Chapter 3

The Causative Alternation: A Probe into Lexical Semantics and Argument Structure

In the previous chapter we argued at length in favor of the existence of a class of verbs with the syntactic properties attributed to unaccusative verbs by the Unaccusative Hypothesis: the selection of a direct internal—but no external—argument and, concomitantly, the inability to assign accusative Case. In this chapter and the next two, we will examine the lexical properties of unaccusative verbs in order to get at the essence of this class of verbs. We will approach the issue from two related perspectives: the basic adicity of unaccusative verbs and their lexical semantic characterization. Establishing basic adicity and uncovering those aspects of meaning that determine syntactic classification are fundamental to the development of a theory of the lexical semantic representation of unaccusative verbs.

In this chapter we use the much-studied causative alternation (see B. Levin 1993 for references), illustrated in (1), as a probe for uncovering these properties.

(1) a. Pat broke the window./The window broke.
    b. Antonia opened the door./The door opened.
    c. Tracy sank the ship./The ship sank.

In English verbs that participate in this alternation show transitive and intransitive uses such that the transitive use has roughly the meaning 'cause to *V*-intransitive'. In some languages the alternation is characterized by morphologically related rather than identical forms of the verb in the two variants, though the same semantic relationship between the variants is maintained.

The semantic relationship between the two variants is reflected in the fact that the subject of the intransitive variant and the object of the transitive variant bear the same semantic role. The causative alternation has

been claimed to be an unaccusative diagnostic (Burzio 1986, C. Rosen 1981, among others) precisely because this sharing of a semantic role can be explained if the verb in the intransitive variant is unaccusative, so that its subject is a D-Structure object. In fact, unaccusative analyses of the intransitive variant, such as the one presented by Hall (1965), antedate Perlmutter's formulation of the Unaccusative Hypothesis.

Many of the verbs cited as prototypical unaccusatives—specifically, verbs of change of state, such as the English verbs *break*, *dry*, and *open*, as well as their counterparts in other languages—participate in the causative alternation.[1] Indeed, participation in the causative alternation has been considered to be a hallmark of a verb of change of state (e.g., Fillmore 1970). In contrast, verbs that are considered prototypical unergatives such as *laugh*, *play*, and *speak* do not participate regularly in the alternation, at least not in English, French, Italian, and Russian.[2]

(2) a. The children played.
b. *The teacher played the children.
(cf. The teacher made the children play.)

(3) a. The actor spoke.
b. *The director spoke the actor.
(cf. The director made the actor speak.)

(4) a. The crowd laughed.
b. *The comedian laughed the crowd.
(cf. The comedian made the crowd laugh.)

Thus, there appears to be good reason to use the causative alternation as a probe into the nature of unaccusativity. If, as previous studies suggest, a verb's ability to participate in the causative alternation correlates strongly with an unaccusative classification of that verb, then one way to arrive at the semantic characterization of the unaccusative class is by asking what element of meaning sets causative alternation verbs like *break* apart from nonalternating verbs like *speak*.

Since unaccusative and unergative verbs are both intransitive, the difference between them is usually considered to be a difference in semantic characterization that does not involve a difference in basic adicity. For example, it has been proposed that verbs of change of state are unaccusative, whereas agentive verbs are unergative (Perlmutter 1978). However, Chierchia (1989), noting the participation of unaccusative verbs in the causative alternation, suggests that unaccusative verbs are derived from

basically dyadic causative verbs, whereas unergative verbs are basically monadic. The semantic characterization of the difference between the two classes of verbs is then reflected in a difference in their basic adicity. In claiming that unaccusative verbs are underlyingly causative and thus dyadic, Chierchia's analysis departs from many others, which take these verbs to be basically monadic, the causative alternation arising from the addition of an argument (see, for example, Brousseau and Ritter 1991, Lakoff 1968, 1970, Williams 1981).

In this chapter we argue that a causative lexical semantic analysis is valid for a large class of unaccusative verbs, although in section 3.3 we argue that it is not valid for all of them. In section 3.1 we introduce our version of the causative analysis and present evidence for its validity. In section 3.2 we consider what element of meaning distinguishes between intransitive verbs that do and do not participate in the causative alternation, since this element will play an important part in the semantic determination of unaccusativity. Although, as noted above, the notions of change of state and agentivity have figured in previous accounts, we show that these notions are too coarse. We propose that a semantic distinction between what we refer to as "internally" and "externally" caused eventualities can be used to characterize when a superficially intransitive verb is basically dyadic. In section 3.2.5 we show that apparent causative pairs involving unergative verbs do not instantiate the same phenomenon as the causative pairs involving verbs of change of state.

In section 3.3 we show that the causative alternation can also be used to argue for the existence of two major semantically defined subclasses of unaccusative verbs. Specifically, we show that in English and other languages verbs of existence and appearance, though cited as bona fide unaccusative verbs, are like unergative verbs in generally lacking causative uses. The causative analysis of unaccusative verbs, then, cannot be extended to the whole class of unaccusatives. This should not be surprising since, as mentioned in chapter 1, we do not take finding a unified lexical semantic representation for all unaccusative verbs to be a goal of this work. Given the many-to-one mapping between lexical semantics and syntax, there is no more reason to believe that the class of unaccusative verbs is homogeneous than there is to believe that all transitive verbs constitute a single semantic class. With respect to the question we address in this chapter, there is no reason to believe that all unaccusative verbs have the same adicity and argument structure.

What emerges from the investigation in this chapter, then, is a correlation between certain lexical semantic properties, basic adicity, and the argument structure associated with intransitive verbs, where the lexical semantic properties have an explanatory relation to adicity and argument structure. We conclude that intransitive verbs can be divided into (at least) three distinct classes with respect to their lexical semantic representation. The first is the class of unaccusative verbs whose lexical semantic representation is basically that of a causative (dyadic) verb and whose argument structure consists of a single direct internal argument. The second is also a class of unaccusative verbs, but these unaccusative verbs are not related to "more basic" causative verbs. The members of this second class are shown to have two internal arguments. The last class consists of the unergative verbs, a set of verbs that in terms of their lexical semantic representation are basically monadic and in terms of their argument structure take a single external argument. In the course of this chapter, we introduce most of the semantically defined intransitive verb classes that we will be analyzing further in the remainder of the book. (Full lists of the members of the major intransitive verb classes that we discuss are included in appendix A.) As we do this, we sketch the semantic characterization of the three classes of intransitive verbs that need to be distinguished on the basis of argument structure. In the next chapter we elaborate on the lexical semantic properties of the various classes of verbs and formulate the linking rules that give rise to the syntactic properties of these verb classes. In this chapter, as in the last, we take the unaccusative and unergative status of certain verbs for granted, without justifying their syntactic status through the use of unaccusative diagnostics. We do this in chapters 4 and 5.

3.1 A Causative Analysis of Alternating Unaccusative Verbs

The observation that many of the verbs cited as unaccusatives are paired with morphologically related, if not identical, causative transitive counterparts in a variety of languages has led Chierchia (1989) and, in his footsteps, Reinhart (1991) to argue that all unaccusative verbs are basically causative. We assume that the alternating unaccusative verbs are basically causative, although we differ from Chierchia and Reinhart in not extending this analysis to the nonalternating unaccusative verbs for reasons that we set out in section 3.3. More specifically, we assume that the alternating unaccusative verbs have a single lexical semantic representa-

tion associated with both their unaccusative and transitive forms, and that this is a causative lexical semantic representation. Thus, in terms of its lexical semantic representation the verb *break* of *The window broke* is a dyadic causative verb, just as the verb *break* of *Pat broke the window* is. This analysis departs from the analyses that are typically found in other studies, which assume that the intransitive variant of a causative alternation verb is basic and the transitive variant derived. This assumption probably stems from the fact that the typical definition given for the meaning of the verb in the transitive variant of the causative alternation includes that of the verb in the intransitive variant: whereas transitive *break* means something like 'cause to become broken', intransitive *break* appears to mean simply 'become broken'. In contrast, on our analysis those intransitive verbs that do not participate in the causative alternation are inherently monadic predicates, whereas the alternating verbs are inherently dyadic causative predicates. Causative verbs detransitivize only under specific circumstances; we discuss the circumstances that license the nonexpression of the cause in section 3.2.3. But we stress that on our analysis causative verbs do not arise from a process of causativization—they are inherently causative—but instead undergo a process of detransitivization under certain conditions.

The following lexical semantic representations for the two types of verbs illustrate the kind of distinction we propose.

(5) *break:* [[*x* DO-SOMETHING] CAUSE [*y* BECOME *BROKEN*]]

(6) *laugh:* [*x LAUGH*]

A verb like *break* on both its transitive and intransitive uses has a complex lexical semantic representation involving the predicate CAUSE; it represents the meaning of such verbs as involving two subevents, each an argument of CAUSE. The analysis of CAUSE that we are adopting, then, is the "biclausal" or "bievent" analysis argued for by Dowty (1979) and Parsons (1990), among others, and adopted in the work of a number of researchers including Pustejovsky (1991b) and Van Valin (1990) (see also D. Wilkins and Van Valin 1993). The two subevents can be characterized as the *causing* subevent and, following Hale and Keyser (1987), the *central* subevent—the event that specifies the change associated with the verb. Each of the arguments of the verb is associated with a distinct subevent: the causer argument is associated with the causing subevent, and the passive participant—that is, the argument that undergoes the change, which is often referred to as the *patient* or *theme*—with the central subevent (see

Grimshaw and Vikner 1993 for evidence for such an analysis). In some instances the external argument of such a verb corresponds to the entire causing subevent, as in *Will's banging shattered the window*. More often, however, the external argument of such a verb is simply a participant in the causing subevent. This participant can be viewed as representing the entire causing subevent via a process of metonymy, as discussed by D. Wilkins and Van Valin (1993), who call the projection of one of the arguments of the causing subevent to stand in for the whole event "metonymic clipping." It is due to the nature of this process that such verbs may have external arguments that can be agents, instruments, or natural forces (e.g., *The boy/The rock/The earthquake broke the window*).

The lexical semantic representation associated with a nonalternating intransitive verb such as *laugh* does not involve the predicate CAUSE; its representation has only one subevent, and it is taken to be basically monadic. The lack of a causative variant for such verbs is a reflection of the fact that these verbs do not have the predicate CAUSE and the accompanying causing subevent in their lexical semantic representation.[3]

The linking rules that determine the syntactic expression of the arguments in these lexical semantic representations are presented in chapter 4; however, whatever their formulation, it is clear that the intransitive form of *break* must arise from an operation that prevents the causer argument from being projected to the lexical syntactic representation (the argument structure).[4] We discuss this operation in section 3.2. Thus, we take the lexical semantic representation of the intransitive form of the verb *break* to be causative and dyadic, but we follow standard analyses in assuming that the intransitive form of the verb is monadic at argument structure, the level of representation that determines the projection of arguments into the syntax. The unaccusativity of intransitive *break* will follow from the fact that the same linking rule applies to the passive participant whether or not the causer is projected onto the syntax.

We now present some evidence in support of the causative analysis we have just sketched. We begin with evidence involving selectional restrictions. It is almost a defining property of the causative alternation as we have described it that the subject of the intransitive use of the verb bears the same semantic relation to the verb as the object of the transitive use. The shared semantic relations are typically reflected in the existence of common selectional restrictions, a property of these verbs noted by some researchers (see, for instance, Fillmore 1970, Hall 1965). The examples in (7) and (8) suggest that the set of possible objects of transitive *break* and

the set of possible subjects of intransitive *break* do indeed coincide; specifically, only certain types of physical objects can break.

(7) a. Antonia broke the vase/the window/the bowl/the radio/the toaster.
b. The vase/The window/The bowl/The radio/The toaster broke.

(8) a. *Antonia broke the cloth/the paper/the innocence.
b. *The cloth/The paper/The innocence broke.

On closer examination, however, it turns out that the selectional restrictions on the subject of intransitive *break* and the object of transitive *break* are not identical. For instance, there are senses of the verb *break* where the overlap in selectional restrictions is not complete, as in the examples in (9), which were inspired by similar French examples in Brousseau and Ritter 1991.

(9) a. He broke his promise/the contract/the world record.
b. *His promise/The contract/The world record broke.

It appears that across senses transitive *break* allows a wider range of objects than intransitive *break* allows subjects.

This phenomenon is more general. It is not difficult to find alternating verbs where the selectional restrictions on the subject of the intransitive variant and the object of the transitive variant are not identical.[5] Consider another verb of change of state, *open*. It appears that some of the possible objects of transitive *open* cannot be subjects of intransitive *open*. As with *break*, this happens, for example, with some of the extended uses of the verb, as in (11).

(10) a. Jean opened the door/the window.
b. The door/The window opened.

(11) a. This book will open your mind.
b. *Your mind will open from this book.

The differences do not only show up with less "literal" uses of verbs. Consider the verb *clear*, a deadjectival verb that presumably means 'cause to become $\text{clear}_{\text{Adj}}$' or 'become $\text{clear}_{\text{Adj}}$'. This verb is found in causative pairs, as in (12); yet, although one can clear a table, the table can't "clear," as shown in (13).

(12) a. The wind cleared the sky.
b. The sky cleared.

(13) a. The waiter cleared the table.
b. *The table cleared.

In this instance, once again an alternating verb when used transitively is found with a set of objects that is larger than the set of subjects that the same verb allows when used intransitively. As a final example, consider the verb of change of state *lengthen*, which also demonstrates the same pattern of selectional restrictions: there are things that can be lengthened, but that do not lengthen.

(14) a. The dressmaker lengthened the skirt.
b. *The skirt lengthened.

(15) a. The mad scientist lengthened the days.
b. The days lengthened.

If these examples are representative, they suggest that a close examination of a wide range of alternating verbs will reveal that the selectional restrictions on the object of the transitive use and the subject of the intransitive use do not coincide for any verb. However, there is still a generalization that ties all the examples cited here together: the set of possible subjects for the intransitive use of a verb appears to be a subset of the set of possible objects for the transitive use of the same verb.

The asymmetry in the selectional restrictions is significant since it provides a guide to which variant is basic. We assume that the basic use of the verb will impose less stringent restrictions on its arguments, so that in those instances where there are different selectional restrictions on the transitive and intransitive uses, the use with the looser selectional restrictions, if there is one, will be basic. We do not make the alternative assumption that the basic form of the verb is the one that imposes more stringent restrictions since then it would not be easy to derive the variant with the looser restrictions in a plausible way. That is, if intransitive *clear* were the basic form of this verb, it would be difficult to derive the transitive use in *The waiter cleared the table*, which has no intransitive counterpart, short of asserting that the transitive and intransitive uses of a verb like *clear* are not related. Taking this interpretation of the selectional restriction patterns together with data discussed in (12)–(13), then the transitive use of the verb *clear* is basic. A similar assumption about selectional restrictions is made by Junker (1988) in an investigation of the basic transitivity of deadjectival verbs in French; overall, the results of Junker's study support the results of our study. Selectional restriction data, then,

support the claim that certain unaccusative verbs have a causative lexical semantic representation.

The next argument for the causative analysis, which is morphological in nature, is drawn from Chierchia 1989. Chierchia points out that an unaccusative verb that lacks a paired transitive causative use is exceptional on the causative analysis and would be expected to acquire such a use because it derives from a causative predicate and is thus basically dyadic. Chierchia suggests that an unaccusative verb like *come*, for example, which lacks a causative use, is related to a causative verb meaning something like *bring*, but that this causative verb either is not lexicalized or is marked as being lexicalized by a verb that is not related to the intransitive verb morphologically. Citing a personal communication from C. Rosen, Chierchia points out that unaccusative verbs tend to have what he calls "unstable valency." That is, "[t]hey tend to oscillate in valence from transitive to intransitive and vice versa, both diachronically and across dialects" (Chierchia 1989:23). For example, Chierchia cites the Italian verb *crescere* 'grow', which in standard Italian is only intransitive, though there are dialects where it has a transitive causative use with the meaning 'raise (children)'. As an illustration of this point from English, consider the verb *deteriorate;* this verb is generally used only intransitively (*Over the years the roof deteriorated*), but B. Levin once heard her landlord say *The pine needles were deteriorating the roof.* In contrast, Chierchia points out, similar variation is not expected of unergative verbs, since they are basically monadic. Unergative verbs like English *cry* and *sweat*, or their Italian counterparts *piangere* and *sudare*, respectively, are in fact "stable" in their intransitivity in the sense that they are not regularly paired with causative transitive counterparts. (As we will discuss throughout this chapter, Chierchia's discussion is only a beginning; there is in fact much more to be said about when intransitive verbs are expected to be paired with causative uses. We will show that the lack of a causative variant is often more principled than Chierchia's discussion suggests.)

Certain facts concerning the formation of causatives across languages presented by Nedjalkov (1969) are not surprising in light of our analysis of the adicity of alternating and nonalternating intransitive verbs. Nedjalkov looks at the morphological relation between the causative and noncausative uses of the verbs *break* and *laugh* (as well as two other verbs) in sixty languages. Nedjalkov finds that in most of his sample, the transitive causative form of the verb *break* is morphologically unmarked, the

intransitive form being identical to the transitive form (19 out of 60 languages) or derived from this form (22 out of 60 languages). If verbs such as *break* are appropriately characterized as inherently causative verbs, then the monadic use is in some sense derived, and indeed morphological marking has a function: it is needed to indicate the nonexpression of the external cause.[6]

Nedjalkov also considers the verb *laugh*. What is striking is that Nedjalkov does not cite any languages in which this verb has a causative transitive use identical in form to or morphologically less complex than the intransitive use.[7] Nedjalkov reports that in 54 of the 60 languages surveyed, the causative form of *laugh* is morphologically more complex than the noncausative form (see also Hale and Keyser 1987 for discussion of similar data). This is in sharp contrast to the verb *break* and consistent with our proposal that *laugh* is basically a monadic verb, whose lexical semantic representation does not involve a causative predicate.

One final piece of evidence in favor of the causative analysis of unaccusative verbs, also drawn from Chierchia 1989, involves an issue of interpretation. Since the intransitive use of a verb like *break* is analyzed as containing a cause argument at some level of representation, it might be expected that some kind of adverbial modifier could be found that would reflect the presence of this cause. Chierchia suggests that the Italian phrase *da sè* 'by itself' (in the sense of 'without outside help') is such an adverbial. Returning to the alternating verbs, in Italian they are compatible with this adverbial in their intransitive uses, as (16a–b) show.

(16) a. La porta si è aperta da sè.
the door opened by itself
'The door opened by itself.'
(Chierchia 1989, (42a))
b. La barca è affondata da sè.
the boat sank by itself
'The boat sank by itself.'
(Chierchia 1989, (42b))

The English counterpart of the Italian adverbial, the adverbial *by itself*, has two interpretations: 'without outside help' and 'alone'. Only the first interpretation is relevant to Chierchia's point, and, in fact, this interpretation is found with the intransitive use of the English alternating verbs.

(17) a. The plate broke by itself.
b. The door opened by itself.

This adverbial appears to be modifying a cause, which, given its anaphoric nature, it identifies as the theme argument itself. It is striking that the intransitive verbs that do not participate regularly in the causative alternation do not appear with the adverbial. For instance, the most natural interpretation of the sentence *Molly laughed by herself* is that Molly laughed unaccompanied rather than without outside help.

3.2 A Closer Look at the Causative Alternation

Having reviewed some reasons for proposing a causative analysis of certain unaccusative verbs—the alternating verbs—our next step is to provide a more precise semantic characterization of these verbs. Such a characterization will help us to identify the semantic determinants of unaccusativity, given our claim that verbs like *break* have a causative lexical semantic representation but allow both transitive and unaccusative expressions of their arguments. Our goal is to find an explanatory relationship between a facet of the meaning of a verb and its ability to participate in the causative alternation. The adicity of the verb as represented in the lexical semantic representation (5) would then be a direct reflection of a semantic property of the verb. Although the class of alternating verbs can most obviously be described as verbs of change of state and has in fact been characterized precisely in these terms, it will emerge from the study in section 3.2.1 that not all intransitive verbs of change of state have transitive causative variants; furthermore, as we discuss in section 3.2.3, not all transitive causative verbs of change of state have intransitive variants, and some intransitive verbs that are not verbs of change of state have causative transitive uses. Instead, we introduce a distinction between verbs describing "internally" and "externally" caused eventualities, arguing that this distinction more accurately predicts which verbs do and do not participate in the causative alternation. Specifically, we claim that this distinction determines which verbs are basically dyadic causative verbs. In section 3.2.3 we investigate which dyadic causative verbs will have an intransitive unaccusative variant, since not all causative verbs alternate. That is, we ask what distinguishes alternating verbs like *break* from verbs like *cut* and *write*, which have only transitive, but not intransitive, uses. In section 3.2.5 we investigate some intransitive verbs that satisfy the semantic characterization of unergative verbs but have transitive uses that mean roughly 'cause to *V*-intransitive'. We argue that in each instance the causative relationship is not the same as the one characteristic of verbs like

break. Rather, in these instances there is evidence that the intransitive variant is basic. Thus, the apparent counterexamples to our analysis actually turn out to support it.

3.2.1 Internal versus External Causation

Our task is to semantically characterize verbs such as *break* and *open* that have transitive causative uses as well as intransitive noncausative uses. In order to do this, we compare verbs such as *break* and *open* that participate in the causative alternation—and thus show both transitive and intransitive uses—with verbs such as *laugh*, *play*, and *speak* that show intransitive uses but never show transitive causative uses (except perhaps under very special circumstances). We ask what makes verbs like *break* and *open* different from those verbs that are not regularly paired with a transitive causative counterpart. In answering this question, we take as our starting point Smith's (1970) insightful discussion of the semantic factors that play a part in determining which verbs that are used intransitively have transitive causative uses.

Smith characterizes the difference between those intransitive verbs that do and do not have transitive causative uses by means of a notion of control. Verbs like *break* and *open*, Smith proposes, describe eventualities that are under the control of some external cause that brings such an eventuality about. Such intransitive verbs have transitive uses in which the external cause is expressed as subject. Verbs like *laugh*, *play*, and *speak* do not have this property: the eventuality each describes "cannot be externally controlled" but "can be controlled only by the person engaging in it"; that is, control "cannot be relinquished" to an external controller (Smith 1970:107). Smith takes the lack of a causative transitive use for these verbs (and other verbs such as *shudder*, *blush*, *tremble*, *malinger*, and *hesitate*) to be a reflection of the presence of "internal control"; we return in section 4.1.1.3 to the question of why verbs of internal control should have this property.

(18) a. Mary shuddered.
b. *The green monster shuddered Mary.
c. The green monster made Mary shudder.
(Smith 1970:107, (35a–c))

Similar distinctions have been recognized in other work on English (e.g., Hale and Keyser 1987) and other languages (e.g., Guerssel 1986 on Berber, Labelle 1990, 1992 on French).

For reasons we explain below, we do not use Smith's notion of control. Rather, we use a slightly different notion, distinguishing between *internally* and *externally caused* eventualities. With an intransitive verb describing an internally caused eventuality, some property inherent to the argument of the verb is "responsible" for bringing about the eventuality. For agentive verbs such as *play* and *speak*, this property is the will or volition of the agent who performs the activity. Thus, the concept of internal causation subsumes agency. However, an internally caused verb need not be agentive. For example, the verbs *blush* and *tremble*, which take animate—though nonagentive—arguments, can nevertheless be considered to describe internally caused eventualities, because these eventualities arise from internal properties of the arguments, typically an emotional reaction. These verbs, which do not participate in the causative alternation, also exemplify why the notion of control is inappropriate: neither trembling nor blushing is generally under a person's own control, as shown by the acceptability of examples such as *Carla couldn't help blushing whenever her name was called.*

Verbs with an inanimate—and thus clearly nonagentive—single argument may also describe internally caused eventualities in the sense that these eventualities are conceptualized as arising from inherent properties of their arguments. In particular, the notion of internal causation can be straightforwardly extended to encompass a class of nonagentive single argument verbs that we refer to as *verbs of emission*. This set subsumes the verbs that Perlmutter describes as verbs of "[n]on-voluntary emission of stimuli that impinge on the senses" (1978:163). The verbs of emission can be divided into four subclasses according to what is emitted: sound, light, smell, or substance.[8]

(19) a. Sound: burble, buzz, clang, crackle, hoot, hum, jingle, moan, ring, roar, whir, whistle, . . .
b. Light: flash, flicker, gleam, glitter, shimmer, shine, sparkle, twinkle, . . .
c. Smell: reek, smell, stink
d. Substance: bubble, gush, ooze, puff, spew, spout, squirt, . . .

The class of verbs cited by Perlmutter (1978) includes members of only three of these subclasses (the verbs of sound, light, and smell emission); however, since the overall behavior of these three types of verbs resembles that of the members of the subgroup identified here as "verbs of substance emission," all four sets of verbs will be treated as belonging to a single larger class of verbs of emission.

The eventualities described by such verbs come about as a result of internal physical characteristics of their argument. Consequently, only a limited set of things qualify as arguments of any specific verb of emission, as reflected in the strong restrictions that these verbs impose on possible subjects. For example, only embers, lights, and certain substances glow since only they have the necessary properties, and the same holds of other verbs of emission. Consistent with their classification as internally caused verbs, verbs of emission generally do not have causative counterparts, as illustrated in (20). (We return in section 3.2.5 to instances in which they do.)

(20) a. The jewels glittered/sparkled.
b. *The queen glittered/sparkled the jewels.

(21) a. The stream burbled/roared.
b. *The rocks burbled/roared the stream.

(22) a. The stew bubbled.
b. *The cook bubbled the stew.

Verbs of emission, then, pattern with other verbs without causative counterparts even though it seems inappropriate to attribute control to the argument of a verb of emission—the inanimate emitter. Consequently, we prefer the internally/externally caused verb distinction to the internal/external control distinction. (For conciseness, we will refer to internally or externally caused verbs, although it is more accurate to say that a verb describes an eventuality that can be conceptualized as either internally or externally caused.)

Unlike internally caused verbs, externally caused verbs by their very nature imply the existence of an "external cause" with immediate control over bringing about the eventuality described by the verb: an agent, an instrument, a natural force, or a circumstance. Thus, consider the verb *break*. Something breaks because of the existence of an external cause; something does not break solely because of its own properties (although it is true that an entity must have certain properties in order for it to be breakable). Although it might be possible to conceive of something as breaking spontaneously, even so, it is most natural to describe such a situation by a sentence like *The vase broke by itself*, where, as mentioned in section 3.1, the external cause is being overtly identified with the theme itself. In contrast, internally caused verbs such as *glow*, *sparkle*, *shudder*, and *tremble* cannot appear with the phrase *by itself* in the 'without outside help' sense, consistent with the absence of an external cause.[9]

(23) a. *The diamond glowed by itself.
b. *Jane trembled by herself.

Some externally caused verbs such as *break* can be used intransitively without the expression of an external cause, but, even when no cause is specified, our knowledge of the world tells us that the eventuality these verbs describe could not have happened without an external cause. We thus assume that the intransitive verbs that regularly have transitive causative uses are externally caused, and those intransitive verbs that do not are internally caused. (In section 3.2.5 we will show that some internally caused intransitive verbs do have transitive causative uses, but we conclude that such pairs are instances of a different phenomenon.) A closer look at the class of alternating verbs will bear out this suggestion.

The core class of causative alternation verbs are the verbs of change of state, which typically describe changes in the physical shape or appearance of some entity. Jespersen (1927) suggests that the class of verbs that are found in the causative alternation can be characterized as the "move and change" class, because it includes a variety of verbs of change of state and verbs of motion. The list of alternating verbs can easily be divided into two subclasses along these lines.

(24) a. bake, blacken, break, close, cook, cool, dry, freeze, melt, open, shatter, thaw, thicken, whiten, widen, ...
b. bounce, move, roll, rotate, spin, ...

Relatively few verbs of motion participate in the causative alternation; those that do are not necessarily agentive when used intransitively, consistent with our claim that alternating verbs are externally caused. (In section 3.2.5 we examine the causative uses of agentive verbs of manner of motion such as *walk* and *swim*, which because of their agentiveness must be internally caused verbs, and we argue that these causatives represent a distinct phenomenon.) To the extent that the alternating verbs of motion involve a change of position (though not necessarily a translation through space), the set of "move and change" verbs might be given the unified characterization *verbs of change*. There are, however, many more verbs of change of state than verbs of change of position among the alternating verbs, probably because there are few verbs of change of position that need not be agentive, a prerequisite for the classification of these verbs as externally caused.

The difference between internally and externally caused verbs is also reflected in the general pattern of selectional restrictions on the cause

argument of the two kinds of verbs. Many nonagentive internally caused verbs exert strong restrictions on their single argument. For instance, as mentioned above, only a limited set of things qualify as the arguments of any specific verb of emission, so that only embers, lights, and certain substances glow, since only they have the necessary properties; similar restrictions hold of other verbs of emission. Although this property might seem to make the single argument of an internally caused verb resemble the argument of the noncausative use of alternating externally caused verbs such as *break*, which is also subject to strong restrictions arising from the nature of the change of state described by the verb, the appropriate comparison is between the external cause argument of an externally caused verb and the single argument of an internally caused verb. Unlike most internally caused verbs, most externally caused verbs do not impose restrictions on their external cause argument, taking agents, natural forces, and instruments as the external cause. This difference reflects the nature of internal causation, which involves causation initiated by, but also residing in, the single argument and hence dependent on its properties. In contrast, with externally caused verbs, the external cause argument sets the eventuality in motion, but it is not necessarily involved in seeing it through (verbs differ in this respect).

We return now to the lexical semantic representations for the alternating and nonalternating intransitive verbs proposed in (5) and (6), repeated here.

(25) *break:* [[*x* DO-SOMETHING] CAUSE [*y* BECOME *BROKEN*]]

(26) *laugh:* [*x LAUGH*]

As we stated in section 3.1, our proposal concerning the basic adicity of the alternating verbs influenced the choice of representation; the representation is also intended to reflect the fact that such verbs are externally caused verbs, involving two subevents. Abstracting away from the lexical semantic representations suggested for the verbs *break* and *laugh*, we propose that the lexical semantic templates associated with externally and internally caused verbs are as in (27a) and (27b), respectively.

(27) a. [[*x* DO-SOMETHING] CAUSE [*y* BECOME *STATE*]]
b. [*x PREDICATE*]

It is in the nature of internally caused verbs as we have described them that they are inherently monadic predicates. Similarly, externally caused verbs are inherently dyadic predicates, taking as arguments both the ex-

ternal cause and the passive participant in the eventuality. The adicity of a verb is then a direct reflection of a lexical semantic property of the verb, namely, the number of open positions in the lexical semantic representation.[10]

The proposed analysis of externally caused verbs predicts that there should be no externally caused verbs without a transitive variant. An examination of the range of verb classes in B. Levin 1993 suggests that this is indeed so. That is, all externally caused verbs have a transitive causative use, but not all of them have an intransitive use in which the external cause is unspecified, as illustrated in (28)–(31) with the verbs *cut*, *sterilize*, *write*, and *murder*.

(28) a. The baker cut the bread.
b. *The bread cut.

(29) a. The nurse sterilized the instruments.
b. *The instruments sterilized.

(30) a. Anita Brookner just wrote a new novel.
b. *A new novel wrote.

(31) a. The assassin murdered the senator.
b. *The senator murdered.

The English suffix *-ize* is particularly interesting, as is the suffix *-ify*. These suffixes are used to form novel externally caused verbs from adjectives and nouns. We have collected a list of recently coined words with these suffixes (e.g., *windowize a computer*, *Aspenize Jackson Hole*, *securitize planes*), and these coinages support the prediction that there are no externally caused verbs without a transitive variant. As shown by the example in (29), many *-ize* and *-ify* verbs are only transitive, and none of the new verbs we have found are exclusively intransitive.

In English adjectives are used to describe states, and not surprisingly, many alternating verbs of change of state are deadjectival, as shown by the examples in (32), taken from Levin 1993:28. These deadjectival verbs have been divided into two groups, one in which the verbs are zero-related to adjectives, as in (32a), and a second in which the verbs are formed from adjectives through the use of the suffix *-en*, as in (32b).

(32) a. brown, clean, clear, cool, crisp, dim, dirty, dry, dull, empty, even, firm, level, loose, mellow, muddy, narrow, open, pale, quiet, round, shut, slack, slim, slow, smooth, sober, sour, steady, tame, tan, tense, thin, warm, yellow, ...

b. awaken, blacken, brighten, broaden, cheapen, coarsen, dampen, darken, deepen, fatten, flatten, freshen, gladden, harden, hasten, heighten, lengthen, lessen, lighten, loosen, moisten, neaten, quicken, quieten, redden, ripen, roughen, sharpen, shorten, sicken, slacken, smarten, soften, steepen, stiffen, straighten, strengthen, sweeten, tauten, thicken, tighten, toughen, waken, weaken, whiten, widen, worsen, . . .

What is relevant for us is that the adjectives that form the base for alternating verbs of change of state support the proposal that such verbs are externally caused. As pointed out by Dixon (1982), deadjectival verbs of this type tend to be related to adjectives that describe physical characteristics, color, and temperature. More generally, these verbs are related to stage-level adjectives and not to individual-level adjectives. The distinction between stage-level and individual-level predicates is introduced by Carlson (1977). Stage-level predicates describe temporary properties or transitory activities of entities; they contrast with individual-level predicates, which describe permanent properties (see also Diesing 1992, Kratzer 1989). The observation that deadjectival verbs are based on stage-level adjectives supports the claim that only externally caused verbs are found in the causative alternation: individual-level properties typically cannot be externally caused, whereas stage-level properties could be. (We do not address a larger question that is raised by these data: whether both oppositions are necessary.)

The verb *smarten* provides a particularly interesting illustration of the constraints on the adjectives that can serve as the base for alternating verbs. Although the adjective *smart* has two senses, 'intelligent' and 'well and fashionably dressed', the verb *smarten* is related to the second adjectival sense, reflecting the fact that it is typically only in this sense that the adjective describes a stage-level property, and, hence, a property that might be caused to change. Dowty (1979:129, n. 4) discusses several deadjectival verbs that do not show some of the senses of their base adjective. For example, he notes that although the adjective *tough* can mean either 'difficult' or 'resistant to tearing', the verb *toughen* cannot mean 'make difficult'. It seems to us that the stage-level versus individual-level distinction could be responsible for the set of senses available to *toughen*, as well as for those available to some of the other verbs that Dowty cites.

The interaction between the stage-level/individual-level predicate contrast and the internal/external causation contrast can also be used to explain why there is sometimes a verb related to only one member of a

pair of antonymous adjectives. For instance, although there are verb pairs such as *harden* and *soften* or *widen* and *narrow* based on antonymous adjectives, corresponding to the verb *tame* there is no verb *wild* or *wilden*. Our analysis suggests that the absence of this verb is no accident. Rather, it follows because the adjective *wild*, unlike the adjective *tame*, necessarily describes an individual-level predicate and thus cannot be the basis for an externally caused verb of change of state.

Although the major class of causative alternation verbs can be characterized as verbs of change, it is important to point out that external causation cannot be equated with change of state or position. There are verbs of change of state that lack a transitive causative variant whatever the nature of the external cause argument, as the following examples show:

(33) a. The cactus bloomed/blossomed/flowered early.
b. *The gardener bloomed/blossomed/flowered the cactus early.
c. *The warm weather bloomed/blossomed/flowered the cactus early.

(34) a. The logs decayed.
b. *The rangers decayed the logs.
c. *The bad weather decayed the logs.

These verbs are set apart from the alternating verbs of change of state because they describe internally caused changes of state. That is, the changes of state that they describe are inherent to the natural course of development of the entities that they are predicated of and do not need to be brought about by an external cause (although occasionally they can be, and in such instances causative uses of these verbs are found). This class includes verbs such as *flower*, *bloom*, *blossom*, and *decay*, all cited above, and in some languages *blush*, as well as *grow*.[11] The class of internally caused verbs of change of state is much smaller than the large class of externally caused verbs of change of state.

The distinction between internally and externally caused eventualities is also relevant to verbs that are not verbs of change. For example, it explains the behavior of the members of a class of verbs that we call *verbs of spatial configuration* with respect to the causative alternation. This class includes verbs such as *hang*, *sit*, and *stand*, which specify the position of an entity that bears a particular spatial configuration with respect to that position; we discuss these verbs in more detail in section 3.3.3. Certain verbs of spatial configuration allow a transitive causative use; these include *hang*, *lean*, *lie*, *sit*, and *stand*.

(35) a. The laundry hung on the clothesline.
b. Tracy hung the laundry on the clothesline.

(36) a. The ladder leaned against the wall.
b. I leaned the ladder against the wall.

Other verbs in this class, including *slouch*—though rather close in meaning to *lean*—and *loom*, do not.

(37) a. The surly youth slouched against the wall.
b. *I slouched the surly youth against the wall.

(38) a. The bear loomed over the sleeping child.
b. *The giant loomed the bear over the sleeping child.

The distinction between internally and externally caused eventualities appears to provide the key to their differing behavior. Looming and slouching are postures that are necessarily internally caused, unlike hanging, leaning, sitting, or standing, which are postures that can be brought about by an external cause. These examples show yet another way in which the correlation between external causation and change of state is not perfect: there are externally caused verbs that are not verbs of change of state.

We conclude our introduction of the distinction between internally and externally caused verbs by relating it to the unaccusative/unergative distinction, previewing the discussion in chapter 4. The distinction between internally and externally caused verbs corresponds roughly to the distinction between unaccusative and unergative verbs. As we show in chapter 4, internally caused verbs are generally unergative, whereas many unaccusative verbs are derived from externally caused verbs. There are two reasons for saying that there is only a rough correspondence between the internally/externally caused verb distinction and the unaccusative/unergative distinction. First, as we show in section 3.3, there are unaccusative verbs that are not derived from causative verbs; these are the verbs of existence and appearance. Second, as we have just shown, there is a class of internally caused verbs of change of state, and, as we show in section 4.2.1, these verbs are unaccusative.

3.2.2 Consequences of the Internally versus Externally Caused Distinction

The distinction between internally and externally caused eventualities is a distinction in the way events are conceptualized and does not necessarily correspond to any real difference in the types of events found in the world. In general, the relation between the linguistic description of events and the

events taking place in the real world is mediated by the human cognitive construal of events, which is what we take our lexical semantic representations to represent.

Often there are events that are compatible with more than one cognitive construal, as Pinker (1989) and Grimshaw (1993, 1994) have stressed in their research. If the distinction between internal and external causation is indeed implicated in the way humans conceive events, then we predict that verbs that fall squarely into one or the other of these two categories will be stable in their syntactic behavior. For example, verbs that are clearly agentive will be internally caused monadic verbs and will not be found in the causative alternation. However, there are some events in the world that can be construed as either internally or externally caused. Our account predicts variation both within and across languages with respect to whether verbs describing such events are classified as internally or externally caused.

Consider the verb *deteriorate*, mentioned in section 3.1, which is classified as both an internally caused and an externally caused verb in B. Levin 1993. The change of state specified by this verb can be construed as either internally or externally caused. There may even be variation among speakers regarding whether a given eventuality that could be described by this verb should be conceptualized as internally or externally caused. For example, as already mentioned, B. Levin once heard her landlord say *The pine needles were deterioriating the roof.* Although to our ears this sentence is unacceptable, probably because we conceive of deterioration as always being internally caused, it appears that the landlord's conceptualization was different. In fact, Pinker (1989) also includes two causative uses of *deteriorate* in a list of novel causatives, noting that these examples, like the other examples in the list, "sound quite unusual" (1989:153).

(39) a. UL-approved outdoor lighting sets are weatherproofed so that water will not deteriorate the sockets. (Pinker 1989:153, (4.44a))
b. He said that the Agnew and Watergate affairs have tended to deteriorate confidence in the American system. (Pinker 1989:153, (4.44b))

In a follow-up to Nedjalkov's (1969) study discussed in section 3.1, Haspelmath (1993) discusses verbs that tend not to show consistent patterns of behavior across languages. For example, the morphologically simple form of the verb corresponding to English *melt* tends to be transitive in most languages, the intransitive form being the morphologically

derived form, but a few languages show the opposite pattern. It is likely that this cross-linguistic variation arises because the meaning of a verb such as *melt* is consistent with its describing either an internally or an externally caused eventuality. In fact, it should be possible to verify this prediction by looking at the range of subjects found with *melt* in various languages; presumably, in languages where *melt* is internally caused, it will only be found with ice or ice cream or other substances that melt at room temperature as its subject when intransitive. What is important is that the nature of the externally versus internally caused verb distinction leads to expectations about where fluctuation with respect to verb classification both within and across languages may be found. It is precisely verbs such as *melt*, whose classification with respect to the syntactically relevant meaning components is in some way ambiguous, that would be expected to manifest cross-linguistic variation. If certain aspects of meaning determine syntactic behavior, then isolation of the correct syntactically relevant meaning components will help predict which types of verbs are most likely to exhibit cross-linguistic variation. Since the predictions made by the distinction between externally and internally caused eventualities seem to be correct, we take this as corroboration for our approach.

A language could choose to have two verbs whose meanings are the same in every respect except that one describes the eventuality as internally caused and the other as externally caused. An example of this possibility may be provided by a pair of verbs whose contrasting behavior was pointed out to us by A. Kroch. The verbs *shudder* and *shake* at first glance appear to be synonymous, but only *shake*, and not *shudder*, shows a transitive causative use. Given the differing behavior of these verbs with respect to the causative alternation, *shake* should be externally caused and *shudder* internally caused. This proposal receives support from an examination of the things that can shake and shudder. Not only is the set of things that shudder to a large extent a subset of the set of things that shake, but it is a subset precisely in a way that is consistent with the classification of *shudder* as describing an internally caused eventuality. Things that shudder usually can be thought of as having a "self-controlled" body; they include people, animals, and, perhaps by forced extension, the earth, engines, machinery, and vehicles. In contrast, leaves, teacups, and furniture, none of which can be said to have a "self-controlled" body, can only shake. This distinction is relevant because the type of movement characteristic of shaking or shuddering can be inter-

nally caused only with those things that have self-controlled bodies. The narrower restrictions on things that shudder reflect the classification of *shudder* as an internally caused verb. Interestingly, agentivity has nothing to do with the difference between these two verbs.

Given the importance of the nuances in meaning that are central to disentangling the varying behavior of verbs like *deteriorate* and *melt*, the survey-based studies of causatives presented by Haspelmath (1993) and Nedjalkov (1969) are of limited value. It is difficult to get the required level of detail from most grammars and dictionaries or from perfunctory data solicitation from informants. In fact, the Modern Hebrew data that Haspelmath provides are incomplete in a way that is crucial to the point that Haspelmath is investigating. The verb he cites as the Hebrew counterpart of English *burn*, *saraf*, which shows the morphological causativization pattern expected of an externally caused verb, actually means 'burn' in the 'consume by fire' sense. This verb can be predicated of leaves or paper, but not flames or candles. There is another Hebrew verb, *ba'ar*, which means 'burn' in the sense of 'blaze' or 'emit heat or light'. This verb can be predicated of fire, flames, and candles; it is true that some of these entities, such as candles, might sometimes be consumed in the process, but this is incidental. This second verb shows the morphological causativization pattern expected of an internally caused verb. (See section 3.2.5 for more on the causativization patterns of Hebrew verbs.) Indeed, this difference in causativization patterns is what is expected since consumption by fire is an externally caused eventuality, whereas the emission of heat or light by a candle or flame is presumably an internally caused eventuality. In fact, in English too, the verb *burn* shows the causative alternation only in the 'consume by fire' sense.

(40) a. The leaves burned.
b. The gardener burned the leaves.

(41) a. The fire burned.
b. *The campers burned the fire.

Nedjalkov, like Haspelmath, also examined the verb *burn*, finding that its behavior with respect to causative formation across languages is significantly more variable than that of *break* and *laugh*. It may be precisely because they failed to control for the subtleties in the meaning of *burn* that both Nedjalkov and Haspelmath found considerable cross-linguistic variation in the morphological causativization patterns of this verb.

3.2.3 When Can Externally Caused Verbs "Detransitivize"?

In the previous section we proposed that all externally caused verbs are basically dyadic. However, although we proposed that the intransitive form of an alternating verb like *break* is derived from the causative form, only a subset of externally caused verbs have such intransitive uses.

(42) a. The baker cut the bread.
b. *The bread cut. (on the interpretation 'The bread came to be cut')

(43) a. The terrorist killed/assassinated/murdered the senator.
b. *The senator killed/assassinated/murdered.

(44) a. Anita Brookner just wrote a new novel.
b. *A new novel wrote.

Furthermore, alternating verbs often show the intransitive form only for some choices of arguments, as discussed in section 3.1. In this section we address the following question: when can externally caused verbs turn up as intransitive verbs, and why is this possibility open to some verbs only for certain choices of arguments? We continue to draw on the insights in Smith 1970 to reach an understanding of this phenomenon, which, in turn, is crucial to understanding unaccusativity, given our proposal that a large class of unaccusative verbs are basically causative dyadic verbs.

Smith proposes that the verbs of change that may be used intransitively are precisely those in which the change can come about independently "in the sense that it can occur without an external agent" (1970:102). Smith's observation can also be recast as follows: the transitive causative verbs that detransitivize are those in which the eventuality can come about spontaneously without the volitional intervention of an agent. In fact, among the transitive verbs that never detransitivize are verbs that require an animate intentional and volitional agent as subject. Consider some verbs that never detransitivize, such as the verbs *murder* and *assassinate* or the verbs of creation *write* and *build.* These particular verbs require an animate intentional and volitional agent as subject.

(45) a. The terrorist assassinated/murdered the senator.
b. *The explosion assassinated/murdered the senator.

(46) a. Pat wrote a letter to the editor of the local newspaper.
b. *My anger wrote a letter to the editor of the local newspaper.

(47) a. A local architect built the new library.
b. *The windstorm built a sand dune.

Since these verbs have meanings that specify that the eventuality they describe must be brought about by a volitional agent, the change they specify obviously cannot come about independently. In contrast, the change specified by alternating verbs such as *break* can come about without the intervention of a volitional agent. Consequently, alternating verbs allow natural forces or causes, as well as agents or instruments, as external causes, and, hence, as subjects.

(48) The vandals/The rocks/The storm broke the windows.

Next consider the verb *cut*. As shown in (42), this verb cannot be used intransitively to describe the coming about of a separation in the material integrity of some entity. The behavior of this verb can be understood in the context of the proposed constraint since what characterizes its meaning is a specification of the means or manner involved in bringing about the action described by that verb; this specification, in turn, implies the existence of a volitional agent. The very meaning of the verb *cut* implies the existence of a sharp instrument that must be used by a volitional agent to bring about the change of state described by the verb. If the same change of state were to come about without the use of a sharp instrument, then it could not be said to have come about through cutting. A verb like *cut* demonstrates that the set of verbs that do not detransitivize is not the same as the set of verbs that restrict their subjects to volitional agents. The verb *cut* allows instruments or agents as subjects; however, *cut* does not allow natural force subjects.[12]

(49) a. The baker/That knife cut the bread.
b. *The lightning cut the clothesline.

The proposed constraint on detransitivization may explain the behavior of the verb *remove*, which does not have an intransitive form. Its nonexistence might seem somewhat surprising since to a first approximation this verb's meaning might be paraphrased as 'cause to become not at some location'. However, a closer look at its meaning reveals that the eventuality it describes is brought about by a volitional agent, as shown by the oddness of the examples in (50), which have inanimate nonvolitional subjects.

(50) a. ??The wind removed the clouds from the sky.
(cf. The wind cleared the clouds from the sky.)
b. ??The water removed the sand from the rocks.
(cf. The water washed the sand from the rocks.)

In ƀ. Levin and Rappaport Hovav 1994 we show that the approach developed here can explain why verbs formed with the suffixes *-ize* and *-ify* cannot typically detransitivize, as the data in (51)–(52) illustrate, even though these affixes have been characterized as "causative" (see, for example, the discussion of these suffixes in Marchand 1969).

(51) a. The farmer homogenized/pasteurized the milk.
b. *The milk homogenized/pasteurized.

(52) a. Carla humidified her apartment.
b. *Her apartment humidified.

Most of these morphologically complex verbs cannot detransitivize, we propose, because they describe eventualities that cannot come about spontaneously without the external intervention of an agent. In contrast, those *-ify* and *-ize* verbs that allow for this possibility appear to be precisely the ones that do detransitivize.

(53) a. I solidified the mixture./The mixture solidified.
b. The cook caramelized the sugar./The sugar caramelized.

Again, the *-ify* and *-ize* verbs that resist detransitivization show a narrower range of subjects than those verbs that permit detransitivization; specifically, they appear to exclude natural force subjects.

(54) a. *The weather humidified the apartment.
b. The intense heat caramelized the sugar.

The constraint on detransitivization also explains why some verbs have intransitive uses only for certain choices of the argument that changes state: it is only for these choices that the change can come about without the intervention of an agent. For instance, in section 3.1 we noted the following contrasts involving the verb *clear:*

(55) a. The waiter cleared the table.
b. *The table cleared.

(56) a. The wind cleared the sky.
b. The sky cleared.

Our knowledge of the world tell us that tables are things that are cleared (typically, of dishes) through the intervention of an animate agent. The sky, however, can clear through the intervention of natural forces, such as the wind. Hence the difference in the possibility of intransitive counterparts.

In this context, we can also understand the contrast presented in section 3.1, and repeated here, involving the verb *lengthen*.

(57) a. The dressmaker lengthened the skirt.
b. *The skirt lengthened.

(58) a. The mad scientist lengthened the days.
b. The days lengthened.

Skirts can only be lengthened through the intervention of an agent; hence, the verb *lengthen* as applied to skirts is not typically used intransitively. Days, on the other hand, become longer as the earth progresses through a certain part of its orbit around the sun, something that happens without the intervention of an animate agent. And *lengthen* as applied to days is typically used intransitively, although in a science fiction context where artificial manipulation of the length of days is possible, transitive uses might be found, as in (58a).

We can return here to the instances of *break*, cited in (9) and repeated here, which do not detransitivize.

(59) a. He broke his promise/the contract/the world record.
b. *His promise/The contract/The world record broke.

Again, this verb does not detransitivize for these choices of object because the eventuality it describes cannot come about without the intervention of an agent for these choices. The examples in (55)–(59) show once again that detransitivization is possible precisely where an externally caused eventuality can come about without the intervention of an agent. In this sense, detransitivization is a productive process, since it appears to be possible wherever this condition is met.

Our study of the factors that influence a verb's transitivity suggests that verbs can be classified according to whether or not they describe an externally caused eventuality and according to whether or not they describe an eventuality that can occur spontaneously. If the eventuality described by a verb has an external cause, the verb is basically transitive; moreover, if this eventuality can occur without the direct intervention of an agent, then the external cause does not have to be expressed in the syntax. Given the similarities between these two notions, the question arises whether they might be collapsed. In fact, Haspelmath (1993) has independently developed an analysis that resembles the one presented here, except that he does not make a clear distinction between the two notions. Haspelmath links the likelihood of spontaneous occurrence to intransitivity, and al-

though he is not explicit about this, it appears that he takes spontaneous occurrence to be the opposite of external causation, so that if a particular event does not occur spontaneously, then it is externally caused and thus expressed with a transitive verb. For Haspelmath, those verbs that describe eventualities that are likely to occur spontaneously will have an intransitive form, and those that are not likely to occur spontaneously will have only a transitive form. Thus, the verbs *wash* and *decapitate* will have only a transitive form, and the verbs *break* and *laugh* will both have intransitive forms.

It seems to us that there is evidence that favors the use of both spontaneous occurrence and external causation in the determination of transitivity, as in our approach. The evidence comes from an observation that Haspelmath himself makes. He notes that across languages certain intransitive verbs like *break* tend to be the morphologically marked member of a causative alternation verb pair, whereas others like *laugh* tend to be the morphologically unmarked member. It turns out, as he notes, that those verbs which like *break* describe eventualities that are both spontaneously occurring and externally caused are the ones that tend to have the intransitive form as the morphologically marked one. Those which like *laugh* describe eventualities that occur spontaneously and are internally caused tend to have the transitive member of a causative alternation pair morphologically marked. That is, among verbs describing spontaneously occurring eventualities, it is the status of the eventuality as internally or externally caused that determines the morphological shape of the verb. This difference justifies the recognition of both notions as contributing to a verb's syntactic behavior and morphological shape. In some sense, Haspelmath's study provides cross-linguistic corroboration of the results we obtained from our in-depth study of English.

3.2.4 The Derivation of the Intransitive Use of Externally Caused Verbs

In this section we propose an account of how the intransitive use of an externally caused verb arises. As a first step, we refine and reformulate the constraint on detransitivization. In the previous section we observed that alternating verbs do not usually exert any restrictions on the external cause argument: it can be an agent, instrument, circumstance, or natural force. As for verbs that do exert restrictions on the external cause argument—that is, the nonalternating verbs—they appear to exert a rather limited range of restrictions on it. Parsons (1990) observes that there appears to be no verb that is lexically specified to take only an instrument

as subject. All verbs that allow an instrument as subject also allow an agent, and some allow natural forces as well. Taking Parsons's observation further, there is also, as far as we know, no verb describing an externally caused eventuality that takes only a natural force as subject. Thus, the only restrictions exerted by verbs on the external cause seem to involve agency in some way.

However, a closer look at causative verbs provides an even deeper insight into this. Causative verbs are generally classified as accomplishments in Vendler's (1957) terms, and, as mentioned in chapter 2, accomplishments are standardly analyzed as complex predicates involving a causing event that brings about some change of state or location (Dowty 1979, Grimshaw and Vikner 1993, Pustejovsky 1991b). We mentioned in chapter 2 that resultatives are expressions in which both the causing event and the change of state are specified, each by a different predicate. In contrast, morphologically simple accomplishment verbs usually specify either the causing event or the result state; for example, the verb *break* specifies the result state, but leaves the causing event unspecified. In *Pat broke the window*, it is only the change in the state of the window that is specified by the verb; Pat could have brought this change about by any of a wide variety of activities. On the other hand, the verb *cut* specifies both the change of state and something about the event leading up to this change of state.[13] What characterizes the class of alternating verbs is a complete lack of specification of the causing event. Thus, the fact that a wide variety of subjects are possible with the alternating verbs is just a reflection of the fact that the causing event is left completely unspecified. Therefore, we can reformulate the condition sanctioning detransitivization: an externally caused verb can leave its cause argument unexpressed only if the nature of the causing event is left completely unspecified.

There is one advantage to the reformulation. If the restriction were against detransitivizing a verb with an agent, we would expect that even a verb like *break*, when used agentively, could not be used in the intransitive form. But this is clearly not the case, as shown by the acceptability of *I threw the plate against the wall, and it broke.* If, however, we say that the property of *break* that allows it to detransitivize is that it specifies something about the change of state in the passive participant but nothing about the causing event, then the example conforms to our generalization.[14]

We have suggested that the lexical semantic representation of verbs describing externally caused eventualities consists of two subevents, the

causing subevent and the central subevent. As we discussed in section 1.1, the external cause argument of such a verb in some sense stands in for the causing subevent. Suppose that the intransitive form of externally caused verbs arises from binding the external cause within the lexical semantic representation, where this binding is interpreted as existential quantification. The intransitive form will then be interpreted as asserting that the central subevent came about via some causing subevent, without any specification of its nature. Suppose, however, that if the verb lexically specifies something about the nature of the external cause, then it cannot be lexically bound, and the intransitive form of the verb would not be attested.

We suggest that the binding of the external cause takes place in the mapping from the lexical semantic representation to argument structure. Just as the binding of a position in argument structure prevents that position from being projected onto the syntax, so the binding of a position in the lexical semantic representation prevents the projection of that position to argument structure. Since the position is not projected into argument structure, there is no argument associated with this position in the syntax. We can schematize the proposed relation between the lexical semantic representation (LSR below) of *break* and the argument structure of both its transitive and intransitive forms as follows:

(60) *Intransitive* break

LSR	[[x DO-SOMETHING] CAUSE [y BECOME *BROKEN*]]	
	↓	
Lexical binding	∅	
Linking rules		↓
Argument structure		⟨y⟩

(61) *Transitive* break

LSR	[[x DO-SOMETHING] CAUSE [y BECOME *BROKEN*]]	
Linking rules	↓	↓
Argument structure	x	⟨y⟩

There is evidence that the operation of binding the external cause must take place before argument structure. This evidence comes from comparing certain properties of the intransitive form of causative alternation verbs and passive verbs. As described by Grimshaw (1990), for example, the operation that derives the passive form of a verb from an active one involves binding a position in the lexical syntactic representation of a

verb—its argument structure—thereby preventing the expression of that argument in the syntax. Thus, it contrasts with the operation of binding the external cause of a verb such as *break*, which we propose involves its lexical semantic representation. Although the lexically bound argument of a passive verb cannot be directly expressed in the syntax, there is well-known evidence that the argument is present, nonetheless, in argument structure. Specifically, its presence is manifested in the sanctioning of *by* phrases and the control of purpose clauses, as discussed by Roeper (1987), who cites work by Manzini (1983) as the source of the evidence involving purpose clauses.

(62) a. The ship was sunk by Bill. (Roeper 1987:268, (2b))
b. The boat was sunk to collect the insurance. (Roeper 1987:268, (3b))

(63) a. The window was broken by Pat.
b. The window was broken to rescue the child.

In contrast, the lexically bound external cause cannot license a *by* phrase or control a purpose clause, as is also well known.

(64) a. *The ship sank by Bill. (Roeper 1987:268, (2a))
b. *The boat sank to collect the insurance. (Roeper 1987:268, (3a))

(65) a. *The window broke by Pat.
b. *The window broke to rescue the child.

In closing this section, we raise a question that requires further investigation: the relationship between detransitivization and the unexpressed unspecified objects permitted by verbs such as *eat* and *read.* It has been proposed that the unspecified objects understood in sentences such as *The child ate* arise through existential quantification of the object at some level of linguistic representation (see Bresnan 1980 and Dowty 1981 for proposals along these lines, and Fodor and Fodor 1980 for arguments against such an account). This phenomenon may appear to be problematic for our analysis since, as we discuss immediately below, under what appear to be similar circumstances an argument can be left unexpressed with unspecified object verbs, whereas an argument cannot be left unexpressed with verbs like *break*. However, despite the similarity in the analyses proposed for them, the phenomena themselves appear to be different. We have proposed that in order for a causative verb to detransitivize, the verb must not impose any lexical specification on the causing subevent, so that

in its noncausative intransitive use the external cause argument of the verb is understood as not being lexically specified. In the noncausative use of a verb like *break*, the claim is that the external cause can be left unexpressed, whatever its nature. On the other hand, the unexpressed argument of the unspecified object construction is probably best characterized as being interpreted as the "prototypical" choice for that argument. It does not seem correct to characterize this argument as not being lexically specified since the unexpressed argument must do more than meet the general selectional restrictions on that argument; it must be the most typical argument that meets those restrictions, and in this sense it is predictable rather than not lexically specified. We think that being a prototypical argument is quite different from not being lexically specified. Prototypicality is determined by real-world knowledge; it is not linguistic knowledge. We leave additional investigation of this question for further research.

3.2.5 Apparent Instances of the Causative Alternation

We have characterized causative alternation verbs as externally caused verbs that meet the criteria for detransitivization. Thus, such verbs have a causative lexical semantic representation, the unaccusative use arising when the criteria for detransitivization are met. In section 3.1 we also mentioned the observation cited by Chierchia (1989) that unergative verbs appear to be stable in their intransitivity, a property in part attributable to their monadic lexical semantic representation. However, there are pairs of morphologically identical verbs in English consisting of an internally caused intransitive verb and a transitive verb that means roughly 'cause to *V*-intransitive'. The existence of such pairs might seem to be problematic for our analysis. In this section we examine several instances of this phenomenon and argue that each represents a different phenomenon from what we have described as the causative alternation. Specifically, we argue that in such causative pairs the relationship between the transitive and intransitive uses is not the same as the one characteristic of causative alternation verbs like *break*. From now on we reserve the term *causative alternation* for the alternation shown by verbs like *break;* we will use the term *causative pair* to refer to any pair of morphologically related transitive and intransitive verbs such that the transitive verb means approximately 'cause to *V*-intransitive'.

First, we investigate certain agentive verbs that appear in causative pairs, as illustrated in (66)–(68).[15]

(66) a. The soldiers marched to the tents.
b. The general marched the soldiers to the tents.

(67) a. The horse jumped over the fence.
b. The rider jumped the horse over the fence.

(68) a. The mouse ran through the maze.
b. We ran the mouse through the maze.

Although these pairs, like those observed with verbs like *break*, involve transitive and intransitive uses of verbs that differ with respect to the notion "cause," there is evidence that the pairs shown in (66)–(68) do not involve the causative alternation. This phenomenon is exhibited by members of a semantically coherent subgroup of the agentive verbs: agentive verbs of manner of motion. These verbs of motion, which we discuss in more detail in sections 4.1.4 and 5.1.1, describe the manner in which motion takes place, contrasting with verbs of inherently directed motion like *come* and *go*, which describe the direction but not the manner of motion. Various researchers have commented that the causative use of agentive verbs of manner of motion is qualitatively different from that shown by verbs such as *break* (see, for example, Cruse 1972, 1973, Hale and Keyser 1987). Some of them have pointed out that the referent of the direct object in sentences such as (66)–(68) maintains a degree of agentiveness that is uncharacteristic of the objects of verbs that usually participate in the causative alternation or the objects of transitive verbs in general.

The proposal that we are dealing with two distinct phenomena receives further support from another fact, which to our knowledge has never been accounted for in the literature, although it is mentioned briefly by Pinker (1989): the directional phrases that are optional in the intransitive use of the agentive verbs of manner of motion are obligatory in their transitive use.[16]

(69) a. The soldiers marched (to the tents).
b. The general marched the soldiers to the tents.
c. ??The general marched the soldiers.

(70) a. The horse jumped (over the fence).
b. The rider jumped the horse over the fence.
c. ?The rider jumped the horse.

(71) a. The mouse ran (through the maze).
b. We ran the mouse through the maze.
c. *We ran the mouse.

This distinctive property of the agentive verbs of manner of motion is highlighted when these verbs are contrasted with nonagentive verbs of manner of motion such as *roll* and *bounce*—Jespersen's (1927) "move" verbs—which, as shown in (72), do not require a directional phrase in either their transitive or intransitive use.

(72) a. The ball bounced/rolled (into the room).
b. The boys bounced/rolled the ball (into the room).

Additional evidence that a distinct phenomenon is involved comes from the observation that the "cause" argument in such causatives can only be an agent in the true sense, never an instrument or a natural force, as pointed out by Cruse (1972) and Reinhart (1991).

(73) a. *The downpour marched the soldiers to the tents.
b. *The tear gas marched the soldiers to the tents.

(74) a. *The lightning jumped the horse over the fence.
b. *The firecracker jumped the horse over the fence.
c. *The whip jumped the horse over the fence.

Given the fundamentally different properties of the causative pairs involving agentive verbs of manner of motion and those involving causative alternation verbs like *break*, we conclude that there is no need to abandon our proposal that only externally caused verbs show the causative alternation. But what about the causative pairs involving internally caused verbs? Our analysis does not preclude the existence of such pairs; it simply predicts that they cannot represent the same phenomenon as the causative pairs associated with verbs like *break* since they could not have been derived in the same way. Specifically, since internally caused verbs, unlike externally caused verbs, are not causative verbs basically, the noncausative use cannot be derived from detransitivizing the causative use. However, there is no reason not to assume that the agentive verbs of manner of motion, like other internally caused verbs, are basically monadic noncausative verbs and that the transitive members of the pairs in (66)–(68) are actually derived by a process of causativization. We propose that this is the case.[17] (We return in section 5.1.1.2 to the question of why the directional phrase is needed in the English causative uses.)

Evidence for a causativization analysis comes from the morphological relationship between the members of the causative pairs with agentive verbs of manner of motion. If, as we have been assuming, the morphologi-

cally marked member of a causative pair is the derived member, then in languages that, unlike English, differentiate the members of causative pairs morphologically, it should be possible to verify the causativization analysis. We would expect that in such languages the causative member of a causative pair involving an internally caused verb should be morphologically marked. Investigations of several languages of this type suggest that the prediction is borne out.

Consider first Modern Hebrew, where verbs are formed from triconsonantal roots. A single root can give rise to up to seven basic verb patterns, many of which show strong semantic correlates (Berman 1978, Bolozky 1982, Bolozky and Saad 1983, Glinert 1989, among others). The most productive morphological pattern for intransitive/transitive causative pairs with externally caused verbs, particularly verbs of change of state, is for the transitive causative verb to be in the Pi'el pattern and the intransitive verb to be in the derived Hitpa'el pattern, as in the pairs in (75) and (76).

(75) a. Hu kimet et ha-bad.
he creased ACC the-material
'He creased the material.'
b. Ha-bad hitkamet.
the-material creased
'The material creased.'

(76) a. Hu kirer et ha-oxel.
he cooled ACC the-food
'He cooled the food.'
b. Ha-oxel hitkarer.
the-food cooled
'The food cooled.'

The intransitive form of verbs with causatives in the Pi'el pattern always involves the Hitpa'el pattern (Bolozky 1982, Rappaport 1979). In fact, the Pi'el-Hitpa'el pairing is used for all semantically appropriate new coinages; see Berman 1980 for evidence for this point from child language acquisition and Bolozky and Saad 1983 for evidence involving the coining of novel denominal verbs. Morphologically, the Hitpa'el pattern is derived from the Pi'el pattern by affixation of the prefix *hit-*; the vowel change accompanying the affixation is due to a regular phonological process (Prince 1975). Berman (1980) also argues that the Pi'el pattern is basic and the Hitpa'el pattern is derived.

Modern Hebrew differs from English in allowing to a certain extent the formation of causatives of verbs describing internally caused eventualities, including some agentive verbs of manner of motion. What is striking is that the morphological relationship between the causative and noncausative uses of such verbs is invariably different from that associated with verbs describing externally caused eventualities. With internally caused verbs, the noncausative form is the underived form, appearing in the Pa'al pattern, and the causative form is the derived form, appearing in the Hif'il pattern. The examples in (77)–(80) illustrate this point, which also emerges from the discussion in Bolozky 1982.[18]

(77) a. Hu rakad.
he danced
'He danced.'
b. Ha-nagan hirkid oto.
the-musician made dance him
'The musician made him dance.'

(78) a. Hu rac.
he ran
'He ran.'
b. Ha-meamen heric oto.
the-coach made run him
'The coach made him run.'

(79) a. Hu kafac.
he jumped
'He jumped.'
b. Ha-ra'aš hikpic oto.
the-noise made jump him
'The noise made him jump.'

(80) a. Ani caxakti.
I laughed
'I laughed.'
b. Ha-yeled hicxik oti.
the-boy made laugh me
'The boy made me laugh.'

Since the Modern Hebrew process involves causative morphology, its scope is wider than the scope of the English process. The Hebrew process is found with a range of other internally caused verbs; the English process

is productive only with a semantically coherent subset of the internally caused verbs (see section 5.1.1.2).

Hale and Keyser (1987) cite similar evidence from Berber, Navajo, Warlpiri, and Winnebago. They write, "In Athapaskan languages, for example, the ergative alternation [the causative alternation] is marked in the simplest manner, by choice of the so-called 'classifier' (an element appearing in immediate prestem position correlating very roughly with transitivity), while the transitivization of 'unergative' verbs like *walk* and *run* involves not only this classifier element but special causative prefix morphology as well" (1987:25), pointing the reader to entries in Young and Morgan's (1980) dictionary of Navajo.

Agentive verbs of manner of motion are not the only internally caused verbs that show causative uses in English. Apparent instances of the causative alternation are found sporadically throughout the class of nonagentive internally caused verbs, as in (81) from Smith 1970, although they are observed most frequently, but not exclusively, among the verbs of emission, especially among the verbs of sound emission.

(81) a. The baby burped.
b. The nurse burped the baby. (Smith 1970:107, (36a))

(82) a. The doorbell buzzed/rang.
b. The postman buzzed/rang the doorbell.

(83) a. The flashlight beamed/shone.
b. We beamed/shone the flashlight.

We will show that these are also not instances of the causative alternation as we have defined it. The pair in (81) is what we term an *idiosyncratic* pair, in the sense that it is a one-of-a-kind pair that is not representative of any sort of regular type of causativization. The pairs in (82) and (83) are what we call *spurious* causative pairs; by "spurious" we mean that what appears to be a causative pair involves two distinct verb meanings—one of them causative—that are not derivationally related.

Consider first the *burp* example in (81). As Smith (1970) points out, the verb *burp* enters into such causative pairs only for certain highly specific choices of objects for the transitive use.

(84) a. The baby burped.
b. The nurse burped the baby. (Smith 1970:107, (36a))

(85) a. The doctor burped.
b. *The nurse burped the doctor. (Smith 1970:107, (36c))

Not only are there restrictions on the transitive object, but *burp* is one of two verbs of bodily process that show this phenomenon. The other is the verb *bleed*, which is used in the sense of 'cause to *bleed*-intransitive' in a very restricted way. For instance, it is not possible to use *bleed* as a causative if one cuts one's hand on a knife.

(86) a. The patient bled.
b. The doctor bled the patient.

Furthermore, as expected if they are internally caused verbs, other verbs of bodily process do not show causative uses at all.

(87) a. Kay coughed./*The doctor coughed Kay.
b. Pat yawned./*The sleeping pills yawned Pat.
c. Tony sneezed./*The pollen sneezed Tony.

As there is no evidence that the causative uses of *bleed* and *burp* represent a regular process of causativization as applied to a particular verb class, we suggest that they represent idiosyncratic instances of causativization. We propose that the sporadic causative coinages that turn up in everyday speech, such as the examples in (88), represent the same phenomenon.

(88) a. What's fussing her? [A Grandpa wondering why baby is crying] (Pinker 1989:153, (4.44l))
b. "He lunched me to-day in terrific style . . ." [G. B. Stern, *The Matriarch*, 261]

Consider next the examples of verbs of emission in (82) and (83). Some, though by no means all, verbs of emission can be found in causative pairs. Among the verbs of light emission, besides the verbs *beam* and *shine*, the verb *flash* is found in causative pairs. Similarly, among verbs of sound emission, besides the verbs *buzz* and *ring*, a range of verbs are found in causative pairs, including *clatter*, *clink*, *jingle*, *rattle*, *rustle*, and *toll*.

Unlike the agentive verbs of manner of motion, the nonagentive internally caused verbs, including the verbs of emission, do not require co-occurring directional phrases in their causative use. However, the causative uses of verbs of emission resemble the causative uses of the agentive verbs of manner of motion in one respect: they also do not permit instrument or natural force subjects.

(89) a. *The short circuit rang the bell.
b. *The dishwasher clattered the dishes.

In this respect, both of these classes contrast with the causative uses of verbs like *break*.

The relationship between the causative and noncausative uses of verbs of emission also differs from that associated with the causative and noncausative uses of causative alternation verbs. With a causative alternation verb, the causative use entails the noncausative use, so that if someone breaks something, then that thing breaks. In contrast, verbs of emission do not demonstrate this pattern. Not only do they show causative uses only for a very restricted range of emitters, as the examples in (90)–(93) show, but the relationship between the causative and noncausative uses is different from that shown by the *break* verbs. For example, if someone buzzes a doorbell or flashes a light, it is odd to describe the very same event by saying that the doorbell buzzed or the light flashed. In contrast, if someone breaks a window, then it is possible to describe the same event with the sentence *The window broke*.

(90) a. The doorbell buzzed.
b. The postman buzzed the doorbell.

(91) a. The bees buzzed.
b. *The postman buzzed the bees.

(92) a. The light flashed.
b. The stagehand flashed the light.

(93) a. The lightning flashed.
b. *The cloud seeding flashed the lightning.

This difference supports treating the causative pairs involving verbs of emission as representing a phenomenon other than the causative alternation.

How can this pattern of properties be explained? We proposed in section 3.2.2 that certain verbs have meanings that allow them to describe either an internally caused or an externally caused eventuality. Although in section 3.2.1 we proposed that verbs of emission describe internally caused eventualities, we suggest that some verbs of emission are actually compatible with a dual classification as either internally or externally caused verbs. The transitive causative uses of verbs of sound and light emission in (82) and (83), we argue in B. Levin and Rappaport Hovav 1994, represent the externally caused option, and the intransitive uses they are paired with represent the internally caused option.

Consider, for example, the verb *buzz*. When used as a verb that describes a particular animal sound, this verb clearly describes an internally

caused eventuality since the sound is emitted under the emitter's own control. It also describes an internally caused eventuality when used to describe the sound emitted by certain devices, such as doorbells and buzzers, which can in some circumstances be conceptualized as emitting the sound under their own control. However, certain devices—many of them the same ones that can be conceptualized as self-controlled—can be made to emit the sound known as a *buzz* by a person who manipulates the device; this is the externally caused option. To the extent that the set of emitters that can be manipulated to emit a particular sound and the set of emitters that can be conceptualized as emitting the same sound under their own control overlap, the verb describing the emission of that sound will show internally and externally caused uses with the same emitters. Consequently, apparent causative pairs, such as the one in (90), arise. When an emitter belongs to only one of these two sets, then the verb shows only one of the two options for that emitter. As an illustration, consider the pair in (91): bees cannot be externally caused to emit a buzz, so that there is no externally caused use of *buzz*, such as **The postman buzzed the bees*, paired with the internally caused use of *buzz* in *The bees buzzed.*

There are several factors that limit the number of apparent causative pairs with verbs of sound emission. Most important, there are restrictions on the set of verbs that can be found in such pairs. The sounds associated with some verbs of sound emission, such as the verb *burble*, are necessarily internally caused, and, thus, these verbs will not show externally caused uses at all. In general, externally caused uses are found with verbs describing sounds emitted through contact between two surfaces, such as *jingle*, *rattle*, and *rustle*. It is a matter of real-world knowledge whether the emission of a particular type of sound involves internal or external causation. The number of apparent causative pairs is further limited because even when a verb of sound emission permits an externally caused use, such uses can arise only with certain emitters. In the externally caused use, the relevant sound must be emitted by manipulable entities such as coins, dishes, keys, papers, doorbells, and buzzers under direct manipulation. If the emitters are not manipulable, then the emission of the sound cannot be externally caused.

The relationship between the two members of the causative pairs with verbs of emission can be made explicit using the lexical semantic representations introduced in chapter 1. The constant associated with each verb of emission represents what is distinct about that verb; for example, for a

verb of sound emission it would be the characteristic sound associated with that verb. Suppose that the constant associated with a verb of emission showing causative and noncausative uses is compatible either with the lexical semantic template of an internally caused verb or with that of an externally caused verb. If so, a causative pair associated with such a verb of emission involves two distinct lexical semantic representations that happen to share a single constant and thus the same "name." They are not, however, related by any productive rule. It is for this reason that we labeled these "spurious" causative pairs. Our initial investigations suggest that the causative pairs involving verbs of emission merit further study, showing behavior that is more complicated and less uniform than the data presented here suggest; however, we believe that their behavior patterns can all be understood in terms of the discussion here and in sections 5.1.2.2 and 5.3.

Summarizing this section, English has two types of regularly formed causative pairs. The first, and by far more pervasive, involves externally caused verbs, which, although basically dyadic, in specific circumstances undergo a process of detransitivization. English has a more restricted phenomenon of causativization of agentive verbs of manner of motion in the presence of a directional phrase. We return to these alternations in the next two chapters, where we provide an explanation for why internally caused verbs cannot be causativized, except in special conditions.

3.3 Verbs of Existence and Appearance

So far in this chapter we have focused on the causative alternation as a device for better understanding how unaccusative verbs differ from unergative verbs. In this section we introduce a fundamental division within the class of unaccusative verbs that is motivated by behavior with respect to the causative alternation. Specifically, we show in section 3.3.2 that the arguments used in favor of a causative lexical semantic analysis of one class of unaccusative verbs indicate that the causative analysis is inappropriate for another class of unaccusative verbs. Verbs of existence such as *exist*, *flourish*, and *thrive* and verbs of appearance such as *appear*, *emerge*, and *arise*, although all bona fide unaccusative verbs, do not participate in the causative alternation. We show that this property is not characteristic only of English, but is typical of a variety of languages. We show that they are nevertheless dyadic even though they do not have the causative lexical

semantic representation we attributed to the alternating externally caused verbs. In chapter 4 we establish that they are unaccusative, taking two internal arguments. In section 3.3.3 we introduce a subclass of the verbs of existence, the simple position verbs, and show that although many of them have a causative use, they also do not participate in the causative alternation, as narrowly defined in section 3.2.5.

3.3.1 Verbs of Existence and Appearance Introduced

As argued in many studies (Clark 1978, Kimball 1973, Lyons 1967, and works cited therein), there is a relationship between existence and location. For instance, noting the deictic origin of English *there* and similar elements that characterize existential sentences in European languages, Lyons writes that "it might appear reasonable to say that all existential sentences are at least implicitly locative (the term 'locative' being taken to include both temporal and spatial reference)" (1967:390). We follow these studies in taking verbs of existence to be verbs having two arguments: one describing the entity that exists and the other describing the location at which this entity exists. Thus, we claim that verbs of existence are basically dyadic, although, since we argue in chapter 4 that they are unaccusative, we propose that they take two internal arguments rather than an internal and an external argument like verbs of change of state.

More recently, Hoekstra and Mulder (1990) and Mulder and Wehrmann (1989) have also explored the properties of verbs of existence. Mulder and Wehrmann recognize that verbs of existence describe eventualities that involve two participants: a theme (i.e., an entity whose existence is asserted) and a location. However, Mulder and Wehrmann, and following them Hoekstra and Mulder, treat these verbs as monadic verbs taking a small clause internal argument, which itself contains theme and location arguments. We discuss a problem with the small clause account in section 6.7 in the context of our investigation of locative inversion. Here we merely emphasize that there is general agreement that verbs of existence are associated with a theme and a location.

Verbs of appearance and verbs of existence are related semantically. A verb of appearance can be viewed as a verb of coming into existence. Alternatively, a verb of existence can be seen as a verb that describes the state resulting from the appearance of some entity; in fact, Kimball writes, "The concept of existence is, I claim, formed semantically (and grammatically) as the perfective of coming into being" (1973:267). It is unclear to us which of the two characterizations is correct or whether both are plau-

sible, and it is beyond the scope of this book to determine this. All that matters for our purposes is the existence of a semantic relationship between the two. Verbs of disappearance, such as *disappear* and *vanish*, also belong in the larger class of verbs of existence and appearance, since they can be considered to be verbs of coming not to exist.

Support for treating the verbs of appearance, the verbs of disappearance, and the verbs of existence together comes from the fact that these three types of verbs share a variety of properties, although for some purposes the classes need to be kept distinct. First, all three types of verbs require a location argument—and, if there is no overt location argument, one is understood. Second, verbs of existence and appearance are the verbs most commonly found in the locative inversion construction, which we discuss in detail in chapter 6, and the *there*-insertion construction, which we discuss briefly in chapter 4; as we note in these discussions, verbs of disappearance are independently excluded from these constructions.

(94) a. In front of her appeared a fabulous sight.
b. In the desert flourished a utopian community.

(95) a. There appeared a ship on the horizon.
b. There exists a solution to that problem.

Finally, all three types of verbs consistently lack causative variants. This property will be central to our consideration of whether the causative analysis proposed for externally caused verbs of change of state is also applicable to these verbs.

(96) a. My mother lived in Boston.
b. *Her job lived my mother in Boston.

(97) a. A picture appeared (on the screen).
b. *The programmer appeared a picture (on the screen).

(98) a. The bicycle disappeared (from the garage).
b. *The thief disappeared the bicycle (from the garage).

3.3.2 Evidence against a Causative Analysis

With this background, we turn now to evidence that the causative analysis is inappropriate for the verbs of existence and appearance. We do this by reviewing those arguments previously used to support the causative analysis of the alternating intransitive verbs that would be expected to extend to the verbs of existence and appearance. For instance, given the lack of a

causative form, the argument from selectional restrictions is inappropriate and is not considered.

First, consider the phenomenon that Chierchia terms "unstable valency." It is striking that this property does not extend to verbs of appearance and existence, even though they are also considered to be unaccusative. The examples in (99)–(102) illustrate the inability of such verbs to participate in the causative alternation in several languages that we are familiar with.[19]

(99) *English*

a. i. A star appeared in the sky.
ii. *The darkness appeared a star in the sky.

b. i. An explosion occurred.
ii. *The gas leak occurred an explosion.

c. i. A solution exists.
ii. *The mathematician existed a solution.

(100) *Modern Hebrew*

a. i. Koxav hofia.
star appeared
'A star appeared.'
ii. *Ha-xošex hofia koxav.
the-darkness appeared star

b. i. Er'a hitpocecut.
happened explosion
'An explosion happened.'
ii. *Dlifat ha-gaz er'a hitpocecut.
leak the-gas happened explosion

c. i. Ha-pitaron nimca be'amud 90.
the-solution is found on page 90
'The solution is found on page 90.'
ii. *Ha-mexaber himci et ha-pitaron be'amud 90.
the-author made be found ACC the-solution on page 90
iii. Ha-mexaber maca et ha-pitaron be'amud 90.
the-author found ACC the-solution on page 90
'The author found the solution on page 90.' (wrong interpretation)

(101) *Italian*

a. i. È apparsa una stella.
is appeared a star
'A star appeared.'

ii. *La notte a apparso una stella.
the night has appeared a star

b. i. Accadono delle cose strane qui.
happen some things strange here
'Some strange things are happening here.'

ii. *Il vento accade delle cose strane qui.
the wind happens some things strange here

c. i. La risposta si trova a pagina 90.
the answer REFL finds on page 90
'The answer is found on page 90.'

ii. Lo scrittore ha trovato la risposta a pagina 90.
the writer has found the answer on page 90
'The writer found the answer on page 90.' (wrong interpretation)

(102) *Russian*

a. i. Zvezda pojavila-s' na nebe.
star appeared-REFL in sky
'A star appeared in the sky.'

ii. *Noč' pojavila zvezdu na nebe.
night appeared star in sky

b. i. Proizošël vzryv.
occurred explosion
'An explosion occurred.'

ii. *Utëčka gaza proizošla vzryv.
leak gas occurred explosion

c. i. Suščestvuet rešenie.
exists solution
'A solution exists.'

ii. *Matematik suščestvil rešenie.
mathematician existed solution

d. i. Rešenie ètoj zadačy naxodit-sja na stranica 90.
solution this assignment finds-REFL on page 90
'A solution to this assignment is found on page 90.'

ii. Student našël rešenie ètoj zadačy na stranica 90.
student found solution this assignment on page 90
'The student found the solution to this assignment on page 90.' (wrong interpretation)

Those verbs listed above that are morphologically related to transitive verbs, such as the Modern Hebrew verb *nimca* 'be found' (related tc *maca*

'find') or its Russian and Italian counterparts *naxodit'sja* 'be found' and *trovarsi* 'be found' (related to *naxodit'* 'find' and *trovare* 'find'), cannot be related to them by the semantic relation that characterizes the transitive and intransitive variants of a verb such as *break*. Specifically, these intransitives are stative, unlike the intransitive form of verbs such as *break*. Consequently, there is no reason to believe that *The solution is found on page 90* is semantically derived from *Something caused the solution to be found on page 90*, as the causative analysis would predict. (Although it is striking that three languages have similar pairs, suggesting that there is more to be said here.)

Chierchia (1989) suggests that unaccusative verbs without a transitive causative form are idiosyncratically marked for the nonlexicalization of this form. However, since a semantically coherent subset of the unaccusative verbs consistently lacks this form in a variety of languages, this phenomenon does not seem to be idiosyncratic at all, casting doubt on an analysis that takes these verbs to have a causative lexical semantic representation.

The morphological shape of the verbs of existence and appearance also does not provide any support for a causative analysis, further distinguishing these verbs from the causative alternation verbs. As we have pointed out several times, the intransitive form of a causative alternation verb is morphologically complex in many languages, being derived from the causative form. Often it is derived from the causative form via a reflexive affix (Chierchia 1989, Marantz 1984, Nedyalkov and Silnitsky 1973, among others). That is, this variant is associated with the morphological form used to derive the intransitive *dress* of *She dressed* (meaning 'She dressed herself') from transitive *dress*. This is the case, for instance, in French, Italian, Modern Hebrew, and Russian. A perusal of the morphological shape associated with the verbs of existence and appearance listed in (99)–(102) shows that there is no general pattern suggesting a transitive causative source—even a nonlexicalized one—for these verbs. In particular, there is no association of reflexive morphology with these verbs. For example, in Modern Hebrew the verbs in these classes typically show the patterns Pa'al, Nif'al, or Hif'il, which are never associated with a reflexive interpretation, unlike the Hitpa'el pattern used for the causative alternation verbs (see section 3.2.5). In the Romance languages hardly any of these verbs have the reflexive morpheme (*se/si*). We have found only one such verb, which interestingly has a counterpart with this morphological shape in Russian; this is the verb glossed as 'be found'.

(103) a. trovarsi 'be found'/trovare 'find' (Italian)
b. se trouver 'be found'/trouver 'find' (French)

In Russian verbs of existence and appearance vary in their morphological shape. Some have the reflexive morpheme *-sja*, though they are rarely related to transitive verbs lacking this morpheme, as the examples in (104) illustrate, whereas others do not have the reflexive morpheme (e.g., *suščestvovat'* 'exist', *proizidti* 'occur').[20]

(104) a. pojavit'sja 'appear'/*pojavit'
b. slučit'sja 'occur'/*slučit' (exists, but with the wrong meaning)
c. naxodit'sja 'exist/be found'/naxodit' 'find'
d. okazat'sja 'turn out'/*okazat' (transitive)
e. ostat'sja 'remain'/*ostat' (transitive)

Even when such verbs *do* have reflexive morphology, as in the case of Russian *naxodit'sja* 'be found', Italian *trovarsi* 'be found', and French *se trouver* 'be found', the interpretation of the verb makes it clear that it is not plausibly related to the transitive form, if one exists, by a process of "decausativization." And in many instances there is no related transitive form, again setting these verbs apart from the verbs like *break*. In general, then, there appears to be no general systematic morphological pattern associated with verbs of existence and appearance that would suggest that they are related to a more basic transitive causative form.

Next, consider the adverbial modifier *by itself*, which is claimed to bring out the presence of the cause argument that would be expected if the causative analysis were appropriate. As discussed in section 3.1, Chierchia suggests that the Italian phrase *da sè* 'by itself' (in the sense of 'without outside help') is such an adverbial. Although this adverbial can be found with verbs of change of state, it is striking that the English counterpart of the Italian adverbial cannot appear with verbs of existence and appearance, and, where it does appear, it receives a completely different interpretation: 'alone'.

(105) a. Cassie appeared by herself. ('alone', not 'without outside help')
b. My mom lived by herself. ('alone', not 'without outside help')
c. *The solution existed by itself.

Once again verbs of existence and appearance behave differently from verbs of change of state, which permit the 'without outside help' interpretation of the adverbial. Thus, this adverbial does not provide evidence for

positing a cause argument for verbs of existence and appearance. The unambiguous 'alone' interpretation of the adverbial would not be surprising if these verbs simply had no cause argument.[21]

In summary, the arguments in favor of a causative lexical semantic representation for the alternating unaccusative verbs do not hold up for the verbs of existence and appearance. These verbs do not participate in the causative alternation, as the examples in (99)–(102) demonstrate, nor do they show other evidence of a causative analysis. In light of our analysis of the causative alternation in section 3.2, we propose that this behavior reflects the absence of an external cause in the lexical semantic representation of these verbs. However, unlike internally caused verbs such as *laugh* and *cry*, which also lack an external cause, these verbs are among the prototypical unaccusative verbs of many languages, as we show in chapter 4. In English, for example, these verbs cannot assign accusative Case, and in Italian they typically select the auxiliary *essere* 'be', the auxiliary found with unaccusative verbs. Furthermore, these properties suggest that these verbs are not internally caused verbs either, since then they would most likely be classified as unergative by the linking rules. Rather, we propose that these verbs belong to a class of verbs for which the notions of external and internal causation are apparently not relevant. Given this characterization, the unaccusativity of these verbs must have a different source from the unaccusativity of those externally caused verbs such as *break*, which undergo a process of detransitivization. We formulate a linking rule to handle this in chapter 4. In chapter 6, where we discuss verbs of existence and appearance in greater detail, we show that this class of verbs is distinguished from the externally caused verbs of change of state in a variety of ways.

3.3.3 Verbs of Spatial Configuration

Hoekstra and Mulder (1990) include verbs such as *sit*, *stand*, and *lie* in the class of verbs of existence. Although this treatment appears to be well motivated, these verbs show some properties that at first glance are rather unexpected if this classification is correct.

Before we can offer a fuller treatment of the verbs of spatial configuration, we need to set out the range of meanings associated with them in English and other languages. What is distinctive about verbs such as *sit*, *stand*, and *lie* is that each is associated with a specific spatial configuration. Languages associate up to three types of noncausative meanings and one type of causative meaning with a particular spatial configuration.

Only one of the noncausative meanings is relevant to determining whether verbs such as *sit* are verbs of existence; therefore, we need to present the possible meanings in order to ensure that we are considering the relevant one in our discussion.

The first noncausative meaning available to verbs of spatial configuration is agentive and can appropriately be called the *maintain position* sense. This meaning describes the maintenance of a particular spatial configuration by an animate being, as in *Yvonne stood alone (in the hallway) for six hours.* The locative phrase is optional when the verb is used in this sense. Another agentive noncausative meaning can be referred to as the *assume position* sense; it describes an animate being coming to be in a particular position under his or her own control, as in *Yvonne stood (up).* Again a location phrase is not required when the verb is used in this meaning. It is likely that the location phrases found with these two meanings are adjuncts. As we discuss in Rappaport Hovav and B. Levin, in press, the two agentive meanings can be distinguished from each other: in the assume position meaning, but not the maintain position meaning, verbs associated with spatial configurations often cooccur with completive particles in the simple past tense, as illustrated in (106).[22]

(106) a. Holly sat up/down.
b. Denise lay down.
c. The audience all stood up.

The third noncausative meaning is nonagentive. In this meaning, the verb is typically predicated of inanimates (or animates "viewed" as inanimates) and describes the location of the entity it is predicated of, as in *The papers lay on the desk;* we refer to this meaning as the *simple position* meaning. The locative phrase is obligatory with this meaning, as illustrated in (107).

(107) a. The statue stood *(in the corner).
b. The purse lay *(on the table).
c. The picture is hanging *(on the wall).

Languages differ about whether they use a single verb form to label all four verb meanings associated with a particular spatial configuration; see Talmy 1985 for some discussion of the possibilities. English often allows the three noncausative verb meanings associated with a particular spatial configuration to be associated with a single verb form; sometimes, as we discuss below, the same form may also be used for the causative meaning. This verb form can be said to take its name from the spatial configuration.

Given the theory of meaning/form association set out in section 1.4, each of the verb meanings can be viewed as involving a distinct lexical semantic template, with particular spatial configurations used to fill the constant associated with these templates. The result is a set of lexical semantic representations with a shared constant, and hence in English, more often than not, these representations are associated with a shared name. When we refer to verbs that take their name from a spatial configuration apart from one of the specific meanings that can be associated with such verbs, we will refer to them as *verbs of spatial configuration*. When we are discussing particular senses associated with verbs of spatial configuration, we will refer to the verb according to its meaning.

It is the simple position sense of verbs of spatial configuration that is relevant to the discussion of verbs of existence; we return to the other senses in chapter 4. We propose that the simple position verbs are verbs of existence. These verbs pattern in many respects like verbs of existence. They describe the existence of an entity at a particular location, each particular verb contributing information about the particular spatial configuration involved. Like verbs of existence, these verbs require a locative phrase in this sense. Furthermore, in chapter 4 we present cross-linguistic evidence that the simple position verbs, like verbs of existence, are unaccusative. In chapter 6 we show that, like verbs of existence, the simple position verbs participate in locative inversion.

If the simple position verbs are verbs of existence, then one aspect of their behavior is somewhat unexpected. As noted earlier, many of these verbs have transitive causative variants, unlike verbs of existence in general.

(108) a. The bicycle leaned against the fence.
b. I leaned the bicycle against the fence.

(109) a. A statue of Jefferson stood on the pedestal.
b. They stood the statue of Jefferson on the pedestal.

However, if simple position verbs, like other verbs of existence, are not externally caused verbs, then all we need to show is that such causative pairs do not represent the same phenomenon as the causative pairs involving externally caused verbs like *break*. There is indeed evidence that this is so.

We begin with a variety of morphological evidence that these causative pairs should be set apart from the causative pairs involving verbs like *break*. The morphological relationship between the causative and noncausative senses of the simple position verbs is not always completely regular.

For example, although the verb *sit* can be used to describe the location of animate or inanimate entities, the causative sense of this verb is appropriate for describing the position of animates only, *set* being used as the causative when describing the position of inanimates and sometimes animates.

(110) a. The usher sat the guests in the first row.
b. We set/*sat the books on the table.

On the other hand, the verb *lie* is used as a simple position verb but not as a causative; the related causative meaning is expressed with the verb *lay*.

(111) a. The dressmaker laid/*lay the dress carefully in a box.
b. Sally laid/*lay her baby down for a nap.

The irregularity of the pattern is also evident in the behavior of another subset of the verbs of spatial configuration. The members of this subset appear not to have the simple position sense available. They cannot be used intransitively with an inanimate subject; instead, the adjectival passive participle based on their causative sense is used to express the comparable meaning.[23]

(112) a. We balanced the load on the wagon.
b. *The load balanced on the wagon.
c. The load was balanced on the wagon.

(113) a. The designer mounted the photograph on the bulletin board.
b. *The photograph mounted on the bulletin board.
c. The photograph was mounted on the bulletin board.

(114) a. We perched the picture on the piano.
b. *The picture perched on the piano.
c. The picture was perched on the piano.

To take another example of the irregularity, compare the behavior of the apparently synonymous verbs *hang* and *suspend. Hang* behaves like *stand*, allowing the simple position sense and the related causative sense, whereas *suspend* patterns like *balance*.

(115) a. The cook hung the dried herbs from the rafters.
b. The dried herbs hung from the rafters.
c. The dried herbs were hung from the rafters.

(116) a. The cook suspended the dried herbs from the rafters.
b. *The dried herbs suspended from the rafters.
c. The dried herbs were suspended from the rafters.

Irregular morphological relationships between the causative and noncausative forms of such verbs are also displayed in other languages. In Dutch the verbs *zitten* 'sit' and *liggen* 'lie' have the intransitive simple position sense, but cannot be used as transitive causatives; instead, the phonologically related verbs *zetten* 'sit' and *leggen* 'lay' are used. In Russian the pattern of morphological relations between the forms is even more complicated, although there is evidence of a common root (for further discussion, see Townsend 1970, Gołab 1968, Gladney 1993). What is relevant is that this pattern is different from the regular pattern associated with the causative pairs involving the Russian counterparts of verbs like *break*. In true causative alternation pairs, the causative verb is morphologically simple and the noncausative verb is morphologically complex, being derived by affixation of the reflexive suffix *-sja* (*-s'* after vowels) to the morphologically simple verb.

(117) a. Anna otkryla dver'.
Anna opened door
'Anna opened the door.'
b. Dver' otkryla-s'.
door opened-REFL
'The door opened.'

In general, a range of lexicalization patterns are observed across languages for expressing the various verbal meanings associated with a given spatial configuration, as briefly reviewed by Talmy (1985). We expect that further study will reveal some subregularities, although we do not pursue this issue here. All that matters is that these irregularities are in clear contrast with the very regular morphological relation that obtains between the members of the causative pairs involving externally caused verbs of change of state.

The semantic relationship between the causative and noncausative uses of verbs of spatial configuration is also not the same as the relationship between the causative and noncausative uses of externally caused verbs of change of state like *break*. With alternating verbs like *break*, the intransitive use can be described as "inchoative"; it means something like 'come to be in the state lexicalized by the verb'. In fact, many of the alternating verbs, such as *cool*, *dry*, and *harden*, are morphologically related or identical to adjectives that name this state. Therefore, it is possible to derive the inchoative variant from the causative variant via a process that lexically binds (or existentially quantifies over) the first argument of the CAUSE

predicate, as suggested in section 3.2.4. In contrast, verbs of spatial configuration are never morphologically deadjectival. Rather than being inchoative, the intransitive simple position sense of a verb of spatial configuration like *hang* is stative and means something like 'be in the spatial configuration designated by the verb'. (Marantz (1984) provides one of the few discussions of causative pairs that acknowledges that in some instances the intransitive member of the pair is stative.) Of the possible senses associated with a given verb of spatial configuration, the one that comes closest to having an inchoative interpretation is the assume position sense, but it is unlikely that the causative sense of the verbs of spatial configuration is related to this sense. With the exception of the verb *sit*, in the causative sense the theme does not have to be animate, unlike the entity that assumes a position in the assume position sense; nor does the theme of the causative sense have to be able to assume a position under its own control, again contrasting with the assume position sense.

Carter (1976, 1978) argues that all causative verbs should be analyzed as causatives of verbs of change. If so, the causative verbs of spatial configuration would have roughly the same lexical semantic representation as the causative verbs of change of state. That is, this representation would take a form along the lines in (118). (In this representation we use */SPATIAL-CONFIG* to indicate the spatial configuration that is particular to a given verb; we also intend this notation to encode the modificatory function that this constant serves within the lexical semantic representation.)

(118) [[*x* DO-SOMETHING] CAUSE [*y* BECOME AT *z* */SPATIAL-CONFIG*]]

The process of lexical binding of the first argument of the CAUSE predicate, which was used to derive the intransitive use of an externally caused verb such as *break*, would not derive the simple position use of a verb of spatial configuration from its causative use. The simple position use is stative, but the central subevent in the representation in (118) is that of a verb of change, and the process of binding will not effect any changes in the representation of the central subevent. In fact, it is unclear what kind of rule could derive the lexical semantic representation of a stative verb from that of a verb of change.

As suggested above, we propose that the causative and simple position senses do not involve a single lexical semantic representation, as we proposed for the two uses of *break*, where the intransitive use arises from the lexical binding of an argument in the lexical semantic representation that

is common to both uses. In contrast, causative pairs involving verbs of spatial configuration involve the association of a single constant specifying a particular spatial configuration with two distinct lexical semantic templates. There are thus two verbs, belonging to two semantic classes, that happen to involve the same constant and therefore may have the same name. (Obviously, nothing precludes the association of distinct names with two lexical semantic representations involving distinct templates but the same constant.) Intransitive *hang*, for example, belongs to the class of simple position verbs, whereas transitive *hang* belongs to the same class as causative *put*, except that it lexicalizes the spatial configuration of the placed entity. B. Levin (1993) calls the class of verbs that includes *hang* "verbs of putting in a spatial configuration." The fact that these two verbs *hang* share the same "name" is due to the fact that they both involve the same spatial configuration. The relationship between the two uses of *hang* is illustrated with the lexical semantic representations in (119); compare this relationship to the one that holds between the lexical semantic representations for transitive and intransitive *break* given in (60) and (61).

(119) a. [*x* BE AT *z* /*HANG*]
b. [[*x* DO-SOMETHING] CAUSE [*y* BECOME AT *z* /*HANG*]]

Why, then, don't all verbs of spatial configuration have causative uses? As discussed in section 3.2.1, some, like *loom* and *slouch*, take their name from spatial configurations whose very nature makes them compatible only with meanings associated with internally caused eventualities. These constants, therefore, cannot be associated with the lexical semantic template of externally caused verbs. Consequently, the verb forms naming such spatial configurations will not be associated with a transitive causative use for the same reason that verbs like *laugh* and *talk* are not. Only those spatial configurations that can be externally caused may be associated with a causative lexical semantic template.

To summarize, causative pairs of the type exhibited by verbs like *break* involve two distinct argument structures associated with a single lexical semantic representation. In contrast, with the verbs of spatial configuration causative pairs arise because two distinct lexical semantic representations, one causative and one not, share the same constant. Furthermore, the morphological relationship between the two members of such causative pairs is not necessarily uniform across the entire class within any particular language, and the morphological expression of the relationship

is often different from the one that signals the relationship between the members of the *break*-type causative pairs. Moreover, there is greater cross-linguistic variability in the way languages express the relation between the members of these pairs. Thus, these causative pairs are spurious pairs in the sense defined in section 3.2.5, and their presence does not detract from the inclusion of the simple position verbs among the verbs of existence and appearance.

3.4 Conclusion

In this chapter we have isolated three broad classes of verbs, defined in terms of their lexical semantic representation and their associated argument structure, and hence in terms of their syntactic configuration. The first set of verbs can be characterized as externally caused verbs; this set includes many verbs of change of state. In terms of their lexical semantic representation, these verbs are basically dyadic causative verbs that need not express their cause argument under certain circumstances, giving rise to what we show in chapter 4 is an unaccusative intransitive use. The second set of verbs includes internally caused verbs; these verbs are monadic in terms of their lexical semantic representation and, as we show in chapter 4, unergative. The third set includes the verbs of existence and appearance, which are dyadic; as we show in chapter 4, these verbs are unaccusative verbs with two internal arguments.

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Chapter 4
The Linking of Arguments

In the previous chapter we investigated the basic adicity of a range of intransitive verbs and began to isolate certain lexical semantic distinctions relevant to determining a verb's argument structure. We sketched properties of the argument structures of various types of intransitive verbs, but not in any systematic way. In this chapter we focus on the explicit formulation of the linking rules that are responsible for determining the argument structures of a wide variety of intransitive verbs and, hence, the syntactic expression of their arguments. In section 4.1 we lay out the four linking rules we will make use of. In section 4.2 we examine the interactions between these rules. In section 4.3 we compare our approach with other proposals concerning the lexical semantic determinants of argument expression.

4.1 The Linking Rules

4.1.1 The Immediate Cause Linking Rule

In the previous chapter the distinction between internally and externally caused verbs was shown to be pertinent to determining basic adicity. The notions of internal and external causation allow the identification of the participant in an eventuality that is the immediate cause of the eventuality, if there is such a participant. We call such a participant the *immediate cause*, and we suggest that the linking rule that determines which argument of a verb is its external argument makes reference to this notion.[1]

(1) *Immediate Cause Linking Rule*
The argument of a verb that denotes the immediate cause of the eventuality described by that verb is its external argument.

The Immediate Cause Linking Rule will apply to both internally and