Squire, L. R., & Zola-Morgan, S. (1991). The medial temporal lobe memory system. *Science*, 253, 1380–1386.

Swinney, D. A. (1979). Lexical access during sentence comprehension. (Re)consideration of context effects. *Journal of Verbal Learning and Verbal Behavior, 18.*

Terrace, H. S. (1985). In the beginning there was the "name." *American Psychologist, 40.*

Treisman, A. (1995, April). *Object tokens, attention and visual memory.* Attneave Memorial Lecture, University of Oregon, Eugene.

Walker, C. H., & Yekovich, F. R. (1987). Activation and use of script-based antecedents in anaphoric reference. *Journal of Memory and Language, 26.*

Yekovich, F. R., & Walker, C. H. (1986). The activation and use of scripted knowledge in reading about routine activities. In B. K. Britton (Ed.), *Executive control processes in reading.* Hillsdale, NJ: Lawrence Erlbaum Associates.

3

THE STRUCTURE OF EVENTS AND THE STRUCTURE OF LANGUAGE

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Introduction

Perhaps the two most basic syntactic structures of human languages are the clause and the phrase (noun phrase or prepositional/postpositional phrase; it generally functions as a subject, object, or oblique element related to the main verb of the clause). The clause and the phrase are centered around the communication of *events* and *objects*, respectively. Events include both *actions* (processes involving change) and *states* (where no change is involved). Objects include persons and things that function as participants in those events. Obviously this description is an oversimplification of the semantics of clauses and phrases, but it is a useful starting point for delving into their true cognitive complexity.

Objects, particularly physical objects, look deceptively easy to handle from a cognitive point of view. They generally (although not always) come neatly individuated. Objects can be spatially isolated in our physical environment, are also physically manipulable, and persist through time. All three of these properties suggest that the identification and categorization of objects is an easy cognitive ability to model. In fact, it is not so easy as that, as is evidenced by the well-known psychological research of Rosch (e.g., Rosch, 1978) into prototypes and basic-level categories and the linguistic research by Fillmore (1982, 1985) into how lexical categories can frame our experience in different ways.

Events, on the other hand, have never been deceived. In terms of categorization and cognition, they are hard to handle from the beginning. Events are largely transitory (although some are less transitory than others), and are not physically manipulable; hence, there is less we can learn and more we need to remember in order to identify them. Worse, events, even physical events, are not causally or temporally isolated in our environment. The world appears to be made up of an extremely

complex causal network constantly unfolding through time of which we encounter just fragments. Deciding which segment of a fragment of experience counts as an event is obviously a complex cognitive process.

It is the purpose of this chapter to describe both some of the complexities involved in events, and an approach based on cognitive linguistics for analyzing the complexity. As in most other work in cognitive linguistics, the analyses here are based on the semantic interpretation by the analysts of invented or (less often) naturally occurring sentences, using a family of theoretical constructs whose lineage can be traced back to cognitive psychology or philosophy. The presentation here will, I hope, suggest how relevant the cognitive linguistic research is to psychological theories, and how cognitive linguistic analyses can be tested in experimental psychological paradigms.

Aspect: The Temporal Structure of Events

Although every clause illustrates the full complexity of the conceptualization of events, we cannot deal with all of this complexity at once. I begin by looking at the relation of events to time and leave the discussion of causality in events until the next section.

As was noted in the introduction, events are essentially temporal. This is in itself a matter of *conceptualization*. If I use the phrase *my pickup truck* as in *My pickup truck broke down last week*, then I am treating the pickup truck as an object, namely, without reference to its temporal duration in this world. If, on the other hand, I use the predicate *be my pickup truck*, as in *That is my pickup truck*, I am construing this fact—the identification of *That*—as a state of affairs with a temporal duration (for as long as I own the truck, or for as long as the truck exists before being junked). In the clause and in the phrase, I am talking about the same thing, namely my pickup truck, whose lifetime is therefore also the same. But in the clause, temporal duration is an essential part of the meaning, whereas in the phrase, temporal duration is irrelevant.

Because events exist in time, they can also be situated in time. The grammatical category of *tense* situates events in time with respect to the time of the speech act. English has a basic, apparently simple system: present (event holds at the time of the speech act), past (event occurs prior to the time of the speech act), and future (event occurs subsequent to the time of the speech act). Tense does not refer to the internal temporal structure of events, and so is set aside here. But it is worth noting that even with a simple system like tense, conceptualization plays a role: The present tense can be used for past events in the "historical present" (*This guy comes up to me and asks me for a light . . .*), which transfers the immediacy of the present to the narrative, and for "scheduled" future events (e.g., *The train leaves in ten minutes*), where the present tense conveys the virtual certainty of the future event.

What interests us here is that because events exist in time, they have temporal structure. That is, events have an internal temporal contour. For instance, the

aforementioned distinction between actions (processes) and states represents a difference in the temporal contour of the two event types: Processes involve change of some sort over time, whereas states do not. Of course, the interest in this intuitive model of events for us is the fact that grammatical distinctions are sensitive to the temporal contour of events. Those grammatical distinctions are called *aspectual* distinctions.

The most salient grammatical distinction that is sensitive to aspect is the choice between the *simple present* verb form (verb plus present tense inflection) and the *present progressive* verb form (*be* VERB*ing*) to describe a state of affairs that is true at this moment. To convey that a state is true at this moment, an English speaker must use the simple present, not the present progressive, which is unacceptable.

1. a.   *She is tall.*
    b.   **She is being tall.*

    To convey that a process is true at this moment, on the other hand, one must use the present progressive:

2. a.   *Tess is playing the flute.*
    b.   *Tess plays the flute.*

    The simple present is not ungrammatical with processes (2b), but it does not convey that the process is true at this moment. Instead, it conveys that this is an habitual activity or generic ability of the subject: the process need not actually be taking place at this moment.

    There is one subclass of processes that disallows both the simple present and the present progressive for conveying what is true at this very moment:

3. a.   **He is shattering the windowpane.*
    b.   **He shatters the windowpane.*

The relevant temporal feature of these events, called *achievements* following Vendler (1957/1967), is that they are conceived as taking place instantaneously, that is, as if they have no temporal duration. I say "as if" because it is obviously true that they do have a temporal duration, albeit extremely short, at or beyond the boundary of perceptual discrimination. With achievements, the event is conceptualized or *construed* as being instantaneous, and this fact is reflected in the inability of expressing the event in the present tense, whether in the simple present or in the present progressive. Linguists interpret the absence of present tense forms as reflecting the inability to align the point in time of the achievement and the point in time of the present. Instead, one must say something like *He just shattered the windowpane*, with a past tense form and an adverb (*just*) indicating immediate past.

At this point, there is a three-way distinction between event types, based on their temporal contour:

(i) States, which do not involve change and are extended in time;
(ii) Processes, which do involve change and are extended in time;
(iii) Achievements, which involve change but are points (not extended) in time.

There are two semantic dimensions here: whether or not the event involves change and whether or not the event is extended in time. There is a fourth logical possibility that is also found:

(iv) Point states, which do not involve change and are points in time. For example:

4.   It is eight o'clock.
5.   The train is on time.

Hence, it is clear that the temporal structure of events, named by verbs, in part determines the grammatical patterns of English. But there is a rather odd mismatch between grammatical form and temporal meaning. For the temporal meaning of "true at this moment," one must use the simple present for states but the present progressive for processes. Conversely, the grammatical form of the simple present has a true-at-this-moment meaning with states and an habitual/generic meaning with processes. Why does the grammar of English have this semantically unnatural complication? In fact, we will see it is not unnatural at all, but represents a deeper fact about English grammar: The aspectual grammatical constructions in part determine the temporal structure of the event it describes via conceptualization.

Let us begin with a simpler example, though. Some states that appear to be unacceptable with the present progressive, in fact do allow it under the right circumstances:

6. a.   *Sylvia is resembling her mother.
   b.   Sylvia is resembling her mother more and more every year.
7. a.   *I am understanding the semantics of aspect.
   b.   I am understanding the semantics of aspect better and better every day.
8. a.   *I am loving her.
   b.   I am loving her more and more, the better I get to know her.

These "states" are interpretable in the present progressive if the time scale is enlarged beyond just the present moment and if there is an assumption of a (gradual) change in degree in the relation between the subject and the object of the verb. If one takes a broader or more "coarse-grained" temporal perspective, then the state turns out to involve some change after all, in these circumstances, and so the progressive can be used. If, however, one uses a smaller, more normal,

time scale, of the sort assumed in the (a) examples without any context, then no change is perceptible and the progressive is unacceptable. Thus, a shift in temporal scale leads to a shift in the acceptability of the present progressive for this class of events, which I call gradable relations.

This is not the only way in which a state can be interpreted in the present progressive, however:

9. a.   Jeff is a jerk.
    b.   Jeff is being a jerk (again).
10. a.   She is nice to him.
    b.   She is being nice to him (for once).

The (a) sentences in (9) and (10) indicate a property of the person taken as a whole, which is true at this moment. The (b) sentences cannot be interpreted as a property of the person, but instead are descriptions of a particular action that is manifesting the property. The (b) sentences could be paraphrased with the process verb act (like a jerk, nice, etc.), but this is not necessary in order to produce an acceptable English sentence.

This class of events, which I call dispositions, can be construed either as involving no change, in which case it is taken to be an inherent property of the person, or as involving change, in which case it is taken to be a property of a transitory action. Why is this so? We conceptualize being nice or being a jerk as a (possible) character trait of a person. But this trait is only manifested to us in particular actions of the person at particular times. When we encounter such actions, we can construe them as representing an inherent character trait of the person, or alternatively construe them as "one-off" properties of the action. The choice of simple present or present progressive determines the construal of the dispositional property to be conveyed by the speaker as belonging to either the person or the action.

Again, we can represent this in terms of the scalar perspective of the temporal contour of the event. If we are focusing on a single incident of niceness, we are taking a "fine-grained" view on the temporal scale, and correspondingly the process—the presence of change in the action—is salient. If we construe niceness as a character trait, we are assuming that the person is nice on many occasions, that is, we are enlarging the time scale to a very coarse-grained view. When we do so, we simultaneously abstract away from the specifics of the individual actions that are nice, and construe it as an unchanging state of the person.

A similar phenomenon is found with another class of events, which I call inactive actions, such as verbs of posture:

11. a.   Bill is standing in the doorway.
    b.   The Pennines lie to the east of Manchester.

Examples (11a) and (11b) show that either the present progressive or the simple present can be used to convey that the event is true at this moment. However, the two aspectual constructions are not interchangeable in these contexts:

12. a. *Bill stands in the doorway.*

 b. *The Pennines are lying to the east of Manchester.*

Example (12a) suggests that Bill is a permanent fixture in the doorway, whereas (12b) suggests that the Pennines are pausing briefly on a march across the British countryside. Intuition suggests a difference in interpretation that Goldsmith and Woisetschlaeger (1982) described as "structural" (simple present) versus "phenomenal" (present progressive). A structural state of affairs is one that is construed to represent the inherent way of the world, whereas a phenomenal state of affairs is a passing fancy, so to speak. Goldsmith and Woisetschlaeger demonstrated that the structural-phenomenal distinction cannot be simply equated with the length of "actual" time by giving the following examples:

13. a. *The statue of Tom Paine stands at the corner of Kirkland and College (but everybody expects the new Administration to move it).*

 b. *The statue of Tom Paine is standing at the corner of Kirkland and College (and nobody thinks the deadlocked City Council will ever find a proper place for it).* (p. 84)

It could be the case that the "actual" time that the statue of Tom Paine has been standing at the corner of Kirkland and College in (13b) is longer than the time in (13a). But what matters is whether the speaker construes the position of the statue as permanent (the structural interpretation) or transitory (the phenomenal interpretation).

If the simple present represents a construal of an event as permanent (and so unchanging), and the present progressive a construal of the event as transitory (and thus changing as it occurs), then one can interpret the "mismatch" of use of the simple present and present progressive described earlier. Processes, that is, individual occurrences of processes, are transitory, and so call for the present progressive to convey that they are occurring at this moment. States are normally inherent, lasting events and therefore normally employ the simple present to convey that they are true at this moment.

For a process to occur in the simple present, it must be construed as a lasting state of affairs. This can be achieved by casting the process as either an habitual or a generic activity, not unlike construing an act of being nice as an inherent property of a person. If I say Tess plays the flute, then I am describing the process of playing the flute as an inherent characteristic or ability of Tess that is true over time, and I am abstracting away from the specific processes and construing playing the flute as a lasting state.

Conversely, for a state to occur in the present progressive, it must be construed as a transitory process. There is no single general way in which this can be done, and the examples given previously show how it can be done for a variety of event types; enlarging the time scale for gradually changing relations, such as understand, or focusing on a single manifestation of the property in an action for dispositions, such as be nice. These construals are generally interpretable with a minimum of context provided. But even an apparently uninterpretable sentence such as (1b) can be given a construal: It could, for instance, describe a situation where she gets up on a box to be taller than the others (suggested by Anna Mawhinney, personal communication, 1997). In this case, the present progressive is used to construe the event as a temporary, passing action.[1]

There are several lessons to be drawn from these observations. Words such as verbs cannot be strictly divided into semantic classes on the basis of the grammatical constructions in which they occur. The grammatical constructions themselves convey a conceptualization of the event denoted by the verb. What matters in understanding the semantics of aspect is the semantic interpretation (if any) of a particular semantic class of verbs when used with either the simple present or the present progressive. In principle, any verb can be combined with any aspectual construction, although in practice, some construals are impossible to imagine. Lastly, the semantic features required for a hearer to interpret a verb plus grammatical construction include quite detailed and even context-specific information (as in *She is being tall*), which suggests that there is no sharp dividing line between "linguistic meaning," general knowledge about a concept, and specific knowledge about the context.

If we turn to achievements, there is a similar story to tell. Achievements supposedly cannot occur in the present progressive to describe the point-like event as happening at this very moment. This is due to the fact that although the present progressive construes an event as transitory and as involving change, it also construes the event as being extended in time. But some pointlike processes do allow the progressive:

14. a. *She just died.*

 b. *Help! She's dying!*

15. a. *The light just flashed.*

 b. *The light is flashing.*

Example (14a) describes the point of time when her life ended, that is, a pointlike transition from life to death. Example (14b) is interpretable, but instead of referring to the pointlike transition, it describes a process leading up to that point. It must be some specific process: I cannot say *I'm dying* this very moment just because I am mortal; I have to be terminally ill, or mortally wounded, that is, in the middle of a process that normally leads to the

pointlike transition. I call these *run-up achievements* (where the present progressive describes the run-up process to the achievement normally denoted in the past tense).

The examples in (15) demonstrate a different way in which an achievement can be construed with the present progressive. Example (15a) can be interpreted as a single flash, a pointlike event. Example (15b) is interpretable as describing not a single flash, but a series of flashes. Putting the series of flashes together over a larger time scale than a single flash, the sequence can be construed as a change (on–off–on–off–etc.) over time, which can then be conveyed by the present progressive. I call these *cyclic achievements*.

In fact, (15b) has another easily obtainable interpretation. Imagine watching a distant lighthouse whose light turns around relatively slowly; I could utter (15b) just as the light is coming around to our view. In other words, an achievement is an achievement only to the extent that a speaker construes it to be a single, pointlike event. Even a verb like *shatter* can be construed in the progressive, by allowing it to refer to iterated events: If you asked someone who was brazenly engaged in a major act of vandalism what he was doing, he might reply, *Oh, I'm shattering windowpanes*. Moreover, there is no single interpretation assignable to a combination of a verb denoting an event and an aspectual grammatical construction. The interpretation of such a combination depends largely on the speaker's and the hearer's real-world knowledge about how such events take place, and/or their imagination in figuring out a plausible scenario for which that combination of verb (event) and aspectual conceptualization is appropriate.

The shifts in interpretation are not merely quirks of the simple present–present progressive distinction. To illustrate this, I introduce another aspectual-semantic distinction, *telicity* (also known as *boundedness* or the *perfective/imperfective* distinction). A telic event (called an *accomplishment*) is one that has a "natural" endpoint or resulting state, whereas an atelic event (an *activity*) does not:

16. a. *I wrote the letter/three letters (in an hour).*
    b. *I slept (for three hours).*
    c. *I wrote letters (for three hours).*

Example (16a) is an example of a telic event. Writing a single letter has a natural endpoint, namely, when you have completed the letter. There is a special adverbial phrase in English using *in*, called the *container adverbial*, which specifies the amount of time from beginning to completion of the telic event. Example (16b) is an atelic event. There is no "natural" specified endpoint to sleeping. One can sleep for any length of time; there is no measurement to show that you have "finished" sleeping, as opposed to simply having stopped sleeping. English uses a different adverbial phrase with *for*, the *durative adverbial*, to indicate how long an atelic event

goes on. Example (16c) shows that the process described by *write* (and many other verbs) is telic only if the direct object is a definite or measured quantity. If the direct object of *write* is an indefinite amount or quantity, then the action is atelic: one can go on writing letters; without specifying the number of letters, there is no natural endpoint to the process.

Now, both container and durative adverbials require an interval of time, and so are incompatible with achievements when the latter are construed as pointlike events. Achievements are instead compatible with pointlike temporal adverbs, such as *suddenly*:

17. a. *The window suddenly shattered.*
    b. *The cockroach suddenly died.*
    c. *The light suddenly flashed.*

However, one can combine achievements with container and durative adverbials, with exactly the same sorts of interpretations as are found in the counterpart progressive sentences:

18. a. *He fell ill and died in two weeks.*
    b. *They reached the summit in five hours.*
    c. *The light flashed for five minutes.*
    d. *He shattered windowpanes for half an hour, and then moved on to smashing doors.*

For run-up achievements as in (18a–b), the container adverbial describes the length of time of the run-up process; and the container adverbial is used because the actual pointlike transition is a natural endpoint of the run-up process. For cyclic achievements as in (18c), and the iterative interpretation of typical achievements as in (18d), the durative adverbial describes the length of time of the iterated achievement; and the durative adverbial is used because there is no natural endpoint (iteration of the event is open ended).

Run-up achievements illustrate the problem of individuating events: In simple past tense uses, the event denoted is the pointlike transition, but in the progressive, the event denoted is the run-up process. Another example of variation in what part of the event is denoted by a verb-plus-aspectual-construction is found with verbs of perception and cognition, which I call *inceptive states*:

19. a. *I went around the bend and suddenly saw the mountain lion.*
    b. *Yes, I see the warbler near the top of the tree.*
    c. **I am seeing the warbler near the top of the tree.*
20. a. *I suddenly understood what was happening.*
    b. *I understand how to fill out this form.*
    c. **I am understanding how to fill out this form.*

The (a) sentences in (19–20) describe the inception of the perceptual/cognitive state (as indicated by the acceptability of *suddenly*), while the (b) sentences describe the perceptual/cognitive state itself. The (c) sentences are unacceptable because the construal of the present progressive is not compatible with the construal of the event as either the pointlike inception or the resulting state (of course, [20c] would be acceptable with a coarse-grained, gradual change interpretation). Nevertheless, it is clear that both the inceptive and state interpretations are about equally natural in the appropriate grammatical constructions (simple past for the former, simple present for the latter).

A proper description of the semantic combination of inceptive state verb and construction for (19–20) must include a representation of the inception (the transition from not seeing/understanding/etc. to seeing/understanding/etc.) as well as of the resulting state. But it is more complicated than that. Either the container or the durative adverbial can be used with inceptive state verbs, but they describe different parts of the event:

21. a. *I remembered the answer for five minutes.*
    b. *I remembered the answer in five minutes.*

Example (21a) follows the expected pattern in which the (atelic) state is described as lasting for five minutes. But (21b) describes the period of time up to the inception of the state, not unlike a run-up achievement. Moreover, the pattern in (21b)—describing a run-up process before the inception of the event—is found with ordinary atelic processes, states, and achievements as in (22a–c):

22. a. *In two years, she was president of the company.*
    b. *The horse was galloping in two minutes.*
    c. *The light flashed in a few seconds.*

The observations in this section lead us to two conclusions. The first is that the semantic representation of an event denoted by a verb must be complex, involving not only what we normally think of as "what the verb means" but also the event leading up to it (the run-up process or preceding state) and the event leading out of it (resulting state or, in the case of cyclic achievements, the return to the original state). Hence, we must be able to specify what part of the event is actually described in the sentence and what part is the "background." The part actually described is called the *profile* (following Langacker, 1987) and the "background" part is called the *base* (Langacker, 1987) or *frame* (Fillmore, 1982, 1985).

The second conclusion is that some adverbs and adverbial phrases (e.g., *suddenly, for a week, in two hours, almost*), like the simple present and progressive constructions, also involve a construal of the event, specifically, some particular time interval; but which time interval is profiled depends on the temporal structure of the event. The container adverbial profiles a process leading up to the last natural

transition point in the event frame—the endpoint for telic events and the inception for atelic events (including states, inceptive states, and achievements). The durative adverbial profiles an event continuing beyond the first transition point in the event frame—that is, the inception for all event types, including telic events (23):

23. *I read War and Peace for two hours (and then fell asleep).*

A *punctual* adverbial like *suddenly* profiles the pointlike transition (24a–c):

24. a. *Suddenly I saw Jack.*
    b. *Suddenly he was in a large cavern.*
    c. *Suddenly the horse galloped.*

If the event is telic, the interval from inception to completion is construed as the transition point (25a), and if that interval cannot be construed as a point in time, the sentence is unacceptable (25b):

25. a. *She suddenly shut the door.* (cf. *She was shutting the door*)
    b. **I suddenly read War and Peace.*

The transition points, or boundaries, are relevant to other aspectual constructions as well. The adverb *almost*, the prospective *be about to*, and the conative *try* all appear to profile a process leading up to the first transition point:

26. a. *She almost ran/was about to run/tried to run.*
    b. *The mouse almost squeaked/was about to squeak/tried to squeak.*
    c. *She almost was chair/was about to be chair/tried to be chair.*

However, when applied to a telic event, instead of profiling only the run-up to the inception of the event, or construing the event as a pointlike transition, these aspectual constructions are ambiguous as to whether they profile the run-up to the inception (in [27], before entering the river) or the process which would lead to completion of the event (here, reaching the other side of the river):

27. a. *She almost crossed the river.*
    b. *She was about to cross the river.*
    c. *She tried to cross the river.*

That is to say, the adverb *almost*, the prospective, and the conative profile a process leading up to any transition point in the event frame, either the first transition point (the beginning of the event) or the last one (the natural completion point of the event, if there is any). Other aspectual constructions can also be

defined in terms of what part of the event frame is profiled by the combination of verb and construction; *begin to VERB/begin VERBing* (natural endpoint of a telic event), *stop VERBing* (first transition point), *finish VERBing* (termination point other than the natural endpoint of a telic event), and so forth.

In this section, we have seen why the semantic category of aspect has been one of the more difficult areas of grammatical semantics to analyze. On the one hand, we have a complex representation of an event and its temporal structure. On the other hand, we have aspectual grammatical constructions whose meaning does not simply match (or fail to match) the temporal structure of the event. Instead, the aspectual grammatical construction provides a conceptualization of the temporal structure of an event, and speakers have considerable flexibility in adjusting the temporal structure of the event frame denoted by the verb so that an appropriate part of the structure is profiled by the sentence. The conceptualization processes include the invocation of general real-world knowledge of the event; innovative exploitation of specific aspects of the context; selectively attending to a relevant part of the event in the event frame; and "scalar adjustments" of the scale of the temporal dimension and the dimension of change over time (also presumably an attentional phenomenon).

Having seen how the interaction between lexicon and grammar is mediated by conceptualization processes in the temporal structure of events, we now turn to the conceptualization processes underlying the grammar of the causal structure of events.

Grammatical Relations and Voice: The Causal Structure of Events

In several examples in the preceding section, the event structure was complex, and what part of the event structure was actually profiled by the verb varied with the aspectual grammatical construction with which the verb was used. In the most complex cases, there was some sort of run-up activity that brought about a (usually pointlike) transition that resulted in a new state of the object in question. These examples all suggest that the basic structure of events is causal: Event structure is part of the causal network that unfolds over time.

How, then, are events "cut out" of the causal network and expressed in language? That is, what general cognitive and semantic principles are involved? There are basically two salient features of events that have major grammatical consequences on the organization of clauses. The first is the temporal contour, that is, the states, processes, and transitions described in the preceding section, which are linked together causally. The second are the participants in the events and their causal interactions. In the examples of temporal contours in the events preceding section, either just one participant was involved, or we quietly ignored the existence of multiple participants. In this section, I examine the grammatical status of participants in events in greater detail.

Before doing so, however, I must point out that the structure of the fragment of the causal network expressed in a clause is itself dependent on the speaker's point of view. Consider the following two sentences (Croft, 1991, p. 163):

28. a. *John was sick.*
    b. *The virus attacked John's throat, which became inflamed, resulting in laryngitis, until the immune system succeeded in destroying the infection.*

Examples (28a) and (28b) could be used to describe the same segment of the causal network. But, (28a) conceptualizes it as a single, simple, transitory state, whereas (28b) conceptualizes it as a complex set of processes that causally interact. Either conceptualization is possible and is available to the English speaker; it only matters what "grain size" (level of attention) the speaker wishes to use for describing the phenomenon. Nevertheless, there is a significant commitment that the speaker makes: The choice of grain size determines the choice of what objects count as participants in the event. This is further evidence that the participants help to determine the causal structure of events for encoding in language.

Examples (28a–b) also illustrate another important difference in conceptualization. Example (28a) is a simple sentence, that is, it contains multiple clauses. Because clauses denote events, causation is construed here as events causing other events. This is generally the case for the formulation of causal relations in complex sentences. Example (28a), however, is a simple clause; it contains one participant, but clauses can contain two, three, or even more participants, expressed as the *subject*, *object*, or an *oblique* expressed by a prepositional phrase (e.g., *for*, *with*, *to*, etc.). When a segment of the causal chain is expressed in a single clause, the causal relations are encoded in terms of participants acting on other participants. This insight was first explicitly described by Talmy (1972, 1976), but is now used widely by a variety of cognitively oriented linguists. I do not discuss complex sentences any further, and therefore, focus my attention on single clauses in order to see how the causal interaction of participants determines choice of subject, object, and oblique for a variety of clauses in English.

The value of causal structure for understanding how participants in an event are assigned to subject or object is best demonstrated by briefly outlining the difficulties of one of the most popular approaches to the semantics of grammatical relations, namely the semantic classification of participants according to semantic roles (also called *thematic roles* or *case roles*). The following examples illustrate some of the more common semantic roles, with rough definitions and how they are expressed in English (roles and many of the examples are from Frawley, 1992):

Agent: a volitional being that brings about a change

29. a. *TOMMY drove the car.*
    b. *The food was eaten BY RACCOONS.*

Author: a nonvolitional object (typically a natural force) that brings about a change

30. a. *LIGHTNING struck the tree.*
    b. *The tree was struck BY LIGHTNING.*

Instrument: an object under the control of an agent that brings about a change

31. a. *Ellen cut the salami WITH A KNIFE.*
    b. *THE KEY opened the door.*
    c. *THIS KNIFE can really cut through cardboard.*

Patient: an object that undergoes a change of state of some sort

32. a. *The man cleaned THE CAR.*
    b. *The authorities banned THE BOOK.*
    c. *THE BOOK was banned by the authorities.*
    d. *THIS MEAT cuts easily.*

Experiencer: a being whose mental state is altered by some external stimulus

33. a. *BUDDY smelled the flowers.*
    b. *The dog scared ME.*

Stimulus: an object that brings about a change in mental state in an experiencer

34. a. *Buddy smelled THE FLOWERS.*
    b. *THE DOG scared me.*

Benefactive: a person who benefits from an action being carried out, sometimes by receiving something as a result of the action

35. a. *I sang the song FOR FRED.*
    b. *Mary bought Bob lunch.* (actually recipient)

Theme/Figure: an object whose location/motion is described by the verb; figure contrasts with ground as in Gestalt psychology (the terminology was borrowed by Talmy, 1974, 1983)

36. a. *Bill rolled THE BALL across the floor.*
    b. *THE BALL rolled across the floor.*
    c. *The bus spattered the sidewalk WITH MUD.*

Spatial goal: the ground (reference point) for motion of a theme to or toward the ground object

37. a. *They went TO NORMANDY.*
    b. *The bus spattered THE SIDEWALK with mud.*

Metaphorical goal: the endpoint of a nonspatial process that is metaphorically construed as motion

38. a. *Wine can turn INTO VINEGAR.*
    b. *We made VINEGAR out of the wine.*

Spatial source: the ground for motion of a theme away from the ground object

39. a. *The cat leaped FROM THE KITCHEN COUNTER.*
    b. *The porcupines stripped THE SPRUCE of its bark.*

Metaphorical source: the starting point of a nonspatial process that is metaphorically construed as motion

40. a. *WINE can turn into vinegar.*
    b. *We turned THE BENCH into a coffee table.*
    c. *The publisher bought the rights FROM THE AUTHOR.*

The examples of semantic roles given in (29–40) demonstrate that they are simply not helpful for predicting the semantics of grammatical relations: Almost any semantic role can occur in almost any grammatical relation. Yet, intuitively, the choice of subject, object, and oblique in English (and in other languages) is not chaotic. Moreover, semantic roles are not independent semantic constructs. Semantic roles are defined with respect to other semantic roles. All semantic roles are defined with respect to the sorts of events with which they are found. This apparent problem is in fact the pointer to a solution to the puzzle of the semantics of grammatical relations.

Choice of subject and object (and as we see shortly, also obliques) is largely relative: The subject must act on the object in some way (physical or otherwise). Agents, authors, and instruments act on patients and themes. Hence, if one of the former and one of the latter appear in an active transitive sentence, the agent/etc. will be subject and the patient or theme will be object (the passive, and alternation between object and oblique, is discussed later). This prototypical event type is called the "transmission-of-force" model by Talmy (1976) and the "billiard-ball" model by Langacker (1991): One participant interacts with another participant and transmits its force to the other participant, which then undergoes a change. In later work, Talmy recognized that there were other kinds of *force–dynamic* relations (as he now calls them; Talmy, 1988) than the basic billiard-ball model:

41. a. *I kicked the ball.*
    b. *I pushed the ball.*

    c. I held the ball
    d. I stopped the ball
    e. I dropped/let go of the ball
    f. I left the ball (in the house).

Example (41a) conforms to the billiard-ball model: I make contact with the ball and it goes off. Example (41b) is the most similar to (41a) but the *initiator* of the action continually applies force to the *endpoint* (*extended* causation vs. the *onset* causation of [41a]). Example (41c) is quite a bit different. Unlike (41a–b), the endpoint (the ball) has a natural tendency to motion (due to gravity) rather than to rest; the initiator must apply continuous force to keep the endpoint at rest; Talmy described this as extended causation of rest ([41a–b] are causation of motion or more generally, change of state). Extended causation of rest events, incidentally, are inactive actions: Even though no change takes place, the dynamic character of the action as manifested in the progressive is due to the application of force by the initiator. Example (41d) illustrates onset causation of rest: the moving ball makes contact with my foot and stops moving; I could remove my foot and the ball won't move (in some uses of this sentence). Examples (41e–f) illustrate *letting* rather than *causing* (in Talmy's terminology); the initiator "acts on" the endpoint by refraining to exercise its force–dynamic potential, thus allowing the endpoint either to undergo change (letting of motion; [41e]), or not (letting of rest; [41f]). Talmy also recognized *helping* and *hindering* force–dynamic relations in addition to causing and letting.

The examples in (41) are ranked in rough order of frequency of expression as simple transitive verbs. In fact, many of the less prototypical sorts of force–dynamic relations are typically expressed through verbs that take complements (*let X VERB, keep VERBing, keep X from VERBing, leave X to VERB, help X VERB*, etc.). But when any force–dynamic relationship is expressed by a simple active transitive verb, the assignment of participants as subject and object is clear: The initiator is the subject and the endpoint is the object.

The force–dynamic relations between participants analyzed in the preceding paragraphs are all examples of causation of physical events, typically by volitional agents but also by physical objects. Talmy (1976) recognized that there are other kinds of causal relations in which the endpoint of the force–dynamic relation undergoes a change of mental state rather than of physical state; he called these *affective* causation or *inductive* causation (depending on whether the initiator was physical or volitional, respectively). These are the verbs whose participants are experiencer and stimulus. Unlike physical events, however, some mental verbs make the experiencer the object (42a–c) and others make the experiencer the subject (43a–d):

42. a. The dog frightened me.
    b. The performance pleased her.
    c. Her behavior puzzled him.

43. a. I looked at the elk.
    b. I listened to the sonata.
    c. I thought about my presentation.
    d. I grieved over her death.

The reason that mental verbs fall into two separate types (a third is discussed later) is that mental processes are fundamentally ambivalent forces dynamically. The experiencer directs her or his attention to the stimulus (an inactive action) and the stimulus simultaneously alters the mental state of the experiencer. The sentences in (42) and (43) selectively attend to different aspects of the causal relationship between experiencer and stimulus. The sentences in (42) describe the change in mental state of experiencer caused by the stimulus, and so the experiencer is object. The sentences in (43), on the other hand, describe the experiencer directing her or his attention to the stimulus; in this case, it is the experiencer that carries out a change of state (the experiencer's own state), whereas the stimulus isn't doing anything. (In fact, the stimulus in such sentences is typically an oblique, not a direct object, because of its lack of affectedness by the event; this is discussed further.)

Cross-linguistically, this pattern is largely maintained: Verbs highlighting how the stimulus causes a change in the experiencer's mental state make the stimulus the subject and the experiencer the object (sometimes the indirect object); whereas verbs highlighting the experiencer, directing their attention to the stimulus, make the experiencer the subject and the stimulus an object (or an oblique, because it is not directly affected by the experiencer's action).

There is a third type of mental verb for which there is significant cross-linguistic variation in how the experiencer and the stimulus are expressed. These are stative mental relations, where the verb simply indicates that a mental state of an experiencer holds with respect to the stimulus, as in *I like cats*. In mental states, there is no force–dynamic relationship: the competing force–dynamic directions are balanced. Hence, in some languages (such as English), the experiencer is normally made subject; in other languages (such as Russian and languages of south-central Asia), the experiencer is normally made (indirect) object; in still other languages, the experiencer and stimulus are both encoded either as subjects (Japanese "double-*ga*" constructions) or as objects (Eastern Pomo; for details, see Croft, 1993).

In general, a noncausal stative relation can be expressed in different ways; the force–dynamic model of subject–object assignment makes no a priori prediction, and across languages, one finds variation. The two most common relations are the spatial relation between figure and ground, and the possessive relation between possessor and possessed. Despite the cross-linguistic variation, however, there appear to be systematic patterns as to how noncausal relations are incorporated into the causal structure of events. Essentially, it appears that noncausal relations are construed as force–dynamic relations in experientially plausible ways.

Beginning with spatial relations, we find the following systematic pattern in English and in other languages:

44. a. *Bobby loaded rutabagas on the wagon.*
    b. *Bobby loaded the wagon with rutabagas.*
45. a. *The beaver stripped bark from the trees.*
    b. *The beaver stripped the trees of bark.*

In the (a) sentences, the figure is the direct object and the ground is an oblique phrase governed by a spatial preposition, which varies depending on the spatial relation. In the (b) sentences, the ground is the direct object and the figure is an oblique phrase governed by *with* (if the figure ends up in contact with the ground) or *of* (if not). This pattern persists with possession and other relations:

46. a. *They supplied arms to the Azeris.*
    b. *They supplied the Azeris with arms.*
47. a. *They robbed/stole $50 from him.*
    b. *They robbed him of $50.*
48. a. *I substituted a set of readings for the textbook.*
    b. *I replaced the textbook with a set of readings.*

These patterns, which are systematic and which are found across languages, can be explained by the following account. First, there is a systematic construal of noncausal relations as indicated in (49):

49. Causal: *Initiator*   *Endpoint*
    Spatial: *Figure*   *Ground*
    Possessive: *Possessed*   *Possessor*
    Substitutive: *New*   *Former*

The construal is natural, in that generally, an agent acts on the figure to alter its spatial relationship with the ground, acts on a possessed item in order to transfer it to the possessor, and introduces a new object to take the place of the former object.

Second, although subjects must always be antecedent to objects in the causal chain, oblique referents may be either antecedent or subsequent to the object in the causal chain. However, oblique prepositions divide themselves into two types, those that indicate *antecedent* oblique phrases and those that indicate *subsequent* oblique phrases, as listed in (50):

50. Antecedent Oblique: *with, by, of,* metaphorical *from, out of*
    Subsequent Oblique: *to, for,* all spatial prepositions (*in, out, on, off, from,* etc.)

These two hypotheses account for (46–48), as well as for many other sentences. For instance, in (46a), the figure is a direct object and the ground is an oblique. Because the ground is construed as subsequent to the figure in the causal chain, it must be governed by a normal spatial preposition. In (46b), on the other hand, the ground is the direct object and the figure is an oblique. Because the figure is construed as antecedent to the ground, it must be governed by an antecedent preposition, namely *with.*

Similar arguments apply to (47–48). Moreover, these examples fit in with the standard pattern with purely causal chains:

51. a. *He stirred the soup with a spoon.*
    b. *He made the soup for Sandra.*
52. *This house was designed by Frank Lloyd Wright.*

In (51a), the agent acts on the spoon, which acts on the soup. Hence, the spoon is antecedent to the direct object *soup* in the causal chain, and so requires an antecedent oblique preposition, *with.* In (51b), on the other hand, Sandra receives a positive benefit from the making of the soup. Hence, Sandra is subsequent to the direct object *soup* in the causal chain, and so requires a subsequent oblique preposition, *for.* Finally, in the passive sentence in (52), the house is the subject; because the agent is antecedent in the causal chain to the subject (let alone a direct object, which is absent here), it must be governed by an antecedent oblique preposition, namely *by* (the passive voice is discussed further).

The distinction between antecedent and subsequent obliques is such a basic one that it appears to be acquired by young children and used innovatively. English has several antecedent oblique prepositions, and children tend to substitute one for another, but not to substitute a subsequent preposition for an antecedent one. For example, children sometimes substitute *by* for the instrumental *with* ([53a], from Bowerman, 1983, pp. 463–465; and [53b] from Tomasello, 1992, p. 176); or the antecedent prepositions *from, of,* or *with* for the passive agent *by* ([53c] from Bowerman, 1989, p. 29; cf. Clark & Carpenter, 1989); or the subsequent preposition *for* for *to* ([53d] from Tomasello, 1992, p. 175):

53. a. "*I just eat it BY my spoon*" [C 4;4].
    b. "*Can I pick it up BY my hands*" [T 1;10–2;0].
    c. "*Sometimes Eva needs to be feeded WITH you because she doesn't eat*" [C 4;4].
    d. "*Santa Claus gave it FOR me*" [T 1;10–2;0].

More strikingly, children take a verb that occurs with only one direct object option in adult English—ground only as in (54a) or figure only as in (54b)—and use it in the other direct object option, with an antecedent or subsequent oblique preposition as appropriate (Bowerman, 1982, pp. 338–339):

54. a. "... 'cause I'm going to touch it [hand] on your pants" [E 3;0]. (Figure is incorrectly made direct object, but appropriate subsequent oblique preposition governing ground is chosen.)

b. "I don't want it because I spilled it [toast] or orange juice" [E 4;11]. (Ground is incorrectly made direct object, but appropriate antecedent oblique preposition governing figure is chosen.)

These examples demonstrate that English children come to understand the force–dynamic model underlying the choice of subject, object, and (antecedent or subsequent) oblique in adult English, and sometimes to use it productively.

The variation in assigning participants in events to subject, object, and oblique grammatical relations is thus based on a systematic understanding by the speaker of the force–dynamic interactions of those participants in the events in question. As with the temporal contour of events, the force–dynamic relationships constitute the event frame, and only part of the event in the event frame is profiled by the verb, combined with a particular assignment of subject, object, and oblique. Specifically, I hypothesize that the part of the causal chain that is profiled is the part of the chain that goes from the subject to the object (if there is one). Of course, this hypothesis would be more convincing if there was a semantic correlate to the "beginning" and "end" of the verbal profile, that is, to subject and object status where a choice is possible. In fact, there is such a correlation, namely control for subjects and affectedness for objects. Moreover, these semantic properties suggest an answer to a major question posed at the beginning of this chapter: How do speakers individuate events out of the causal chain and encode them with verbs and their grammatical dependents?

It has long been observed that the choice of figure or ground as the direct object in (46a–46b) involves a subtle difference in meaning. If (46a) is chosen, then it is inferable that all of the rutabagas have been loaded onto the wagon, but it is not necessarily inferable that the wagon is full. If (46b) is chosen, the opposite is true: It is inferable that the wagon is full but it is not necessarily inferable that all the rutabagas have been put on the wagon. In other words, the participant assigned to direct object position can be inferred to be fully affected by the action, whereas one cannot make the same inference for the participant assigned to the oblique position.

The association of direct object status with a higher degree of affectedness can be found in other types of examples. I noted previously that in mental verbs that describe the experiencer, directing their attention to the stimulus, the stimulus is not physically altered and is usually found as an oblique rather than as a direct object (43a–43d). Other verbs allow a participant to be either the direct object or an oblique, with a corresponding difference in affectedness:

55. a. *I shot the sheriff.*
    b. *I shot at the sheriff.*

56. a. *Johnny chewed on the bone.*
    b. *Johnny chewed the bone.*

Example (55a) entails that the sheriff was struck by a bullet (in some contexts, it even implies the sheriff was killed); (55b) does not. Example (56a) implies that Johnny did not break the bone, whereas (56b) implies that he did (and in fact probably put the entire bone in his mouth).

Whereas full affectedness appears to be the salient semantic feature for assignment as object, full control appears to be the salient semantic feature for assignment to the subject position. Normally, an agent is the subject in an active sentence. Authors, i.e. natural forces, can also function as the subject, largely because they appear to act without a further external force acting on them. Instruments do not normally appear as subjects, precisely because they are under the external control of an agent. Yet, they can appear as subjects, as in (31b–31c). In (31c), the key is the subject, because its shape determines that the door can be opened; in this context, *open* can be paraphrased as *unlock*. In (31c), ability to cut cardboard well is attributed to properties of the knife (rather than to properties of the agent wielding the knife); the knife is construed as the ultimate cause of the event and is assigned to subject position. Even a patient can be construed as responsible for the outcome of an active voice verb, as in (32d), where it is the tenderness of the meat that renders it easily cuttable.

Why are control and affectedness associated with subject and object assignment, that is, the two "edges" of the verbal profile in an event frame? Consider what is almost universally taken to be the prototypical causal event type: A volitional agent acting on her or his own brings about a complete change of state to a patient, so that the patient cannot change any further in the relevant semantic dimension. An event of this type is the easiest to isolate from the causal network. The agent is construed as acting entirely under her or his volition, and so there is no obvious antecedent participant causing the agent to act. The patient undergoes a full change of state, which means no further process can lead to another event in the causal chain (this is the natural endpoint of a telic event). Moreover, states generally do not have causal consequences, hence no further participants are usually involved in the causal chain.

In other words, a segment of the causal chain whose initiator is in full control and whose endpoint is fully affected is the most completely individuated from the causal network (Croft, 1994). It is thus not surprising that this is the prototypical event type encoded by verbs. Of course, many events (perhaps most events) are not really like this. Agents act under duress or out of some emotional response. Or the initiator isn't even an agent, but a natural force or an instrument with some salient relevant properties (a sharp knife). Patients are not completely affected, so further consequences may follow; or the event is atelic; or the change of state affects the mental state of another participant, leading to another causal chain. To some degree, the assignment of grammatical

relations to participants is determined by the way the world is, that is, our real-world knowledge of particular kinds of causal relations and our knowledge of specific circumstances. But to a considerable degree, it is up to the speaker's construal of the event. Was it I, or my knife, or the meat itself that led to an easy cutting event? Was I the agent in control of the action, or did someone make me do it? And so on.

Lastly, I consider the phenomenon of passive voice in the context of the individuation of events for communication. The analysis of the passive voice is straightforward in this model: The event frame is the same as the active voice counterpart, but the passive verb form profiles only the segment of the causal chain including the patient's change to a resulting state. The passive verbal profile accounts for the assignment of patient as subject in (32c) and (52), and the use of an antecedent oblique for the passive agent when it is expressed, as in (29b), (30b), and (52). The choice of passive vs. active voice is generally considered to be governed by discourse factors, e.g. focus of attention on the patient vs. the agent. The discourse analysis of the passive is not incompatible with the cognitive account given here: The verbal profile is "shortened," excluding the agent's causal role, precisely for the purpose of communicating to the hearer that the portion of the causal network involving the patient only is the most relevant for the purposes at hand. (In fact, Langacker, 1987, suggested that profiling is an attentional phenomenon.) In general, it should not be forgotten that the cognitive construal of experience in language is ultimately done for the purpose of communication in discourse, and cannot be separated from that function (Croft, 1994).

Conclusion: Semantics and Grammar

In this chapter, I outlined a cognitive linguistic approach to the grammar of event structure in English aspectual constructions and grammatical relations. The emphasis was how the event structure underlying verb meanings interacts with the conceptualization of events provided by the semantics of grammatical constructions. I wish to conclude with some remarks on the relationship of this approach to traditional issues in grammatical analysis.

The central starting point for the analysis of grammatical structure in linguistics is what is called distributional analysis: the distribution of words (in this case, verbs and the phrases dependent on them) across grammatical constructions (such as the simple present vs. the present progressive, container vs. durative adverbials, and subject, object, and oblique grammatical relations). The assumptions behind distributional analysis are: (a) words have a fixed distribution across constructions—they are either acceptable or not in those constructions; (b) their distribution can be used to define grammatical categories; and (c) grammatical categories and constructions can be defined distributionally without reference to their meaning or use.

Cognitive linguistics employs distributional analysis as well, but the facts require us to abandon all three assumptions about the nature of distributional analysis. Words do not have a fixed distribution across constructions. To some degree, any word can be used in principle in any construction. Hence, distributional patterns do not establish grammatical categories in the strict sense. What matters is the semantic interpretation of a word in a particular grammatical construction. By examining the meanings of verbs in constructions, we can establish semantic classes of events and conceptual meanings of constructions, as we have done in this chapter. The interaction between verbs and the event frames they evoke on the one hand, and grammatical constructions and the temporal and causal structures they construe events as having on the other hand, is dynamic and flexible. In fact, this interplay between grammatical constructions and the words that speakers fit into them is the source of the richness and flexbility of language as a means of communicating experience.

The flexibility of grammar is limited to some extent by our expectations of what the world is like and how different types of events can be plausibly construed. It is also limited by conventionalized construals of events that have historically become fixed in languages and that also tend to vary across languages. It is a fact of English, for example, that the experiencers in mental states are subjects and not objects. The underlying conceptual processes are subordinated to grammatical convention here (that is, how often speakers of English in the past have chosen to encode the relevant relations). But those underlying processes do manifest themselves, not only in the latent motivation of conventional patterns, but also in the creative learning of language by children, and in the creative, innovative use of language by adults.

Notes

1. In fact, it appears that the expression of transitory states in English is a fuzzy boundary case. The conventional grammatical way to describe some transitory states is by use of the simple present: Gary is sick/Rhonda is the winner. This usage does not fit the general pattern of the simple present conceptualizing the event as an inherent unchanging property. On the other hand, the novel interpretation of She is being tall exploits the present progressive to indicate a transitory state, in contrast to the inherent state described by the simple present She is tall.

2. Talmy calls the initiator the Antagonist and the endpoint the Agonist; I am retaining the terminology of Croft (1991), and subsequent papers that elaborate Talmy's model for the mapping of participants into grammatical relations.

References

Bowerman, M. (1982) Reorganizational processes in lexical and syntactic development. In E. Wanner & L. R. Gleitman (Eds.), Language acquisition: The state of the art (pp. 319–345). Cambridge, England: Cambridge University Press.

Bowerman, M. (1983). Hidden meanings: The role of covert conceptual structures in children's development of language. In D. R. Rogers & J. A. Sloboda (Eds.), The acquisition of symbolic skills (pp. 445–470). New York: Plenum.

Bowerman, M. (1989). *When a patient is the subject: Sorting out passives, anticausatives, and middles in the acquisition of English.* Unpublished manuscript.

Clark, E. V., & Carpenter, K. L. (1989). The notion of source in language acquisition. *Language, 65,* 1–30.

Croft, W. (1991). *Syntactic categories and grammatical relations: The cognitive organization of information.* Chicago: University of Chicago Press.

Croft, W. (1993). Case marking and the semantics of mental verbs. In J. Pustejovsky (Ed.), *Semantics and the lexicon* (pp. 55–72). Dordrecht: Kluwer Academic.

Croft, W. (1994). Voice: Beyond control and affectedness. In P. J. Hopper & B. A. Fox (Eds.), *Voice: Form and function* (pp. 89–117). Amsterdam: John Benjamins.

Fillmore, C. J. (1982). Frame semantics. In The Linguistic Society of Korea (Ed.), *Linguistics in the morning calm* (pp. 111–137). Seoul: Hanshin.

Fillmore, C. J. (1985). Frames and the semantics of understanding. *Quaderni di semantica, 6,* 222–254.

Frawley, W. (1992). *Linguistic semantics.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Goldsmith, J., & Woisetschlaeger, E. (1982). The logic of the English progressive. *Linguistic Inquiry, 13,* 79–89.

Langacker, R. W. (1991). *Foundations of cognitive grammar: Vol. 2. Descriptive application.* Stanford, CA: Stanford University Press.

Langacker, R. W. (1987). *Foundations of cognitive grammar: Vol. 1. Theoretical prerequisites.* Stanford, CA: Stanford University Press.

Rosch, E. (1978). Principles of categorization. In E. Rosch & B. Lloyd (Eds.), *Cognition and categorization* (pp. 27–48). Hillsdale, NJ: Lawrence Erlbaum Associates.

Talmy, L. (1972). *Semantic structures in English and Atsugewi.* Unpublished doctoral dissertation, Department of Linguistics, University of California, Berkeley.

Talmy, L. (1974). Semantics and syntax of motion. In J. Kimball (Ed.), *Syntax and semantics* (Vol. 4, pp. 181–238). New York: Academic Press.

Talmy, L. (1976). Semantic causative types. In M. Shibatani (Ed.), *The grammar of causative constructions* (pp. 43–116). New York: Academic Press.

Talmy, L. (1983). How language structures space. In H. L. Pick, Jr. & L. P. Acredolo (Eds.), *Spatial orientation: Theory, research and application* (pp. 225–282). New York: Plenum.

Talmy, L. (1988). Force dynamics in language and cognition. *Cognitive Science, 12,* 49–100.

Tomasello, M. (1992). *First verbs.* Cambridge, England: Cambridge University Press.

Vendler, Z. (1967). Verbs and times. In Z. Vendler (Ed.), *Linguistics in philosophy* (pp. 97–121). Ithaca, NY: Cornell University Press. (Original work published 1957)

4
LANGUAGE AND THE FLOW OF THOUGHT

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It is a curious fact that efforts to understand the human mind have never taken very much account of how people actually talk. It is not that there has been a neglect of language—far from it—but that studies relating language and the mind have largely ignored insights that can be derived from a close and systematic examination of ordinary speech, the kind of talk that all of us produce and hear around us constantly in our daily lives. There is still no widespread appreciation of what ordinary talk can tell us about the mind, or even of how one can go about exploiting it as a valuable source of understanding. The study of natural conversation has been left largely to sociologists, whose interests have led them more in the direction of studying social interaction (e.g., Atkinson & Heritage, 1984; Goodwin, 1981; Gumperz, 1982).

There are various reasons for this neglect. For one thing, speech is evanescent. The sounds people make as they talk, and even many of the thoughts expressed by those sounds, quickly fade away. The methods of Western science depend fundamentally on an ability to pin down what one observes, usually in visual form, and to return to it again and again. Speech itself does not allow that kind of storage and manipulation. It is true that the invention of writing provided a way to convert sounds and ideas into something visible. It is thus easy to understand why most systematic studies of language through the ages have been based on written language. But visual representations of language always leave out much that is present in actual speech; when we speak of "reducing" language to writing, the implications of the word "reducing" are cogent.

By the early years of the 20th century, there were some linguistic scholars who had begun to recognize the special importance of spoken language, and some went to great trouble to reproduce the sounds of language in writing as faithfully as possible. Particularly in studies of exotic languages, linguists would sit with