which are in turn more topical than obliques.

The majority of the evidence presented for the topicality hierarchy has been based on “natural topics,” that is, grammatical constraints that require that the more animate/more definite NP be made an object instead of an oblique or a subject instead of an object. Givón (1983b) has proposed a gradient concept of TOPIC CONTINUITY for a grammar-independent definition of topic (see 3.2.3). Topic continuity is measured in terms of “referential distance” (how many clauses back to the previous mention of the NP), “persistence” (how many clauses forward the NP is mentioned), and “referential ambiguity” (competition between potential topic NPs). Givón uses the concept of topic continuity to characterize word order alternations and other grammatical devices than case assignment and voice,³ so his definition cannot be solely a definition of “subject” (or, rather, that aspect of subjecthood

that is not subject to semantic or other constraints). Nevertheless, quantitative text studies of voice in Chamorro (Cooreman 1983) and Nez Perce (Rude 1988) suggest that topic continuity does govern subject choice (cf. Givón 1983b:57). Finally, it is worth noting that if topic continuity—that is, opening a cognitive file—underlies nounhood, as I suggested in 3.2.3, then it is not surprising that it also underlies the ranking of NPs: the most active cognitive file is the primary NP in the clause.

Of more direct relevance to the problem addressed here is the relation between topicality (more precisely, the manifestation of topicality in the grammatical relations hierarchy) and semantic relations between NPs and verbs. Semantic relations were first described in traditional grammar under the heading of “uses of the cases,” and in an important recent revival, that by Fillmore (1968), the semantic predicate-argument relations are titled “case roles.”⁴ The case roles, now generally called THEMATIC ROLES, will be discussed in detail in 4.3, but for now we will focus on the relation between the well-established case roles of agent, patient, instrumental, dative/benefactive, and assignment to subject or object. Fillmore proposes a subject selection hierarchy: “If there is an A[gent in the clause], it becomes the subject; otherwise, if there is an I[instrument], it becomes the subject; otherwise, the subject is the O[bject]” (Fillmore 1968:33). Fillmore supports his hierarchy by the following examples:

- (2) *John opened the door.*
- (3) *The key opened the door.*
- (4) *The door opened.*

However, the position of instrumentals in the subject selection is somewhat shaky since, in many languages, instrumentals cannot be assigned directly to subject position if an agent is missing from the clause (see, e.g., DeLancey 1984a: 186).

Givón (1976: 152; and later work) proposes an alternative *topic* selection hierarchy: agent < dative/benefactive < accusative/patient. Givón supports his topic selection hierarchy by the preference of subjects to be agents and, for objects, the preference of dative/benefactive NPs to be unmarked objects if a “dative-shift” or “promotion to object” construction is available in the language (Givón 1984a). If topicality is closely related to subjecthood, then somehow Fillmore’s and Givón’s case selection hierarchies must be reconciled. However, it should be noted that they are not as different as they appear: the

problematic status of the instrumental has already been noted, and a significant component of the topicality of dative/benefactive NPs is that they are overwhelmingly human, whereas patient NPs often are not (see the English text counts in Givón [1979, chap. 2]).

Fillmore’s view of the subject selection problem underwent a significant shift. Fillmore’s best-known article following his original case grammar proposal (Fillmore 1977) discusses the relation between semantic role and subject choice in terms of “perspective on a scene.” The basic concept is that a SCENE—what is being described—is an arbitrarily complex entity, containing all sorts of participants at various levels of detail. When a speaker chooses to describe a scene, however, he or she must select only certain aspects of the scene, by virtue of doing so emphasizing certain aspects of the scene, including certain participants of the scene, relative to other aspects of and participants in the scene.⁵ This selection process is the selection of a main verb and the selection of certain participants as subject, object, and so on.

This method of describing verbs and scenes works best with complex situations such as the commercial situation, in which there are different lexical items such as *buy*, *sell*, *pay*, and *cost* that allow different participants to be subject and object (and also allow different participants to be obligatorily present, optional, or obligatorily absent). In less complex situations, there are fewer lexical choices, but that is made up for to some extent by certain inflectional choices, namely, the different voice forms.

Fillmore’s notion of perspective on a scene represents the conceptualization by the speaker of an external, nonlinguistic situation that the speaker is describing. As in the case of the major syntactic categories, we may examine subject and object assignment to determine what semantic effects they have on thematic relations that are otherwise determined by the verb.

A study of Hare, Newari, and English by DeLancey (1984a) suggests some coercion or construal patterns for subjecthood. In Hare, instrumental NPs cannot normally be (transitive) subjects; however, inanimate nonvolitional NPs can be transitive subjects if they represent an ultimate cause, without any external agent (De Lancey 1984a: 187):

- (5) *séku ye- wékhj*
gun 3OBJ- killed
‘The/a gun killed him/her/it.’

This sentence is not acceptable unless interpreted that the gun went off spontaneously without human interference. In English, it ap-

pears that, while instrumental subjects may allow a proximate cause interpretation, as in *The key opened the door* and *The bullet killed him instantly*, they are also usable as ultimate causes, without human responsibility involved. Volitional causation, at least in the "normal" commonsense construal, is an ultimate cause, without an outside source. Other Hare data, and data from Newari as well, suggest that subjecthood also assigns direct causation: the subject brought about the action without a mediating cause. In Newari, the normal transitive clause has a subject marked with the ergative case; it contrasts with a sentence with the suffix *-yana*; note the English translations (DeLancey 1984a:195):

- (6) *harsa -n₅ wo misa -yato siat -ɔ*
H. -ERG the woman -DAT kill -PERF
'Harsha killed the woman.'

- (7) *harsa -n₅ -yana wo misa sit -ɔ*
H. -ERG '-CAUSE' the woman die -PERF
'Because of Harsha, the woman died.'

DeLancey notes that there are a variety of situations that the two sentences could describe; for example, (6) could be used for a situation in which Harsha physically assaulted the woman without intending to kill her, and (7) could be used for a situation in which Harsha told a third party something that caused the third party to kill the woman. This conceptualization of subjects as direct causers appears to involve not simply subjecthood but the fact that a simple clause with a simple transitive verb is used since indirect causation is expressed by complex clauses in some languages. That is, expression of the action with a single verb as much as assignment of the causer to subject role influences the conceptualization of direct causation.

The semantic effect of assignment of an NP to object position instead of an oblique—conceptualizing an entity as an object—has been observed widely. This is the fact that, in an alternation between object and oblique, the object in the construction is the more AFFECTED entity (Fillmore 1968; Anderson 1970; cf. Wierzbicka 1980:70–74):

- (8) *I shot the sheriff.* [sheriff hit]
(9) *I shot at the sheriff.* [sheriff probably not hit]
(10) *Gary sprayed the paint on the wall.* [all the paint used, but perhaps not all the wall covered]
(11) *Gary sprayed the wall with the paint.* [all the wall covered, but perhaps not all the paint used]

In other words, other things being equal, the object NP is conceptualized as being more affected by the action than the oblique NP.⁶

It does not appear that the semantic conceptualization effects just described relate directly to high topicality (subjects) or "medium" topicality (objects). The relation between conceptualization of objects and pragmatic or discourse function seems the clearer one. If an entity is more affected by the action denoted by the verb, then it is more centrally involved in what is being asserted than a less affected entity. It seems reasonable to assume that a more involved entity is more topical than a less involved one; otherwise, a different predication (or a different verbal form, not requiring the NP to be an object) would have been chosen. The relation between conceptualization of subjects and discourse function appears to be a bit different. An ultimate, direct cause of the action denoted by the main verb is not going to have any competitors for main topic, such as other involved agents. Another factor contributing to the topicality of subjects is animacy. Prototypical agents are volitional; hence, they are most likely human, or at least animate. As we noted, high animacy correlates with high topicality. It has been suggested that subject position also correlates with the participant with which the speaker empathizes most closely (Kuno and Kaburaki 1977; DeLancey 1981). The speaker will empathize with participants higher on the animacy hierarchy (including maximal empathy with the speaker himself or herself and the hearer). Similar arguments apply to the selection of more animate thematic roles such as benefactive as objects (Givón 1976, cited above; Dryer 1986; see also 5.4.2 and 6.1). However, the primary explanation for the conceptualization of subjects and objects is based on the conceptualization of verbs (see 6.4).

I now turn to the issue to be addressed in the following chapters: the relation between subject and object choice, however it is assigned, as well as the conceptualization it imposes on the situation, and the thematic roles that make up the semantics of predicate-argument relations. There are several general problems in the literature that these chapters will address. First, there is the definition of the thematic roles themselves. Second, there is the status of the "subject/object selection hierarchies." Finally, there is the problem of defining the range of thematic roles allowable for subjects and objects and for various oblique adpositions or case markers. This and the following chapters will offer solutions to all these problems.

4.3 Problems with Case (Thematic) Roles

The various approaches to the analysis of grammatical relations, to use that term to cover any proposal for the structure into which to fit

the main verb and the noun phrases and adpositional phrases that make up the main verb's surface arguments, mirror the approaches to syntactic categories. The structural and generative tradition analyzes grammatical relations independently of extralinguistic factors. The plausibility of this approach is due to the fact that the connection between semantic role and choice of grammatical relation is not at all obvious, if it even exists. It is extremely difficult to say what the subject of *John killed the rat* and *John likes Beethoven* have in common semantically. If one adds the passive, *The rat was killed by John*, then there seems to be no basis for a semantic analysis of subject. Instead, much of the debate in the structural and generative tradition has focused on how to represent the structure of the clause, including subject and object: phrase structure, as the generative tradition has consistently maintained; dependency relations, as relational grammar (Perlmutter 1983) and a number of European syntactic theories (Tesanière 1959; Halliday 1976; Hudson 1976; Dik 1981; Mel'čuk 1979) have advocated; or a combination of both, as lexical functional grammar (Bresnan 1982a) has proposed.

Despite the apparent lack of relation between subject and semantic role illustrated above, the thematic roles holding between the main verb and its arguments play a major role in most contemporary theories of grammar. This is particularly true of the oblique grammatical relations but also of the direct ones (subject, direct object, and, possibly, indirect object). The seminal works that brought this interest to the foreground were Gruber's dissertation (Gruber 1976, originally written in 1965) and Fillmore's original paper on case grammar (Fillmore 1968). The case and thematic role theories that have followed Fillmore's have several important features that are not present in traditional grammatical accounts of case uses (although it is difficult to interpret the traditional grammatical analyses owing to their frequent imprecision). The three most significant features are as follows.

- i. Thematic (case) roles are defined as semantic primitives (i.e., semantically unanalyzable).
- ii. Thematic roles are defined independent of the semantics of the verb, which is also left unanalyzed (primitive).
- iii. There are only a small finite number of thematic roles.

These three features lead to a REDUCTIONIST approach to thematic role definitions that attempts to minimize the number of thematic roles that would have to be cited by grammatical rules.⁷ The most extreme version of the reductionist approach is the "strict interpretation" of the localist hypothesis in which nonlocal thematic roles are

reduced to source, location, and goal.⁸ Unfortunately, the reductionistic approaches all share the problem of vagueness and overgenerality in attempting to account for the richness of typological data. In the remainder of this section, I will argue that all three of these assumptions of modern case/thematic role analysis should be abandoned and that their abandonment will in fact permit us to develop a much more adequate theory of relation between surface case marking and semantic relations.

Let us turn to the first assumption, that thematic roles are semantically primitive. A reductionist approach to case analysis will necessarily have to subsume a number of semantically distinct though related participant roles into a single unanalyzed thematic role. For example, one often finds a role called "Goal," which is intended to subsume the traditional allative, recipient, and benefactive roles. However, natural language data show that these three roles must be both distinguished from one another and related to each other as well. Consider the three major subtypes of the "goal" thematic role in English:

- (12) *I gave my ticket to the girl.* [recipient]
- (13) *I walked to the church.* [allative]
- (14) *Carol sewed up the pocket for me.* [benefactive]

These three roles cannot be subsumed unequivocally under a single thematic role because that would not account for the preposition *for* in (14) as opposed to *to* in (12)–(13). On the other hand, these three roles are *related*: the same preposition is used in (12) and (13). The examination of other languages would confirm that these three grammatical roles are related yet distinct: for example, Russian has one case form for (12) and (14) and a distinct form for (13), while Mokilese has the same form for all three.

In addition to examples such as the "goal" role, which subsumes a number of linguistically distinct but typologically related participant roles, there are other case relations that have not yet been accounted for in the case literature to my knowledge, such as the following pattern with English *with* (cf. Nilsen 1972:21):⁹

- (15) *I went to Dyerville Flats with my brother.* [comitative]
- (16) *John tickled her with a feather.* [instrument]
- (17) *Mary played the Rondo with great sensitivity.* [manner]
- (18) *Fred loaded the wagon with hay.* ["objective"]

The relationship between the thematic roles found with English *with* is not obvious, but the typologically quite widespread combination or **SYNCRETISM**¹⁰ of these thematic roles under a single surface case marker must be accounted for.

A theory that considers thematic roles to be unanalyzable primitives will not be able to handle this data. What is necessary is a semantic analysis that will allow us to decompose the semantics of thematic roles in a way that will capture the fact that allative, benefactive, and recipient are related to each other but not to instrumental, comitative, and manner. The question is, How?

The answer to that question lies in the abandonment of assumption (ii), that there is no relation between thematic roles and verb meaning and that the latter is left unanalyzed. The best way to see this fact is to examine assumption (iii), that there is a small finite number of thematic roles, critically. The greatest objection to the reductionist research program in case grammar is the tremendous variety of semantic roles that have to be accounted for. It is difficult to see how one could fit the following examples into a reductionist system:¹¹

- (19) Negative quality *A man without humor*
 Function *I used the stick as a club.*
 Reference *We talked about the war.*
 Price *I bought it for five dollars.*
 Extent *He ran (for) two miles.*

The only way in order to begin to account for the wide variety of thematic roles found with different surface predicates is to analyze the meaning of the verbs that they are associated with. The more difficult to handle thematic roles are associated with very small but semantically coherent classes of verbs, such as verbs of commercial exchange for the price role. In fact, taken to its logical conclusion, a fine-grained analysis of thematic roles will result in a unique case frame for almost every verb in a natural language. I believe that this *reductio ad absurdum* is the correct grounding point for the analysis of case, however: what it implies is that the definitions of the thematic roles must mesh in some natural way with the lexical semantics of the verbs that govern them. It is obvious that, although semantic thematic ROLES may be verb specific, surface morphosyntactic case MARKINGS in natural languages gather together large classes of thematic roles since there are thousands of verbs with thousands of roles but never more than fifty to eighty case markers and at the very most just a dozen or so case markers other than the spatiotemporal ones. Thus, surface case marking imposes structure on thematic relations to an even more abstract

degree than verb roots impose structure on the human experience of events.

It is less obvious that verbal semantics will provide a way out of this problem. To do so, one must hypothesize that verbal semantics itself is quite structured and that only certain crucial aspects of verbal semantic structure are relevant to surface case marking. In the next section I will argue that the causal structure of events will provide the relevant semantic features for case analysis.

4.4 Verbal Decomposition and the Individuation of Events

4.4.1 Causal Structure and Verbal Semantic Analysis

In the preceding section, I argued that among other things an adequate theory of thematic roles would have to link the definitions of those roles directly to the meanings of the verbs that require them. I also argued that, if that is true, then regularities in the semantics of thematic roles would reflect regularities in verbal semantics. In other words, what a single lexical verb in a natural language may denote does not vary in arbitrarily many ways, and in fact there are systematic regularities that cover verbal semantics and in turn (partially) determine thematic roles.

Verbs denote events, that is, processes (actions) or states. Although linguists have not explored lexical semantics very thoroughly, philosophers have debated about the structure of events for many years. Some have proposed that spatiotemporal extension defines events. This proposal runs into difficulties, however, because spatiotemporal extension is neither a necessary nor a sufficient condition for defining events. Simultaneous colocated events, such as a ball spinning and getting hot at the same time or a jogger running and sweating at the same time, demonstrate that spatiotemporal extension is not a sufficient condition for individuating events. There are also a few examples that suggest that spatial location is not a necessary condition. The action of being widowed, for example, cannot be located at either the location of the person dying or that of the person being widowed.¹² This is manifested in the unacceptability of the following sentence:¹³

- (20) **Mrs. Woodland was widowed in Las Vegas.*

A somewhat different type of example of the inability of locating certain kinds of events in a spatial region, also from the philosophical literature, is that of a killing by stabbing in which the victim's death occurs far away from the location of the stabbing (and also long after the time of the stabbing). One does not want to say that the killing oc-

curred at either location (or time, for that matter) alone or in a combination of both. In fact, natural language expressions of the spatial location of events (so-called external locatives) appear simply to describe a spatial region in which the event occurred. With events such as widowing or the drawn-out killing example, in which no single connected spatial region can plausibly include the event, these expressions are unacceptable. Temporal expressions appear to function in the same way: they describe an interval that includes the occurrence of the event. Although the drawn-out stabbing example provides problems for temporal expressions, it is difficult to find a candidate for an event analogous to widowing on the temporal plane.

In a paper titled "The Individuation of Events" (1980a) first published in 1969, Donald Davidson criticized the spatiotemporal approach and argued instead that causal structure defines events.¹⁴ Davidson concludes his article with this passage: "Events are identical if and only if they have exactly the same causes and effects. Events have a unique position in the framework of causal relations between events in somewhat the way objects have a unique position in the spatial framework of objects" (Davidson 1980a: 179).

The criterion of causality in individuating events applies to individual lexical items as well: individual lexical items appear to denote only causally linked events. Consider the well-known example of verbs whose semantics combines a "manner" or activity as well as a path of motion (cf. Talmy 1972):

- (21) *The boat sailed into the cave.*

The activity of sailing and the motion into the cave can be combined only because the activity of sailing *causes* the motion to come about. If the activity does not cause the motion to come about, the sentence is unacceptable:

- (22) **The boat burned into the cave.*

This sentence cannot even mean 'the boat was burning while entering the cave': that would be combining two causally unrelated, albeit simultaneous and spatially co-occurring, events into a single clause. In fact, if one does want to describe two causally unrelated events that are simultaneous and possibly also spatially co-occurring, then one must use two separate verbs in separate clauses, linked coordinately or subordinately:

- (23) *The top spun and got hot at the same time.*

- (24) *The boat was burning as it entered the cave.*

This is not simply a case of an incompatibility between *burn* and *into* in the latter sentence; the combination is acceptable just when the burning causes the motion:¹⁵

- (25) *The branding iron burned into the calf's skin.*

That the lexical semantics of verbs should follow the same principles as the philosophical analysis of events is not altogether surprising since—from the perspective of the surface structure of natural languages expressing cognitive reality fairly directly—the verbal lexicon constitutes an encoding of what human beings perceive and consider to be individual events. But it provides the fundamental basis of the analysis to be presented here: that verbs reflect segments of causal structure, not any other kind of structure.

The question now is, How is causal structure to be represented? The standard philosophical technique is to represent causality in terms of events causing events:

Sail(e_1 , boat) & Enter(e_2 , boat, cave) & Cause(e_1 , e_2).

There are two difficulties with the philosophical-logical representation. First, the thematic roles of the participants are not expressed at all. The notation could be modified, as Castañeda suggested in a modification of Davidson's (1980b) original proposal, in the following way:

Enter(e_2) & Theme (e_2 , boat) & Goal (e_2 , cave).

However, this notation does not indicate any relation between the verb (the unary predicate of e_2) and the thematic role type; both are still unanalyzed. Another drawback is that there is no a priori reason to exclude the possibility of one event causing another event without any participants being shared between the two events, a situation excluded by the commonsense intuitive notion of causation:

Dance(e_1 , Mary) & Enter(e_2 , boat, cave) & Cause (e_1 , e_2).

An alternative approach to decomposing events is in terms of individual arguments combined with propositional arguments, such as the following analysis of the word *break*:

Cause (x, Become(y, Broken(y))).

These analyses are directly related to the generative semantic decompositions of verbs in structure (of which one of the first and best is Gruber [1976]), although they are intended to be semantic rather than syntactic representations. The best-worked-out analysis of verbal semantics in these terms is Dowty (1979), in a Montague grammar frame-

work (see also Foley and Van Valin 1989); Jackendoff (1983), in his own mentalist conceptual structure framework; and Gawron (1983), in a frame-semantics framework. Dowty uses both Vendler's (1967) classification of aspectual types and generative semantic lexical decompositions to construct a Montague grammar semantic fragment. Although Dowty's analysis of verbal semantics is concerned chiefly with the interaction of verbs and temporal expressions, the decompositions are very close to those to be proposed here, in which inherent aspect (or *Aktionsart*) and causal relations are perhaps the two most important components of lexical analysis. Lexical decomposition is often criticized, largely because it is combined with, and confused with, a reductionist approach to the number of primitive subunits used for verbal analysis. It should be clear from the comments in 4.3 that I am not advocating a reductionist approach in linguistic analysis (see also 4.4.2–3).

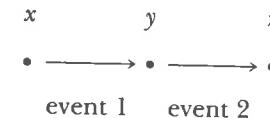
Nevertheless, the propositional-argument representations, in which an individual is related to an event, has its drawbacks. It suffers from the same defect as the philosophical representations in which an event is related to an event, namely, that there is no necessary connection between participants involved and events related:¹⁶

Become(*x*, Broken(*y*)).

Another problem is that there is no thematic role that is consistently associated with the participant that is extracted to be the individual argument, as opposed to the participants that remain in the propositional argument. The thematic role associated with each argument is a combination of the predicate type and its position in the argument structure (e.g., an agent role would be defined as the argument position “*x*” in Cause(*x*, P(*y*))).

I believe that these two objections are relatively minor and can be patched up at least in part by advocates of these means of representing causal structure. However, the major objection to this approach is that there is a third way to represent causation that allows us to capture a large number of linguistic generalizations. This is to represent causation as individuals acting on individuals, with some notion of transmission of force determining which participant is “first” in the causal order or causal chain. This form of representation was first proposed by Talmy (Talmy 1972, 1976) and has begun to be employed by linguists for causal analysis (e.g., DeLancey 1985; Lichtenberk 1985; Langacker 1987a; Klaiman 1982a, 1982b, 1988; see also Barber 1975). The advantage of the representation of causal relations in terms of individuals acting on individuals are twofold. First, it requires that caus-

ally related events share individuals since the individual at the endpoint of one event is the initiator of the next, causally connected, event (*x*, *y*, *z* = participants):



The second advantage is that it imposes a (possibly partial) ordering of participants in the causal chain of events: *x* precedes *y* in the causal chain, and *y* precedes *z* in the causal chain. This will prove to be a crucial feature in formulating linguistic universals, and it is absent from the other two representations of causation.¹⁷

4.4.2 Semantic Primitives and Granularity

At this point, it appears that we are defining a system of semantic primitives not unlike other systems that have been proposed (e.g., Schank 1972). The notion of semantic primitive is attractive but also extremely problematic. The two most important problems are that primitives seem always to be further analyzable and that a finite set of primitives may not succeed in capturing the complexity of our experience (and, as a consequence, the linguistic expression of experience). We may avoid these problems by recognizing that a “semantic primitive” describes a conceptualization of experience, not the complex structure of experience itself; the conceptual processes of granularity and idealization account for the abstraction to “primitives.”

I will illustrate the problem of potentially infinite analyzability and its solution in this section. One may define causes and effects in increasingly fine detail, and so the problem of individuating events arises again, not on the level of what principles structure events, but on the issue of reaching an atomic level of analysis of the causal structure of events. For example, the sentence in (25) can be expanded into the complex but causally linked sequence of events in (26):

(25) *John was sick.*

(26) *The virus attacked John's throat, which became inflamed, resulting in laryngitis, until the immune system succeeded in destroying the infection.*

The solution to this problem is the notion of GRANULARITY (Hobbs 1985; Croft MS). This is the idea that there are different levels of

precision in conceptualization, so that some concepts are conceptualized as irreducible at one level even if they are reducible at another, more "fine-grained" level. Thus, details and distinctions below the more "coarse-grained" level can be ignored at that level of granularity. However, one may shift one's attention to a more fine-grained level of granularity at which those details and distinctions become relevant. Likewise, one can shift one's attention to a still more coarse-grained level at which one may ignore even more distinctions.

Example (25) is at a coarser level of granularity of causal structure than example (26), although both sentences are describing the same "objective" event. Example (25) describes the event as a property of an individual human being as a whole: the human being as a whole is treated as an atomic entity. Example (26), on the other hand, describes the event as a series of events at a level considerably below that of the individual, who is no longer an atomic unit but instead a complex whole made up of many parts, including an entity (the virus) that is not part of John but is relevant (or "distinguishable") at the finer level of granularity in (25). At this level of granularity, the irreducible, atomic event in (26) becomes, not surprisingly, a causal sequence of many events.¹⁸

The concept of levels of granularity in conceptualizing "objective" reality allows one to "ignore" finer-level semantic details in lexical analysis when they are irrelevant to the conceptualization of the event, without committing oneself to a single-level system of unanalyzable primitives. Sometimes it is necessary to treat primitives as being themselves complex, and at other times the primitives are too fine grained for the relevant situation. Although the concept of granularity allows us to avoid these problems, there remains the problem of what can be a proper level of granularity.

There is an "easy" solution to this problem. Levels of granularity are partly determined by the types of entities that the speaker wishes to talk about, that is, the arguments of the verb. That is, what kinds of things a speaker can say about (predicate of) something depend on what kinds of things the speaker is talking about (referring to). Of course, the types of entities the speaker is talking about in turn have their own level of granularity. The distribution of referring expressions (nouns) in levels of granularity presumably has to be accounted for by a theory of perceptual and conceptual structuring of those chunks of reality that lend themselves to human conceptual individuation and classification as objects of various kinds. Developing such a theory is an important task for any cognitive approach to linguistic analysis, but it is beyond the scope of this volume.

The important feature of granularity for this model is that the

granularity levels of the arguments must be matched with the granularity level of the predicate, and so choice of the granularity level of one determines choice of the granularity level of the other. This can be stated in more traditional linguistic terms: there are selectional restrictions that hold between predicates and arguments that are determined by level of granularity as well as by other semantic factors. However, there is no a priori directionality between predicates and arguments in one determining the level of granularity of the other. That is, the speaker may have decided what he is going to talk about (the referent), and that determines the way in which he will express the predication. Or, the speaker may already have an event in mind that he wishes to report, its level of granularity already determined, and that in turn determines the level of granularity of the arguments to the predicate denoting that event.

4.4.3 Ideal Models and Criteria for Atomic Events

The second problem with semantic primitives is that they cannot capture the richness of experience. In general, language does not capture the full range of experience because it has only finite means. Therefore, it must simplify or idealize its cognitive model of experience. For example, Lakoff (1987: 70) notes that the definition of *bachelor* as 'adult unmarried male' is not wrong because it cannot account for the status of the pope, Tarzan, a man living with his girlfriend, a member of a gay couple, etc. It is in fact the correct definition of *bachelor*; the problem is the fit of the cognitive model of maturity, sexuality, and marriage with the variety of experience illustrated by the anomalous examples given above. Idealization, along with granularity, allows human beings to handle the complexity of experience for the purposes of linguistic communication (and, presumably, other purposes as well).

In this section, I will propose a set of criteria that represent the first steps toward an IDEALIZED COGNITIVE MODEL (Lakoff 1987) of individual events, where "individual event" is the semantic entity corresponding to a simple verb. In later sections, I will discuss some modifications to and problematic cases with the criteria given below; the problematic cases represent events that do not fit the idealized cognitive model in roughly the same way that the pope does not fit the idealized cognitive model of *bachelor*. The full idealized cognitive model of events will be presented in 6.4.

Criterion 1. An atomic event must be of only one causation type.

Criterion 2. An atomic event must be of a single inherent aspectual type, specifically a state or process.

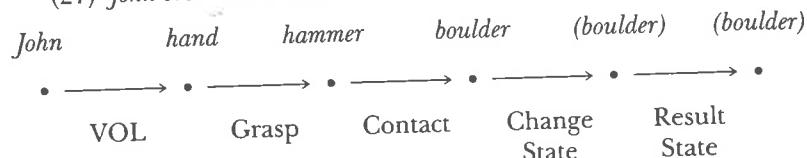
Criterion 3. An atomic event containing two participants must

have those participants aligned in the direction of "transmission of force."

Criterion 4. An atomic event must be a single qualitative unit.

I will illustrate these four criteria by arguing that the causal sequence in (27) is correctly decomposed into the atomic events illustrated by the diagram immediately below it (making certain additional assumptions about the action described that are not explicit in the example sentence).¹⁹

(27) *John broke the boulder with a hammer.*



Criterion 1: Causal Type The first criterion is based on an analysis of causation types developed by Talmy (1972, 1976). Talmy points out that causation is a relation between events, but he argues that the relevant classification of causation types is based on the status of and change in the entities that participate in the event. The analysis that Talmy uses is based on the ability to speak of one object acting on or entering into a causal relation with another object and that other object being affected by the first object.²⁰

Talmy distinguishes four kinds of causation:

Physical causation: physical object acting on physical object;

Volitional causation: volitional entity acting on physical object;

Affective causation: physical object "acting on" entity with mental states;

Inductive causation: volitional entity acting on entity with mental states.

The classic action verbs such as *hit* or *break* fall under the example of physical or volitional causation, depending on the animacy and control of the INITIATOR (a volition-neutral term for the "agent"/"cause"). The mental verbs of emotion, cognition, and perception fall under affective causation, with certain qualifications (see 5.5.1). The verbs called "mental/social" in 2.7 (including the verbs controlling *Equi*), such as *persuade*, *convince*, *force*, etc., fall under the category of inductive causation.

Talmy's four causation types can be analyzed further as an exhaustive listing of causation types based on a commonsense ontology

that is dualist, that is, distinguishes between the mental and the physical. This analysis is illustrated in table 4.1.

TABLE 4.1 *Analysis of Talmy's Four Basic Causation Types*

Initiator (Acting On)	Endpoint (Acted On)	Causation Type
Physical	Physical	Physical
Mental	Physical	Volitional
Physical	Mental	Affective
Mental	Mental	Inductive

Physical causation is the interaction of two nonvolitional, nonsentient entities such that one affects the other. Volitional causation involves an initiator possessing and exercising his mental capacity (through planning, intending, etc.) acting on a physical object. Affective causation involves a physical object or state of affairs changing the mental (emotional, cognitive, perceptual) state of an entity; therefore, the latter must possess a mental capacity. Finally, inductive causation involves an initiator possessing mental capacity exercising it (through communication, persuasion, authority, etc.) to alter the mental state of the endpoint entity (so that he or she will act in some further way).

There is some more detail involved in the commonsense theory of dualism that must be outlined here. First, there is a basic asymmetry in the causation types, which results from a commonsense metaphysics axiom stating roughly, "No telepathy and no telekinesis outside one's own body."²¹ This is illustrated in figure 4.1.

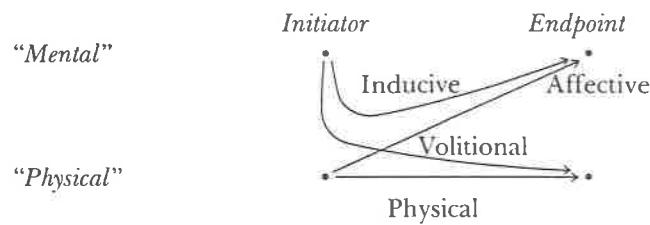


FIGURE 1. *Asymmetries in causation types*

Any causation type that involves an initiating "mental"-level entity must be mediated by a physical entity, specifically, the mental-level

entity's own body. Thus, the arrow (arc) for volitional and inductive causation extends "down" to the physical level before reaching the endpoint. This asymmetry does not apply to endpoints: physical objects (or states of affairs) can alter mental states as well as act on other physical objects.

It should be clear that the mental-physical level distinction harks back to the animacy hierarchies. In fact, it introduces a subtle distinction among the class of humans (and, of course, speech act participants) since humans are dual entities that can act as physical objects (the body) or as mentally capable individuals (the usual case). This distinction is well known in the case of volitional versus nonvolitional subjects, manifested in the two interpretations possible for *John hit the wall* or *John fell*. Less well known is the fact that this distinction is also present for objects as well. In *The king showed his daughter to the knight*, the knight must be using his mental ability, namely his perceptual ability, while all that matters about the king's daughter is her perceptible physical reality, not any mental capability that she has. Thus, the mental-level entity is not just any role that may be occupied by a human being but one *exercising* his mental abilities in the action in question. This is the sense in which the indirect object roles of hearer (in *tell*), perceiver (in *show*), and recipient (in *give*; ownership is actually a social concept, but it still requires mental capacity) are *always* higher in animacy than the patient (which leads to the tendency of these roles to "usurp" object agreement; see 5.4.2).

If the mental-physical distinction does reflect the animacy hierarchy, then the unmarked causation type should be volitional causation with a mental initiator and a physical endpoint, and that certainly is the case (cf. the natural correlations mentioned in 2.2 and discussed in Croft [1988]).²² An example of a split case-marking system that appears to reflect the mental-physical distinction directly is found in Northern Pomo (Dahlstrom 1983). Northern Pomo has an animacy/volitionality split just at the point that one would expect: the unmarked human participants are agentive, and the unmarked non-human participants are nonagentive (table 4.2; A = transitive subject, S = intransitive subject, P = transitive object).

TABLE 4.2 Northern Pomo Case Marking Split

	A, S (Active)	S (Stative), P
Human	-Ø	-al
Nonhuman	ya'	-Ø

The most marked type is the inversion of volitional causation, namely, affective causation, represented by mental experience verbs with thematic roles normally referred to as "experiencer" and "stimulus." The markedness of the "unnatural" correlation involved in affective causation is reflected in the typological variation of the case marking of mental verbs—that is, the use of subject-experiencer or object-experiencer constructions and the frequency of governed obliques instead of simple direct objects (see 5.5.1, Croft 1990a). However, here I am crucially interested in the unmarked case, namely, volitional causation, because the unmarked member of a category provides the core or model type for the relevant linguistic behavior (in this case, case marking) and because the behavior of the marked types is based on or derived from that of the unmarked types (see 2.4). This prediction will be made more precise in 5.4 and 5.5.

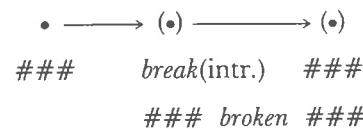
At any rate, figure 4.1 provides the basic notation that I have already used in example (27) and will continue to use throughout the remainder of this book. Atomic events will be represented by directed arcs, and the participants will be represented by nodes linking arcs. The notation is intended to reflect the fact that events, at least those that I hypothesize to constitute the core types, have causal directionality, and they can be linked into a series of causally related events such that the endpoint or affected entity of the causally preceding atomic event is the initiator of the next atomic causal event. This series I will call a CAUSAL CHAIN; any subpiece of the causal chain I will call a CAUSAL SEGMENT or simply a SEGMENT of the causal chain. The minimal segment I will generally refer to as an ARC of the causal chain.

Having explicated and analyzed Talmy's quadripartite division of causation types, one may return to example (27) and determine which arcs are atomic by virtue of the first criterion (distinct causation types imply distinct arcs). The first criterion distinguishes only the first arc from the second. The first arc is an act of volitional causation by the agent, John, onto a physical object, the hammer. Actually, to be completely precise, one must include an intermediate participant, namely, a body part of John's such as his hand, because the commonsense ontology prohibits telekinesis outside the body. This allows the acceptability of sentences such as *He shot the beer can on the fence with his left hand*, meaning that he used his left hand to handle the instrument (e.g., a pistol). On the other hand, such instruments are commonly conceptualized as extensions of the agent's body, and the type of sentence just given is quite rare. The usual meaning of an instrumental expression with a body part is that the body part itself accomplished the action, as in *He broke the boulder with his left hand*.

future diagrams I will leave out the body part “grasp” arc, unless the body part is explicitly expressed as an object or instrument.

Criterion 2: Aspectual Type. The second criterion is based on the classification of inherent aspectual types, also known as *Aktionsarten*. Although various aspectual categories have been observed to be linguistically significant, the distinction that is relevant here—as in the analysis of syntactic categories in chapters 2–3—is that between a STATE and a PROCESS, the latter property being common among the last three.

Distinguishing states and processes allows the separation of a process from its resulting state even though same participant (or participants) is involved. For example, the intransitive inchoative verb *break* in *The boulder broke* covers a different part of the causal chain from the adjectival stative *broken* in *The boulder is broken*: the former includes the breaking process as well as the resulting state, while the latter covers only the resulting state. This distinction is captured by representing the process and the state as separate arcs:



The last two arcs in the example are distinguished by this criterion. (In order to distinguish states from processes, no arrow will be placed at the end of an arc indicating a state; see criterion 4.)

Criterion 3: Transmission of Force. The third criterion is intended to distinguish the “grasp,” “contact,” and “change state” arcs in the example. All three arcs involve physical causation and are processes, so the first two criteria cannot distinguish them. However, in the grasp arc, John (more accurately, John’s hand) is acting on the hammer; in the contact arc, the hammer is acting on the boulder; and, in the change state arc, the boulder is acting (changing state) “on its own.” What has happened is a TRANSMISSION OF FORCE from John (his hand) to the hammer and from the hammer to the boulder. Each shift in the “force” from one participant to another represents a new segment in the causal chain.

The basic concepts that must be captured by an adequate definition of the third criterion are (a) that a transmission of force from one entity to another involves the end of one causal arc and the beginning of another and (b) that the directionality of the causal chain is deter-

mined by the direction of “force.” That is to say, one must be able to decompose purely causal sequences into sequences of one entity acting on another entity, which acts on a third, and so on; in this case, the sequence of entities is John, hand, hammer, boulder. This requires a model of volitional and physical action based on a notion of “force” that remains to be formalized—it would be part of the richer qualitative definitions of the causal arcs.

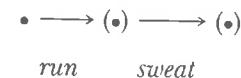
The difference between direct object and oblique assignment is the difference between conceptualizing the event as a transitive ACTION that transfers “force” from one participant to the other and as an intransitive ACTIVITY involving only one participant directly, though with some reference to another event, such as the goal of an unfinished activity or the direction of a gaze or shot. (This underlies the conceptualization of an entity as an object vs. an oblique described in 4.2.) Clearly, one criterion for transfer of force is whether the object undergoes a change of state or at least a complete change of state (just the criteria for object-oblique choice in most languages). The boundary of the two conceptualizations is not a sharp one, and one expects that to be reflected in typological variation in object-oblique case frames for the boundary cases. But by distinguishing between the arbitrarily complex “objective” event and the necessarily simplifying conceptualization of it, as well as the conventionalization of the distinction (subject of course to historical change), one can successfully abstract the generalization that direct object choice will always align itself with the more affected entity.

The theory of volitional action appears to be quite simple. As I argued earlier, the commonsense model requires a mind-body distinction. The link between volition and physical action is quite restricted, being a relation between a volitional entity and that entity’s body (or part thereof). The VOL link translates will (intention) into physical force. The will is the source (ultimate cause; see 4.2) of the force and therefore is clearly the initiator, not the endpoint.

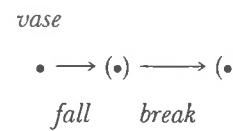
Criterion 4: Qualitative Semantic Differences. Consider again the aforementioned example of John running and sweating²³ or the example of falling and breaking (the latter example is oversimplified in its representation here):

- (28) *John ran, sweating all the way.*

John



(29) *The vase fell and broke.*



Although it is intuitively natural to distinguish two separate atomic causal segments here, on the basis of the first three criteria one cannot distinguish them. In each example, both segments involve physical causation, both segments are processes, and both segments have the same participant. Therefore, "transmission of force" is the same (more accurately, there is no transmission of force). However, English separates the two causal segments by expressing them as separate verbs. Running and sweating, or falling and breaking, are two qualitatively different actions, and thus qualitative differences not captured by the first three criteria also suffice to distinguish causal segments as conceptually (i.e., lexically) distinct entities. Unfortunately, this criterion is not as precise as the first three; however, it will not significantly affect the analyses to be discussed below.

4.3.4 The Definition of Verb Meaning and Thematic Roles

The causal structures defined in the preceding section are actually more complex than the example used suggests. Causal chains extend indefinitely into the past and the future. Causal chains can be circular, so that an initiator may cause something to happen to himself or herself, as in shaving oneself. There are processes that do not affect other entities, such as the boulder breaking. Some relations appear to be symmetrical. This is due to mutual transmission of force, as in two persons wrestling or two moving vehicles colliding. Or it may be due to the fact that a noncausal relation holds between entities, such as one entity being located with respect to another or one entity possessing another.

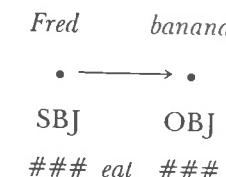
This tremendous complexity of causal structure in human experience must be simplified into verbs and thematic roles, that is, the predicate-argument structure of a clause. This is accomplished, as with syntactic categories, through the conceptualization of events in a specific fashion. In Croft (in press b; see also 6.4), I argue that the conceptual model (or idealized cognitive model, to use Lakoff's [1987] term) for a simple event—that is, an event denoted by a verb exclusive of voice, causative, or applicative derivation—includes the following features:

- a) a simple event is a (not necessarily atomic) segment of the causal network;
- b) simple events are nonbranching causal chains;
- c) a simple event involves transmission of force;
- d) transmission of force is asymmetric, with distinct participants as initiator and endpoint (these terms are defined below).

The prototypical event type that fits this model is unmediated volitional causation that brings about a change in the entity acted on (i.e., the manifestation of the transmission of force), that is, the prototypical transitive event (for an early statement of the prototype, cf. Lakoff [1977]; for typological data in support of it, Hopper and Thompson [1980]; and for a contemporary cognitive statement of it, Rice [1987, sec. 2.5]). Other event types must be "coerced" into this model. A substantial amount of clause-internal syntax (viewed typologically, of course) is a manifestation of the coercion and conceptualization process and is the topic of the following two chapters. The remainder of this section will describe the consequences of this cognitive model of event structure, in particular a–c, on the linguistic issues raised so far in this chapter.

My proposal for the representation of the relation between a clause—the verb and its arguments—and the situation that it describes is actually quite simple to state. A verb denotes a segment of a causal chain, called here the VERBAL SEGMENT. This is condition a, specified further by conditions b–c, and the basis for the analysis in this volume. The subject and the object (if there is one) are at each end of the segment of the causal chain, the subject causally preceding the object (causal ordering in mental states will be discussed in 5.5.1). The causally prior end of the verbal segment represents the INITIATOR and the causally later end the ENDPOINT of the verbal segment. That is to say, subject and object delimit the verbal segment of the causal chain. Thus, a simple sentence like *Fred ate the banana* would be represented as follows (using ### as verb segment delimiters):

(30) *Fred ate the banana.*



This allows us to have our cake and eat it too with respect to the thematic roles borne by subjects and objects: this is a consequence of the

"subject" and "object,"²⁴ but the range of thematic roles allowable by subject and object (in the unmarked, simple active voice case) is defined by the semantic structure of the lexical entries for verbs (see 6.4).

Conditions a, c, and d have been (and will be) discussed in detail. Condition b of the conceptualization of an event specifies that it involves nonbranching causal chains. This is manifested linguistically in various ways (Croft, *in press a*). First, if the two causal chains are parallel, so that a single initiator acts on two endpoints or two initiators act on a single endpoint, then conjoined NPs can be used: *I chopped both the carrot and the cucumber; Carol and I disassembled the shed.* This represents conceptualization of the two parallel events as a single event.²⁵ In most cases, however, two separate clauses, representing conceptualization as two separate events that happen to share participants, are used: *I cut the cucumber when I chopped the carrot.* This is especially true if the intention of a volitional initiator toward the two actions is different, as in *I cut my finger when I chopped the carrot.* More important, non-branching and asymmetrical causal chains clearly distinguish subject from object semantically, so that grammatical and pragmatic asymmetries between subject and object are clearly relatable to their semantic roles.²⁶

I will now illustrate the range of possibilities afforded by the verbal lexicon in describing an "objective" event and affecting the choice of subject and object. Consider a fairly complicated situation, namely, communication. (This example is rich but problematic, as complex examples usually are.) The speaker engages in an activity that creates sound, that is, an utterance, that is heard by the hearer. This situation type and the segments denoted by different verbs are illustrated in figure 4.2.

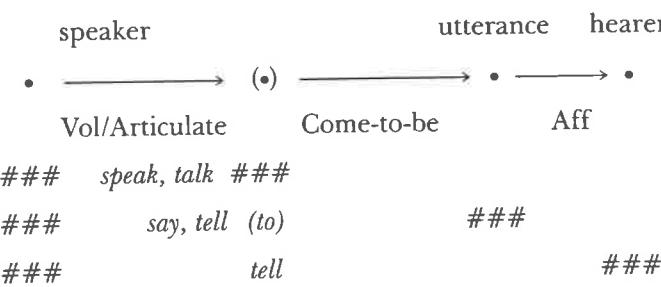


FIGURE 4.2. *Different lexicalizations of the speech event*

English has two verbs that describe just the first part of communication, the speaker's activity: *speak* and *talk*. Both these verbs allow

arguments describing the other "participants" of the complex situation, namely, the hearer and the utterance (or rather the content of the utterance): *speak/talk to X about Z*. However, these additional arguments are optional and oblique. In other words, they do not delimit the segment of the causal chain denoted by the verb, and so one may say that the causal chain does not extend beyond the (unary) activity of the speaker that causes the utterance to come to be. That is, these verbs conceptualize the speaker's activity as a relatively autonomous simple event, without necessary transmission of information, as can be seen by their usage compared with another communication verb like *tell*:

- (31) *He's talking, but no one's listening.*
- (32) ??*He's telling them, but no one's listening.*
- (33) *Be quiet; let me speak!*
- (34) ??**Be quiet; let me tell you!*

Instead, there are other verbs that delimit that larger segment: *say* and *tell (to)*. Both these verbs allow the utterance as a direct object or complement in some form:

- (35) *He said "I love you"/that he loved her/a spell.*
- (36) *She told a story.*

In both cases, the hearer is an oblique argument, which indicates that it does not delimit the endpoint of the verbal causal segment, and is optional, though under slightly different conditions. Finally, the hearer functions as the endpoint in the case of the "dative-shifted" case frame of *tell*—but so can the utterance, although the content may appear as an oblique (*tell Z "X"/that X; tell Z about X*). This example illustrates a number of interesting issues in the relation between causal segments denoted by verbs and the representation of events. First, the complex decomposition of the communication event type into the arcs and nodes in figure 4.2 allows one to distinguish the different verbs on a systematic semantic basis. Second, owing to the richness of the verbal lexicon in this domain and the passive voice (which, I will argue in 6.2, allows the possibility to choose the endpoint rather than the initiator as the subject), any one of the participants can be selected as the subject by the speaker.²⁷

There are two important residual issues whose resolution is crucial for the development and verification of this theory of verbal semantics and thematic roles, which will be briefly described here.

The first issue is the problem of the optionality of surface-structure arguments: some objects are optional, and some obliques are obligatory. Various factors, including the genericness of the object and the pragmatic recoverability of the subject or object, allow the "obligatory" object argument (and also subject argument in certain cases and in certain languages) to be "optional" (see, e.g., Fillmore 1986; Rice 1987, sec. 5.4). That is, various factors, including pragmatic ones, determine optionality of objects and subjects, and it is not clear exactly how they interact with the causal analysis.

Obligatory obliques, as in *look for a book*, are a more direct problem for the causal structure analysis. If the verb meaning is just the causal chain between the subject (initiator) and object (endpoint), then an obligatory oblique is an anomaly. One plausible explanation for this is that the semantic conceptual conditions governing verb structure and objecthood are actually quite narrow, so that in some cases an unaffected "object" cannot be conceptualized (i.e., expressed) as a grammatical object under any circumstances. This will account for most if not all obligatory obliques since they represent unaffected "objects." However, there is some degree of conventionalization since some unaffected "objects" are grammatical objects (e.g., *seek*) whereas others are not (*look for*).

The primary motivation behind the analysis of verbal semantics in terms of causal structure given in the preceding sections is to provide a semantic framework in which to define thematic roles. Assuming that a main verb, that is, a verbal causal segment, has been selected, and consequently also the subject and object have been selected, then one can redefine the major oblique thematic roles that have been proposed in the case grammar literature.

The major oblique thematic roles can be generally described in terms of the ordering of participants in the causal chain, *relative to the choice of subject and object* (i.e., relative to the choice of verb, including verbal voice form). This is not the case for the "direct" thematic roles, those that normally become subject and object (or occasionally indirect object): agent, patient, experiencer, stimulus.²⁸ These thematic roles appear to be defined primarily in terms of the causation types of the arcs of which they are the initiators or endpoints. The following definitions can be used for the direct thematic roles:

Agent: the initiator of an act of volitional causation (a VOL arc);

Patient: the endpoint of an act of physical causation (a PHYS arc); recall that acts of volitional causation must be mediated by a physical entity that physically acts on the patient);

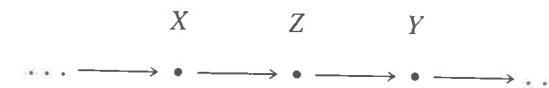
Experiencer: the endpoint of an act of affective causation (an AFF arc);

Stimulus: the initiator of an act of affective causation (an AFF arc).

The often-noted priority of these thematic roles in subject and object choice is due to the semantic structure of the verbal lexicon, namely, that verbal causal segments tend to begin with VOL arcs and end with PHYS and AFF arcs.

The oblique thematic roles, on the other hand, are defined in terms of the relation between nodes and the segment of the causal chain denoted by a verb, although, as will be seen, the causation type or at least the ontological status of the participant (mental level or physical level) sometimes plays a role. I will introduce some terms to allow us to describe positions (modes) in a causal chain more precisely:

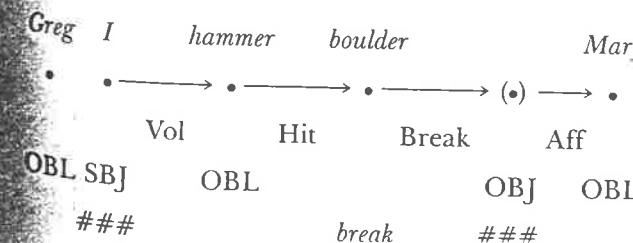
X precedes Y and *Y follows X* in a causal chain if and only if there exists a causal segment of the causal chain such that *X* is the initiator and *Y* is the endpoint. *Z* is *between X and Y* in a causal chain if and only if the causal segment bounded by *X* and *Y* includes *Z*.



The terms "precede" and "follow" will also be applied to causal segments, so that one may say that a causal segment precedes or follows another causal segment (or a participant). A causal segment **IMMEDIATELY** precedes another causal segment if its endpoint is identical with the initiator of the following causal segment, and vice versa for "immediately follows."

I will illustrate the definitions of thematic roles with a slightly elaborated, somewhat contrived version of the "break" sentence, intended to illustrate most of the oblique thematic roles in a single clause.

- (32) *I broke the boulder with Greg for Mary by hitting it sharply with a hammer.*



In (32), the subject and object are *I* and *the boulder*, respectively, and thus the verbal segment extends from the VOL arc to the BREAK arc. I will begin with the participants that are objects or persons (prototypical nouns). *Mary* is a benefactive participant; her position in the causal chain is following the endpoint of the verbal causal segment. *The hammer* is an instrument; its position in the causal chain is between the initiator and the endpoint of the verbal causal segment. *Greg* is in a comitative-role; his position in the causal chain is roughly the same as the initiator of the verbal causal segment. The manner adverbial phrase *sharply* is a property of the verbal causal segment; the adverbial phrase could just as easily have been a prepositional phrase such as *with some difficulty*. The manner role is similar to the instrument because it applies to that part of the segment that is between the initiator and the endpoint, but it differs in that it denotes a property, not an object. Likewise, the means phrase also lies between the initiator and the endpoint of the verbal causal segment, but it denotes an action, specifically, an action that is a proper subsegment of the verbal causal segment and has the same initiator as the main verbal causal segment.

I offer the following definitions of the oblique thematic roles illustrated in the example:

Comitative: An entity that participates in a causal chain at the same point and in the same role as the subject of the main verb. It is likely that the comitative role also requires that the subject be the initiator of an act of volitional causation (a VOL arc).

Instrument: An entity that is intermediate in a causal chain between the subject (initiator) and the direct object (final affected entity). The instrument may have to be further restricted in that it may not be the initiator of an act of volitional causation (Levin [1979] argues in essence that the instrument must in fact be preceded by a VOL arc in the verbal causal segment), but that may in turn fall out of a more general restriction on root verbal causal segments against internal VOL arcs (see 6.1).

Manner: A property holding of some or all of the verbal causal segment. The manner role can be represented by an adverb or a manner PP; I will direct my attention to the case marking found on the last type.

Means: A proper subsegment of the main verb causal segment that shares the same initiator as the main verb. It appears that the means clause must begin with a VOL arc—that is, it must be a volition action, presumably involving a plan of

which the means covers all but the last step—and must be at least one arc longer than a VOL arc to a body part or "instrument." The latter constraint may exist simply in order to make the means clause "informative."

Benefactive (or "malefactive"): The endpoint of an action that causally follows the verbal causal segment. The participant is normally a mental-level entity ontologically, that is, the endpoint of an act of affective or perhaps inducive causation (though the term "causee" is normally applied to the latter), but in some cases a more general definition appears to be suitable (see 5.6.1). I also include the recipient as a benefactive-type oblique thematic role in the evidence to be provided in the next chapter, although the similarity between the two role types requires some additional justification, which will be provided in 5.4.

In addition to the oblique thematic roles found in example (32), one may also define the following thematic roles, these being definable in the model of causal structure as it has been explicated so far:

Cause: An event (action or state) that causally immediately precedes the event sequence denoted by the main verb: for example, *He did it out of love* or *He died from an overdose/the auto accident*.

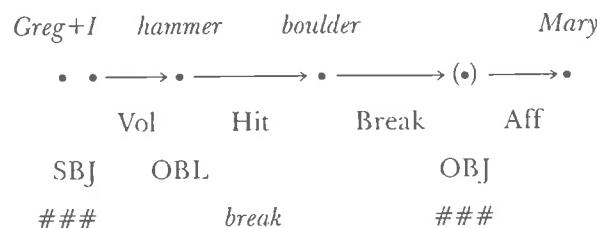
Passive agent: An entity that precedes the subject in the causal chain, when the main verb describes the event that results in the subject's present state. The passive agent somewhat resembles a cause except that it is an object or person and it is technically the initiator of the active version of the verbal causal segment. Again, it is introduced here because it figures in the evidence in the next chapter, but it will be discussed more thoroughly in 6.2.

Result: An event (action or state) that causally immediately follows the event sequence denoted by the main verb, for example, *He choked to death*.

Purpose: An event that is intended by an agentive initiator of the main verb causal segment to follow causally from the event denoted by the main verb causal segment. This role is technically on a different semantic plane from causal structure since intentions are completely different in semantic type from results. However, I include purpose in the evidence in the next chapter because the purpose is closely related to a result and appears to represent a (planned) causal segment that is not necessarily going to come about.

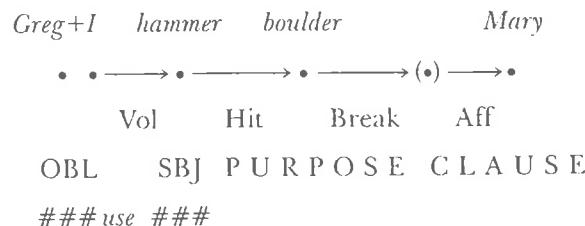
All the definitions of oblique thematic roles have in common the fact that they crucially refer to the position of the subject and the object, that is, the initiator and endpoint of the verbal causal segment, in the causal chain. Their definitions are RELATIVIZED to the assignment of subject and object. Thus, if a different lexical item is used, then the thematic role will also differ. Consider the following alternative descriptions of the scene in (32), or of part of it:

- (33) *Greg and I hit the boulder with a hammer (breaking it).*



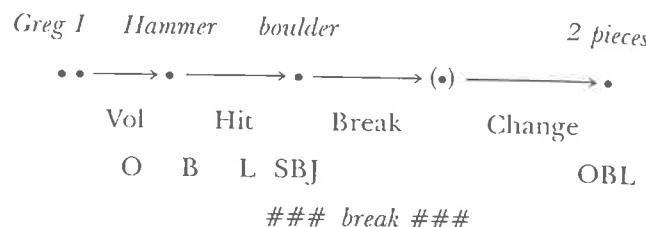
In (33), the two agents *Greg* and *I* have been conceptualized as a single conjoined subject, thus removing the possible comitative role. The verb *hit* covers a shorter causal segment than *break*, but, since *the boulder* is still the endpoint of that causal segment, it remains the direct object.²⁹ Likewise, *the hammer* remains the instrument since it is still between the initiator and the endpoint of *hit*'s causal segment.

- (34) *A hammer was used by Greg and me to break the boulder for Mary.*



In (34), the hammer is the endpoint of the passivized main verb causal segment. Since the verb is passivized, the endpoint *the hammer* is the subject, and the initiator(s) are in the passive agent role. The purpose clause *to break the boulder for Mary* covers the main verb causal segment and in addition all the following arcs illustrated in (32). Finally, *Mary* remains the benefactive participant in the purpose clause since she follows the direct object *the boulder* in the causal chain.

- (35) *The boulder broke into two pieces from the impact of the hammer.*



In (35), the only segment covered by the lexical verb *break* is the BREAK segment in (32).³⁰ The boulder is the subject since it is the “initiator” (in a nonvolitional sense, of course, and as if ignoring the external cause). The phrase *into two pieces* is a result phrase, describing a stative arc following the BREAK arc in (32). The phrase *the impact of the hammer* describes the cause—the causal segment labeled HIT in (32).

4.5 Conclusion

In this chapter, I presented pragmatic (discourse functional) and cognitive factors affecting choice of subject and object and turned to the relation between subject and object choice and the semantic relation (thematic role) of the argument to the verb (predicate). I argued against reductionist approaches to the analysis of the semantics of thematic roles and argued for linking the definitions of the thematic roles, as well as the “subject” and “object” definitions and selection hierarchies, to the semantics of the verb. An analysis of verbal semantics was proposed in terms of causal structure, based on the notion of a participant acting on another participant in an event. This model provides a vocabulary rich enough to define the major thematic roles that have been proposed by case grammarians over the last twenty years and longer. I have also argued that subject and object choice is semantically highly underdetermined and governed largely by the aforementioned pragmatic and conceptual factors and ultimately by the verbal causal segments available in the lexicon and by the voice forms available in the grammar. Thus, the thematic roles generally thought to underlie subjects and objects—at least the roles applying in the “prototypical” causal types that I have been analyzing—are defined largely by causation type, that being determined by verbal semantics. The oblique thematic roles on the other hand are defined largely by position in the causal chain with respect to the subject and the object. Hence, the definitions of the oblique thematic roles are formulated relative to subject and object choice in the causal chain, not in absolute semantic terms.

The one problem broached at the end of 3.2 not yet addressed here is the relation between thematic roles and surface case marking. The thematic roles, as usually conceived, have been used by case grammarians to analyze surface case marking, with mixed success. The obvious question to ask is, Does the causal structure model of verbal semantics provide a way of describing generalizations that are valid for surface-structure phenomena such as case marking and voice as well in a better way than the usual analysis by means of thematic roles? The next chapter argues that the answer to that question is yes.

From: W.A. Croft (1991) Syntactic Categories and Grammatical Relations, University of Chicago Press, Chicago, IL.

Case Marking and the Causal Order of Participants

5.1 Introduction

In the last chapter, I developed a semantic analysis of events that was used to define verbs, subjects, objects, and thematic roles. I now turn to the definition of the surface case markers that allow the hearer to determine what role the participant denoted by the noun phrase is playing in the event denoted by the main verb. That is, I will propose a method for *defining* the surface case markers of a natural language.

This method involves certain assumptions concerning the proper analysis of the meaning of words and grammatical morphemes. These assumptions form the basis of the so-called POLYSEMY OR USAGE-TYPE approach to defining natural language categories. The polysemy approach has been pursued by a number of researchers and can be found in such varied works as Haiman (1974, 1978), Dahl (1979), Herskovits (1982), Lindner (1981), Lakoff (1987, who calls this "radial category structure"), Brugman (1983), Lichtenberk (1985), Langacker (1988b, who calls this the "network category model"), Bybee and Pagliuca (1988), and Croft, Shyldkrot, and Kemmer (1988). In this approach, it is presumed that most natural language words have more than one use, that is, a specific meaning that can be defined precisely. In most cases, the distinct uses of a particular natural language morpheme, such as the English word *with*, are semantically related to each other. It is further hypothesized that the relations among uses fall into a relatively small set of semantic functions linking those uses, three of which are illustrated in the following sections. Finally, the sum total of semantically related uses that fall under one natural language word do not necessarily add up to a single necessary-and-sufficient definition of that word. For example, although the following sections will argue that (among other case forms) the various uses of the English word *with* are semantically related, one cannot provide a single abstract meaning or *Gesamtbedeutung* that will cover all and only the uses of *with*. This approach is particularly attractive for typological analysis. It renders surface grammatical categories comparable across languages, even if the range of semantic uses is not identical from language to

language, by distinguishing semantic uses and relations among uses and mapping surface forms onto the network of uses.

The central concept around which the meanings (uses) of surface case markings are organized is the position of the participant in the verbal segment (i.e., the causal segment denoted by the verb). This concept has already been employed in the definitions of thematic roles, which represent the most important uses of case markings, found in 4.4.4. In this chapter, I demonstrate that the grouping of thematic roles under surface case markers also follows this principle. In particular, oblique case markings divide themselves into two types: those that represent participants that precede the object in the causal chain and those that represent participants that follow it (in the senses of "precede" and "follow" defined in 4.4.4). This division pervades the morphosyntax of obliques, just as the initiator-endpoint distinction forms the basis of the morphosyntax of the "direct" cases.

5.2 The Causal Order Hypothesis

The first and simplest of the possible semantic relations that can hold among the uses or meanings of a given surface grammatical element (such as a case marker) is SPREAD. Spread is the extension of a form from one element (use) in a semantic domain to a semantically contiguous or "nearby" element in the same domain. This corresponds to Lakoff's "radial" categories (Lakoff 1987, chap. 6) and Langacker's notion of "extension" (Langacker 1988b: 13-1). It is actually a specific type of the general phenomenon of extension to semantically "near" or "contiguous" uses/situations that drives the polysemy model of natural language semantics. However, I consider spread to be a well-defined specific type of extension, namely, spread within a single DOMAIN, in this case the domain of causal structure.¹

In order to motivate spread, one must have a model of semantic "nearness"; in the case of causality, this model is provided by the definitions of the thematic roles in terms of the structure of the causal chain. The position of participants in the causal chain with respect to the subject and the direct object is illustrated in figure 5.1, based on the definitions for thematic roles offered in 4.4.4. Similarity of meaning is determined by nearness on the causal chain of the participants referred to by the thematic roles.

However, it turns out that spread by and large respects a sharp boundary between participants that precede the object in the causal chain and those that follow. The following are examples of oblique NPs that precede and follow the object with two standard examples, *for* and *with*.

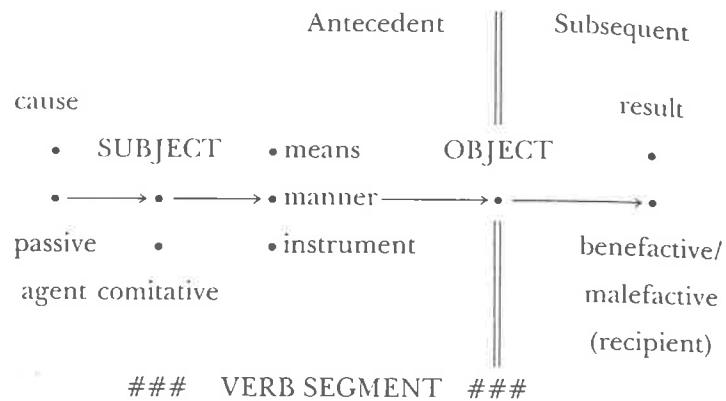
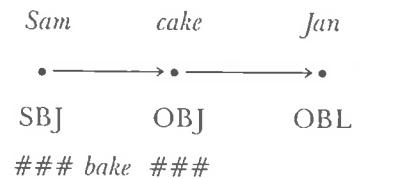
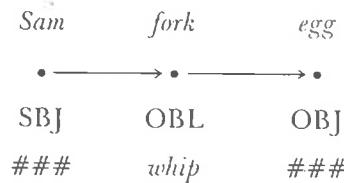


FIGURE 5.1 *Distribution of thematic roles in the causal chain*

- (1) *Sam baked a cake for Jan.*



- (2) *Sam whipped the eggs with a fork.*



In (1), the verb *bake* makes the cake the object by virtue of its lexical semantics (and active voice form). The benefactor, *Jan*, marked by the preposition *for*, follows the cake in the causal chain; the creation of the cake brings about some benefit that affects *Jan*. In (2), the verb *whip* makes the eggs the object; but the instrument, the fork, marked by the preposition *with*, precedes the eggs in the causal chain: *Sam* acts on the fork, which in turn acts on the eggs. Using the causal chain diagram, I will call the benefactive thematic role a SUBSEQUENT role since it follows the object in the causal chain and the instrumental thematic role an ANTECEDENT role since it precedes it.² Likewise, the oblique case marker *for* will be called a "subsequent oblique/marker" and *with* an "antecedent oblique/marker."

The vertical line in figure 5.1 divides the subsequent roles from the antecedent roles. A large number of typological phenomena suggest that this is the appropriate dividing line among thematic roles. The central role that the subsequent-antecedent distinction plays in the organization of surface case-marked arguments in a clause is captured by the following hypothesis:

The causal order hypothesis: The grammatical relations hierarchy $SBJ < OBJ < OBL_{\text{subsequent}}$ corresponds to the order of participation in the causal chain. (Antecedent oblique case markers are used to indicate that the oblique NP does *not* "fit" in the causal chain as the hierarchy would imply.)

Subsequent roles: benefactive, recipient, result.

Antecedent roles: instrumental, manner, means, comitative, passive agent, ergative,³ cause.

The object must always be the endpoint, that is, follow the subject in the causal chain (see also 6.2); hence, $SBJ < OBJ$. The (subsequent) obliques follow the object in the causal chain; hence, $OBJ < OBL$. The grammatical relations hierarchy $SBJ < OBJ < OBL$, manifested in a larger number of grammatical phenomena, is essentially a reflection of the order of participation in the causal chain. This is an unmarked correlation between the lexical semantics of the verb, represented by the causal chain, and the cognitive-pragmatic factors that determine subject and object choice (see 4.2)—the same sort of phenomenon found in the definition of the major syntactic categories. The causal chain model and the causal order hypothesis—essentially a statement of correlation between causal ordering and the grammatical relations hierarchy—take the place of the “subject/object selection hierarchies” of thematic roles proposed in other models.

Of course, there are also the antecedent oblique markers, which violate the correlation of the causal order with the grammatical relations hierarchy. It appears that antecedent oblique markers must exist out of necessity: the nonexistence of antecedent markers would greatly restrict the semantic expressiveness of the clause. The subsequent-antecedent distinction is exactly the division between those oblique case markers that preserve the causal order $SBJ < OBJ < OBL$, that is, the causal order hypothesis, and those that violate it. That is to say, the subsequent-antecedent distinction is the way in which natural languages handle those situations in which assignment of object and oblique status on the basis of the factors discussed in 4.2 does not match the “natural” directionality of causation of object and oblique

(cf. DeLancey's [1981, 1982] analysis of the “mismatch” between animacy, aspect, and causal directionality). Mismatches between subject assignment and causal order for subjects and objects is handled by voice (see 6.2). Thus, any evidence supporting the subsequent-antecedent distinction as the primary distinction among thematic role types in surface case marking also supports the relevance of the causal order hypothesis to grammatical structure and thus is also further support for the relevance of the grammatical relations hierarchy $SBJ < OBJ < OBL$ and causal structure to grammatical theory in general. One would also want typological markedness evidence to demonstrate that the $SBJ < OBJ < OBL$ hierarchy is the unmarked one with respect to causal sequence; this will be demonstrated in 6.2.

The basic form of the evidence that I will provide supporting the subsequent-antecedent distinction is that syncretism of thematic roles will occur so that no surface case marker will subsume both subsequent and antecedent thematic roles (hence the appropriateness of speaking of antecedent and subsequent case markers as well as thematic roles). English provides supporting evidence for this hypothesis. There are two subsequent case markers, the prepositions *to*, which governs the recipient and the result, and *for*, which governs the benefactive. However, only *to* provides positive evidence for the hypothesis since *for* covers only one thematic role.⁴ The antecedent case markers *with* and *by* both provide positive evidence because each covers more than one thematic role, *with* subsuming instrument, manner, and comitative and *by* subsuming means and passive agent. I will consider English to represent three positive pieces of evidence in favor of the subsequent-antecedent distinction since there are three separate syncretisms involved: recipient-result, instrument-manner-comitative and means–passive agent.

This is perhaps a conservative appraisal of the evidence since the synchronic syncretism represented by *with* presumably represents a diachronic spread of the use of *with* from one thematic role to a second and then a third. However, even on the basis of a conservative evaluation of the facts, the typological evidence supporting the hypothesis is very strong. A survey of the case marking of the oblique thematic roles of forty languages was made (see the app. in 5.8). The number of syncretisms among subsequent and antecedent thematic roles was tallied in the same way as was described for English in the preceding paragraph: the subsumption of any number (greater than one) of subsequent or antecedent thematic roles under a single case marker was treated as one instance of a syncretism. The results are given in table 5.1.

TABLE 5.1 *Case Syncretisms among Subsequent and Antecedent Thematic Roles*

Syncretisms among antecedent thematic roles	39
Syncretisms among subsequent thematic roles	30
No directionality in the case system	5
Syncretisms across subsequent and antecedent roles	2
Number of languages surveyed	40

The evidence strongly supports the hypothesis, although there are a few questionable cases (the “no directionality” row) and two outright exceptions, to be discussed below. In fact, this study tends to confirm the general intuitions of typologists on the basis of the examination of a much larger number of languages that thematic roles such as cause, passive agent, manner, comitative, and instrument tend to “go together,” as do recipient, benefactive, and result. For example, Blake (1977:60–61) found the syncretisms ergative-instrumental-cause and dative (recipient)-benefactive-genitive to be quite common among Australian languages.

The questionable cases all involve a massive amount of syncretism to the point at which the subsequent-antecedent distinction itself appears to be abolished. The clearest cases of these appear to be a number of East Asian and West African languages in which one adposition does all or almost all the work of the various subsequent and antecedent case markers of other languages. The best example of this that I am aware of is an Austronesian language, Palauan, which has just one oblique preposition *er*. In the sample, the nondirectional system is found in Lahu, Yape, and Woleaian. The reason I have labeled these “no directionality” is that in these languages not only is there no causal directionality expressed in the case marking system but there is also no spatial directionality expressed in the cases involving motion (the parallelism between direction of causation and direction of motion will be discussed in the next section). Instead, direction of motion is found in the deictic orientation of motion verbs, and a single case marker is used for ablative and allative and often also location.

Other examples of the loss of causal directionality in the oblique case system are found in languages in which the case system appears to be collapsing. In these languages, the case markings cover a large number of uses and appear to be just beginning to break down the

subsequent-antecedent distinction. In the sample, these languages are Attic Greek and Classical Mongolian. The analysis of these “exceptions” is as follows. It is a fact that there are systems in which case markings fairly neatly divide between subsequent and antecedent types; that there are systems in which there is only one basic case marking that no longer has any causal directionality in its semantic content; and that languages can historically shift from one system to the other. This transition will involve incremental spread of case markers and some variation in usage during the transition from a “directional” to a “nondirectional” system. Therefore, some synchronic apparent exceptions are to be expected in languages in the process of transition.

The difficulty is determining independently that a language is in the process of transition from one type of system to the next. Apart from attested historical stages where it is known that the transition took place, such as in the history of Greek, there are very few independent criteria, and they may be largely heuristic. The first criterion is massive syncretism: if only, say, two cases are being used to cover the entire range of oblique thematic roles, it is likely that the system is decaying and the paradigmatic semantic distinctions are being blurred.⁵ The second criterion is what I call LAYERING. In virtually every natural language, at any given historical stage there are several historically distinct layers of grammatical constructions performing the same function (see 3.3.4). Typical examples of different layers are the prepositions and cases of Russian and the simple prepositions and relational nouns of Quiché. In both cases, the historically older layer (cases in Russian, simple prepositions in Quiché) is semantically less specific and paradigmatically less numerous than the historically newer layer. The older layer is in fact carrying little semantic load and thus may be more likely to violate semantic constraints like the subsequent-antecedent distinction. In Quiché, the oldest layer consists of the nondirectional ablative-allative-locative preposition *pa* and the preposition-complementizer *či* used in subsequent, antecedent, and locative expressions. Even the next layer, *či* plus the reduced relational noun *e*, is used for both subsequent and antecedent roles. Only the most recent “layer,” consisting of the relational nouns *umal* “passive agent–cause,” *uk* “comitative,” and *wač* “benefactive-hearer [communicative verbs],” obeys the subsequent-antecedent distinction.

In addition to the borderline cases of stable nondirectional systems and collapsing directional systems, there were two genuine apparent exceptions to the hypothesis in the sample, both involving the use of a subsequent case marker for a single antecedent role (the antecedent role is in italics):

Allative/recipient/purposive/*causee*: Turkish (sometimes); Recipient/benefactive/allative/purposive/*cause*: Konda (also accusative).

I will discuss the former exception in 6.1. The latter exception, also noted in Blake (1977) and apparently rather frequent, is a problematic exception that will not be discussed here, although I believe that it has a diachronic explanation.⁶

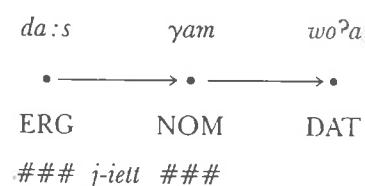
As I stated before, the general support that the results of the typological study of syncretism provide for the subsequent-antecedent distinction confirms general intuitions that are not surprising to the average working typologist. More interesting and perhaps stronger supporting evidence for the hypothesis comes from systems that display a typologically rather unusual distribution of case forms but still obey the causal order hypothesis. An example of such a system is provided by Chechen-Ingush (Nichols 1984: 188–92). Chechen-Ingush, a north central Caucasian language, has an ergative/absolutive (“nominative”) case marking system for its core thematic roles, and for most verbs it has typical subsequent and antecedent case markings, such as the subsequent dative case, used for recipients among other thematic roles, or the instrumental case, used for some instrumentals:

- (3) *cuo cunna a:xča delira*
he.ERG him.DAT money.NOM gave
'He gave him money.'

- (4) *husam da:s ürsaca kuolam ju:ra*
house father.ERG knife.INST chicken.NOM killed
'The host [lit. "house father"] killed the chicken with a knife.'

However, for a small class of verbs denoting physical contact, what a case grammarian would normally call an “instrument” is expressed as a direct object (nominative case), and the erstwhile “patient” is expressed in the subsequent oblique dative case:

- (5) *da:s wo?a: γam j-iell*
father.ERG son-DAT stick beats
'(The) father beats (his) son with a stick.'

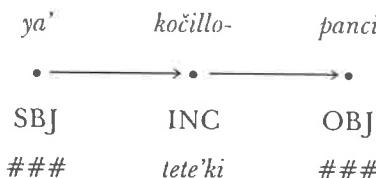


The causal structure diagram in (5) reveals quite clearly that, despite the atypical expression of “instrument” and “patient,” the case marking in the example obeys the causal order hypothesis: the son causally follows the stick, which has been selected as the direct object, and therefore is assigned a subsequent oblique case.

Another rather atypical expression of verbal arguments also supports the causal order hypothesis. A number of languages allow the incorporation of a noun argument, which sometimes allows another participant to become the direct object; Mithun (1984a) calls this the Type II function of noun incorporation. It would be plausible to conclude that the incorporated noun is “between” the subject and the object since it has become part of the verb, so to speak. This turns out to be the case; the instrumental incorporation in (6) is from Huautla Nahuatl (Mithun 1984a: 861, from Merlan 1976), and the patient incorporation in (7) is from Mohawk (Mithun 1984a: 868; this is possible only if the benefactive/malefactive participant is more affected than the patient):

- (6) *ya'ki- kočillo- tete'ki panchi*
he.heit- knife- cut bread

'He cut the bread with it (the knife).'



- (7) *wa- hi- 'sereht- anúhsko*
PAST- he/me car- steal
'He stole my car.' [Or: 'He stole my car on me.']}



There are some languages in which the instrumental case is used for direct objects under certain conditions. In Hausa, the instrumental preposition is used for the direct objects of certain verbs taking recipients when the recipient is absent from the clause (for examples and a

possible alternative account, see 5.4). West Greenlandic Eskimo ~~and~~ passivizes the transitive verb under various conditions (including in definite object; see above); in those cases, the patient is realized in the instrumental case (which is itself distinct from the ergative/possessive case; Sadock 1980). A similar phenomenon occurs in Dyirbal, where the displaced object of an antipassive construction is placed into the dative or the instrumental case. These cases must be weighed against the typologically much more common pattern of marking direct objects with the (subsequent) dative case marker under certain conditions. Both types of cases provide indirect support of the direct object as the correct boundary point between the two case marking types, subsequent and antecedent: when the direct object does acquire a case marking, it can be from either "side" of the boundary (although subsequent markers are more common).

These examples argue for causal ordering analysis over the traditional definitions of "instrument" and "patient," which attempt to pin down the causation type on more specific qualitative facts about the role played by the participant, for cross-linguistically valid generalizations concerning the semantics of surface case markings. The definition of the uses covered by the nominative case in Chechen-Ingush would have to cover both traditionally defined "instruments" and "patients" (not to mention intransitive subjects), and the uses covered by the dative case would have to cover both other "patients" and recipients. One would have to stipulate which "patients" would be realized as absolutives and which as datives and conversely which "instruments" would be realized as instrumentals and which as nominatives. Similar problems arise with Type II noun incorporation. In the causal structure analysis, however, this would fall out directly from the representation of the lexical semantics of the verbs: the verb meaning 'beat' is represented as denoting the causal segment covering only the first arc in the diagram in example (5), whereas the verb meaning 'kill' is represented as denoting the segment covering the causal chain from the killer to the victim. The endpoints are realized as nominatives, and the obliques are subsequent or antecedent, depending on their position in the causal chain. The causal structure analysis elegantly treats a distribution of cases that would cause difficulties for a traditional case grammarian.

5.3 Space and Causality

Up to this point, I have not discussed the role of motion and location in space in case marking. Nevertheless, locative and directional markers are probably the ultimate historical source of most case marking,⁷

and the localist hypothesis seeks to reduce nonlocal roles to local ones in synchronic analysis as well (see references cited in Anderson 1971: 5–6). Although the localist hypothesis posits too strong a relation between local and nonlocal roles, there is still a close relation between causal and locative-directional thematic roles. In fact, there are several distinct relations, and they will be discussed in this section and the next.

The most important relation between causal and locative-directional roles is that of DOMAIN SHIFT OR METAPHOR. Domain shift/metaphor is perhaps as important a relation between the uses of a polysemous surface form as spread. Metaphor, in this technical definition, describes the situation in which the form used for an element in one semantic domain is extended to apply to a "parallel" or "similar" element of another semantic domain (an extensive discussion of metaphor in this sense as it plays a role in basic linguistic expressions can be found in Lakoff and Johnson [1980]). Metaphor differs from a natural correlation in that, in the metaphorical situation, the source semantic domain need not be a component of the target semantic domain, whereas, with a prototypical correlation, elements of both semantic domains are always present in the relevant situations. For example, in the natural correlation between ontological status and causal directionality, both semantic parameters always co-occur in a specific causal situation. What the prototypical correlation indicates is that the pairings of values <mental, initiator> and <physical, endpoint> are unmarked whereas the pairings <physical, initiator> and <mental, endpoint> are not.

On the other hand, when, say, a form denoting a spatial relation is transferred to describe a causal relation, such as the allative *to* as a resultative as in *The house burned to cinders*, no specific spatial relation between cause and result need hold and in fact does not in the example cited.⁸ Instead, a more abstract isomorphism between motion and causality must be present, namely, the directionality of both motion and causation.

Finally, metaphor implies that the two domains in question, the source and target domain, are distinct. The two domains that I will discuss in this section, spatial relations and causal relations, are defined over different parameters. A spatial relation between two entities does not imply a causal relation between them, and vice versa.

There are several metaphorical relations that hold between causality and motion (and between causality and possession, as will be seen in the next section). The fact that there is more than one relation between space and causality illustrates the need to separate these two dimensions as independent semantic domains since there are conflicting metaphorical relations. This section will devote itself to those relations

Chapter Four

1. No connotation of “movement,” “promotion,” or “demotion” should be imputed to this term; it refers solely to the grammatical conditions under which the result of a digging event can be the subject of a clause whose predicate denotes the digging event.

2. This hierarchy was originally christened the “accessibility hierarchy” since it was used to characterize accessibility of an NP to relativization (Keenan and Comrie 1977); but its relevance for predicate-argument relations in general was recognized early (for a summary of typological evidence supporting the grammatical relations hierarchy, see Croft 1990b, 5.3.2).

3. Nevertheless, some of the nonsubject constructions are used to indicate shifts in topics, not continuity of topics, and the more continuous topic NP types are “ordinary” NPs and (especially) pronouns and other anaphoric devices (Givón 1983a:17).

4. Fillmore (1968) also provides a useful historical survey of case.

5. In an important early cognitive approach to grammar, Lakoff (1977) suggests the same view of sentence generation (in the literal sense of generation as the production of an utterance by a speaker).

6. Fillmore also notes a degree of affectedness effect with the intransitive subject in *Bees are swarming in the garden/The garden is swarming with bees* (1968:48).

7. The suggestion that there are only a few distinct thematic roles that have to be postulated for a universal characterization of case is originally Fillmore's: “The case notions comprise a set of universal, presumably innate concepts. . . . the cases that appear to be needed include . . . [he describes six cases]. . . . Additional cases will surely be needed” (Fillmore 1968:24–25). Fillmore has since changed his position (Fillmore 1977:70–71).

8. A “loose interpretation” of the localist hypothesis would simply argue for a close relation between certain nonlocal roles and certain local roles. Nevertheless, only those three roles are actually proposed by localists such as Anderson (1971).

9. These are only four of several uses of *with* described in Nilsen (1973); “objective” is his term for the last type.

10. I will use this term to describe the synchronic subsumption of different thematic roles (uses, meanings) under a single surface form (case marking), not the diachronic falling together of two forms (though the latter can lead to a synchronic case syncretism).

11. Most of these were taken from Comrie and Smith's (1977) Lingua Descriptive Series questionnaire.

12. I am grateful to Douglas Edwards for providing me with this example from the philosophical literature.

13. The locative can be interpreted as providing a temporal condition on

the event, namely, that the widowing event occurred while Mrs. Woodland was in Las Vegas, but then the expression is no longer functioning to delimit spatial location. Also, not all speakers accept *widow* as a verb; the *American Heritage Dictionary New College Edition* states that the verb form is usually found as a past participle.

14. By “cause” is meant “immediate cause,” not any one of or the whole of the entire chain of events that caused the event in question to occur.

15. This example is due to Tom Wasow. A possible counterexample was proposed to me by Terry Winograd: *He screeched around the corner*. However, *screech* here describes the manner in which he went around the corner; i.e., it is a property of the motion that causes the change in location. See the discussion of the “manner” thematic role in 4.4.4.

16. This problem could be avoided using predicate operators such as *Become(Broken(x))*, however. Nevertheless, the use of both predicate operators and propositional arguments puts one beyond first-order logic.

17. For a discussion of evidence suggesting that causal order is relevant to verbal syntax as well, see 5.6.3.

18. It is also worth noting that the aspectual structure of the event—the other major determinant of verbal semantic structure—can change at different levels of granularity. The event described in (25) is a state, while the events described in (26) are all processes or changes of state.

19. I represent a causal arc representing a resulting state without an arrow since no transmission of force is involved (see criterion 3).

20. The semantic transition from speaking of events causing other events to one object acting on another is fraught with difficulties (I am indebted to Richmond Thomason for pointing out this problem to me). The reason for this is that the former representation—something like $P(e_1, x, y) \ \& \ Q(e_2, y, z)$ & $\text{Cause}(e_1, e_2)$ —has less information than the latter, something like $x \rightarrow_p y \rightarrow_q z$. This information is implicitly coded in the ordering of events in the latter representation, but underlying that is a theory of *how* events cause other events or at least how physical events cause other events, namely, the concept of “force” and its transmission, which is discussed below under the fourth criterion. Since I argue here that the additional information expressed in the arc-node representation illustrated in (27) is necessary for defining surface-structure phenomena such as verbal lexical semantics and surface case marking and voice, I will use the richer representation without further comment on this issue for the remainder of the chapter.

21. This is not to say that the speakers of natural language cannot describe situations involving (alleged or fictional) telepathy and telekinesis. However, the way that these atypical or noncommonsensical situations are expressed is either by using an instrumental expression that “invents” an instrument, such as *with mind power*, or by using an expression that explicitly negates the expected instrument, such as *without touching it*. Both expressions imply

that the prototypical causal relation requires a mental-level causation to be mediated by physical entities.

22. Actually, volitionality itself is not a monolithic category. It involves more subtle gradations of subject intention, responsibility, and control (see DeLancey 1984b, 1985). However, I will not discuss the peripheral cases of volitionality here.

23. The example of John running and sweating also illustrates the fact that two causally ordered events may coincide or almost coincide spatiotemporally.

24. As we will see in 6.1, under certain circumstances the causal chain denoted by the verb can be extended by grammatical processes, which allow the assignment of subject and object to participants "outside" the causal chain.

25. In some languages, branching causal chains are indicated by (non-zero) affixes used for distributive and/or plural action readings (a particularly rich system is found in Kwakiutl; Boas 1947: 246).

26. The problem of symmetrical relations, causal and noncausal, will be discussed in later sections (5.4, 5.5.1, and 6.3).

27. The verb *say* has a number of peculiarities associated with it. Normally, inversion of word order is used instead of passivization to bring the utterance into greater prominence, and this can be done only with direct speech complements ("Beat it, kid," said the old man; *That he should beat it, said the old man). However, nouns denoting the utterance usable with *say* can be passivized under appropriate circumstances: Nothing was said to the launch managers by NASA about technical problems with the O-rings. Tell (to) does not allow inversion or passivization with indirect speech complements either: *To beat it, told was told John by the old man.

28. The thematic role of the "causee" will be discussed in 6.1. I will also restrict experiencer and stimulus to stative affective relations in 5.5.1.

29. Note that one can no longer infer that the boulder broke, without the addition of the parenthesized gerund expression, since the information provided by the main verb does not include that segment of the causal chain.

30. Of course, that segment combines the inceptive and the resulting-state arcs, as discussed in 6.4. Note that, in this sentence, one can no longer infer that a volitional agent caused the boulder to break since that information is not contained in the main verb causal segment, and the commonsense ontology allows for "spontaneous" (perhaps "internally" caused) physical events. Commonsense ontology less surprisingly also allows free will—i.e., spontaneous acts of volitional causation.

Chapter Five

1. The potential for semantic uncleanness inherent in this definition is not with the notion of "spread" but with the notion of "domain." In commonsense semantic analysis, many domains are defined in terms of primitive concepts, e.g., space, time, and causality. This forces one to rely on intuitions

about what represents a causal relation as opposed to a spatial or temporal one, and of course intuitions vary, leading to controversy. Future research in commonsense metaphysics may lead to definitions of terms such as "causality" which I take here to be primitive.

2. These roles were named "straight" and "inverse," respectively, in Croft (1986).

3. In the language survey, I include the ergative case as a (marked) antecedent case on the grounds that as "subject" it precedes the direct object, which is found in the unmarked absolute case, generally the only unmarked case in ergative case systems. As will be seen, this assumption allows one to account for the common ergative-instrumental (and ergative-locative; see 5.3) syncretism found, e.g., in the Australian languages. One also finds an apparently anomalous ergative-dative syncretism, especially in South Asian languages; but, in all these cases, the ergative/dative is also the genitive, and it has been proposed (Benveniste 1971; Anderson 1977) that this is due to the historical development of the ergative from the perfective, with which there is a close association with possession (Allen 1964).

4. Actually, *for* covers many roles, some of which will be discussed in 5.5.2. However, only one of the "major" thematic roles, defined in terms of the core causal situation type, is covered by *for*.

5. Interestingly, I have not yet found a simple system of two case markers, one a perfect subsequent case and the other a perfect antecedent case. The closest system is the Kanuri one (see the appendix).

6. In brief, it may be that subsequent forms can spread to the cause by means of expressions of reason. Expressions of reason, which is a category of intention, not of causation, can represent events that causally follow the verb segment (a goal or purpose) or precede (a source or motivation). The hypothesis is that normal subsequent expressions spread to purpose, thence to reason (which is nondirectional), and thence to true cause. This hypothesis would have to be verified in terms of historical evidence and evidence of intermediate stages (e.g., use of the subsequent form for purpose and reason as well as true cause).

7. Body part terms are a major source of case marking, but these terms generally become case markers via a stage at which they represent a deictic schema of locations based on the body (e.g., 'on' = head, 'inside' = belly, and so on). The only common exception to this is the shift of a term for 'face' or 'head' directly to a mental-level oblique role such as recipient or benefactive.

8. Of course, the metaphor itself was probably licensed diachronically by a natural correlation, namely, the fact that typically a causal relation between initiator and endpoint happens also to involve approach and contact of the initiator with the endpoint. But, once the semantic transfer is made, this correlation loses its significance and no longer plays a major role; the formerly directional forms can occur in causal relations without motion involved.

9. Blake also mentions a locative-ablative syncretism but does not discuss it.