Chapter 2

The Anatomy of a Diagnostic: The Resultative Construction

In this chapter we investigate whether there is evidence for the syntactic encoding of the distinction between unaccusative and unergative verbs in English through a close examination of the resultative construction. We examine whether the data involving this construction are better handled by a syntactic account that relies on the syntactic encoding of unaccusativity or a semantic account that does not.

First, we review studies that show how this construction can be used to argue for the syntactic encoding of unaccusativity. These studies have shown that a unified restriction on all resultative constructions, which we call the Direct Object Restriction (DOR), can be maintained assuming an unaccusative analysis of certain intransitive verbs. We then elaborate on both the syntactic and the semantic aspects of previous analyses. We show how the effects of the DOR can be derived from a particular formulation of a familiar linking rule that maps from semantic structure to syntactic structure.

We investigate the distribution of resultative phrases and the syntax of resultative constructions based on transitive, unergative, and unaccusative verbs. A striking fact that emerges from this examination is that the syntax of the resultative construction based on verbs from these three classes is just the syntax of these types of verbs in isolation (assuming unaccusativity), except for the addition of the resultative phrase. We show that our form of the syntactic approach is preferable to the alternative set out by Hoekstra (1988, 1992), which is unable to account for this property of the construction. We also contrast the syntactic approach with two semantic analyses of the resultative construction. These semantic analyses are similar in many respects to our own analysis, which has a substantial semantic component. However, it turns out that there are certain aspects of the construction that have no obvious semantic explanation, although

they have a natural syntactic explanation. Furthermore, the semantic account does not predict the syntactic differences between the resultative constructions based on the three syntactic classes of verbs, because, as we will show, the syntax of the construction is not projected from the syntax of the verbs in isolation on the semantic account. We conclude that the syntactic approach, which relies on the syntactic encoding of unaccusativity, provides a more explanatory account of the phenomenon. We also consider why some unaccusative verbs do not appear with resultative phrases, contrary to what is predicted given the DOR.

2.1 The Distribution of Resultative Phrases

A resultative phrase is an XP that denotes the state achieved by the referent of the NP it is predicated of as a result of the action denoted by the verb in the resultative construction. The basic insight that emerges from work on the resultative construction is that a resultative phrase may be predicated of the immediately postverbal NP, but may not be predicated of a subject or of an oblique complement. We call this generalization the *Direct Object Restriction*.[1] The relevance of the resultative paradigm to unaccusativity was first pointed out by Simpson (1983a), as part of a systematic exploration of the properties of the resultative construction. A more recent systematic discussion of resultative constructions with respect to a variety of verb classes is found in the work of Carrier and Randall (1992, in press). Drawing on this and other previous work, we present a complete typology of resultative constructions in English, while simultaneously establishing the validity of the DOR.

2.1.1 Resultative Constructions Based on Transitive Verbs

Resultative phrases may appear with a variety of transitive verbs. Such phrases may be predicated only of the object of a transitive verb, never the subject.

(1) a. Woolite safely soaks all your fine washables clean. (ad)
   b. . . . a 1,147 page novel that bores you bandy-legged . . . [P. Andrews, "Abandoned in Iran," 28]
   c. . . . while she soaps me slippery all over . . . [D. Pryce-Jones, *The Afternoon Sun*, 186]
   d. And when her father finally did come home and kiss them, he was like the handsome prince, thought Laura, kissing them all alive. [D. Smith, *Remember This*, 28]

    e. The music is violent and mindless, with a fast beat like a crazed parent abusing a child, thrashing it senseless. [B. A. Mason, "A New-Wave Format," 227]

    f. Absently, she dipped a finger into the peanut butter and licked it clean. [M. Thurm, *The Way We Live Now*, 66]

Although XPs may be predicated of the subject of a transitive verb, they receive not a resultative interpretation, but what is referred to as a *depictive* interpretation, a term originally due to Halliday (1967). That is, *Julia burned the cookies dirty* cannot mean that Julia got dirty as a result of burning the cookies, but only that she burned the cookies when she was dirty. We are not aware of any counterexamples to the DOR that involve transitive verbs.

2.1.2 Resultative Constructions Based on Unergative Verbs

The DOR predicts that if a verb has no object, then it cannot appear with a resultative phrase. Indeed, unadorned unergative intransitive verbs cannot take resultative phrases, so that (2) cannot mean that Dora got hoarse as a result of shouting.

(2) *Dora shouted hoarse.

It is striking that this meaning can be expressed through the addition of what Simpson (1983a) calls a *fake reflexive* object: (3) means precisely what (2) cannot mean.

(3) Dora shouted herself hoarse.

Unergative verbs cannot be followed by reflexive NPs in the absence of a following resultative phrase (**Dora shouted herself*). As Simpson (1983a) points out, the fake reflexive NP could be viewed as a syntactic device for allowing a resultative phrase to be interpreted as if it were predicated of the subject of an unergative verb, while still conforming to the DOR. That is, the resultative phrase is predicated of a fake reflexive NP, which is itself coreferential with the subject. (4) and (5) illustrate this use of the fake reflexive.

(4) a. We searched the woods and cliffs, yelled ourselves hoarse and imagined you drowned ... [M. Wesley, *A Sensible Life*, 327]

     b. Well, the conclusion was that my mistress grumbled herself calm. [E. Brontë, *Wuthering Heights*, 78]

     c. The compère stands by grinning awkwardly and the other officers laugh themselves helpless. [P. Lively, *Moon Tiger*, 112]

(5) a. *We yelled hoarse.
    b. *My mistress grumbled calm.
    c. *The officers laugh helpless.

Unergative verbs are also found in a second type of resultative construction where the resultative phrase is again predicated of a postverbal NP; but in this type of construction the NP is not a reflexive pronoun.

(6) a. I ... ruthlessly roused Mr. Contreras by knocking on his door
       until the dog barked him awake. [S. Paretsky, *Blood Shot*, 183]
    b. You may sleep it [= the unborn baby] quiet again ... [E.
       Bagnold, *The Squire*, 285]
    c. ... the system does not "hallucinate" arbitrary meanings into an
       expression ... [D. Stallard, "The Logical Analysis of Lexical
       Ambiguity," 184]

The resultative phrases in (6) describe the state achieved by the referent of the postverbal NP as a result of the action denoted by the verb, just as they do in the transitive verb plus resultative phrase examples in (1). The difference between these examples based on unergative verbs and the examples in (1) based on transitive verbs is that the postverbal NPs found with the former are not arguments of the verbs, as shown by the unacceptability of the examples in (7).

(7) a. *The dog barked him.
    b. *You may sleep it.
    c. *The system hallucinates meanings.

The resultative constructions in (6) are similar in this respect to those involving unergative verbs followed by fake reflexives, such as those in (3) and (4). Both types of constructions involve resultative phrases predicated of nonsubcategorized NPs, differing only in whether the resultative phrase is predicated of a reflexive pronoun or some other NP.

Related to these two types of resultative constructions based on unergative verbs is a third type in which the NP following the unergative verb is a nonsubcategorized inalienably possessed NP (generally denoting a body part), where the possessor is coreferential with the subject of the verb.

(8) a. Sylvester cried his eyes out.
    b. Sleep your wrinkles away. (ad)
    c. Valentino ... winds up strutting his life away in the town square
       with his sister's blessing. [A. Cancogni, "A Widow's Dream," 31]

    d. ... you need not stitch your poor fingers to the bone ... [G. Eliot, *Daniel Deronda*, 247]

Again the postverbal NP in such examples is not subcategorized by the verb.

(9) a. *Sylvester cried his eyes.
    b. *Sleep your wrinkles.
    c. *Valentino strutted his life.
    d. *You need not stitch your fingers. (on the interpretation intended in (8d))

These constructions are intermediate between the first two types. The NP in postverbal NP position is not a reflexive pronoun, as in (3) and (4); however, it does include a possessive pronoun understood to be coreferential with the subject, establishing a relation between the subject and the resultative phrase as in the resultative constructions with the fake reflexive.[2]

2.1.3 Resultative Constructions Based on Unspecified Object Verbs

Resultative phrases predicated of either fake reflexives or nonsubcategorized NPs (whether possessive or not) are also found with a certain class of transitive verbs. The class includes those verbs that, like *eat*, allow intransitive uses with an unspecified object interpretation (*Sylvia ate*), as well as transitive uses (*Sylvia ate the grapes*).

(10) a. Sudsy cooked them all into a premature death with her wild food. [P. Chute, *Castine*, 78]
    b. 'I'm glad you didn't stay at the Club drinking yourself dottier.' [W. Muir, *Imagined Corners*, 62]
    c. Having ... drunk the teapot dry ... [E. Dark, *Lantana Lane*, 94]
    d. Drive your engine clean. (Mobil ad)

Although these verbs are also found in resultative constructions where the postverbal NP is selected by the verb, as shown for *cook* in (11), the resultative constructions in (10) involve postverbal NPs that are not selected by the verb in the construction, as shown by the contrast between (10) and (12).

(11) "It is the heat," complained another old auntie. "Cooking all your flesh dry and brittle." [A. Tan, *The Joy Luck Club*, 71]

(12) a. *Sudsy cooked them. (on the interpretation intended in (10a))
    b. *You drank yourself.

  c. *They drank the teapot.

  d. *Drive your engine.

The resultative constructions in (10) are based on the unspecified object form of the verb in each construction. The sentences in (10) are interpreted in the same way as those based on unergative verbs and include the three types of postverbal NPs illustrated with unergative verbs in (3), (6), and (8). In contrast, as pointed out by Carrier and Randall (1992, in press), transitive verbs that do not independently allow the omission of an unspecified object cannot be found in resultative constructions with postverbal NPs that are not selected by the verb.

(13) a. The bombing destroyed *(the city).

  b. *The bombing destroyed the residents homeless.

(14) a. The bears frightened *(the hikers). (C&R 1992:187, (35a))

  b. *The bears frightened the campground empty. (C&R 1992:187, (37a))

(15) a. The magician hypnotized *(the volunteers). (C&R 1992:187, (35c))

  b. *The magician hypnotized the auditorium quiet. (C&R 1992:187, (37c))

 Several researchers (see, among others, Jackendoff 1990, Sato 1987) have suggested that at least some resultative constructions based on unergative verbs and unspecified object verbs do involve "arguments," because the fake reflexives or nonsubcategorized NPs bear the same semantic relation to the base verb in the resultative construction as the object of the preposition heading an oblique PP complement that can be found with this verb. For example, such PPs are selected by the verbs *bark* and *drink*.

(16) a. The dog barked at them. (cf. (6a))

  b. They drank from the teapot. (cf. (10c))

However, this solution will not extend to all resultative constructions based on unergative and unspecified object verbs. It is difficult to imagine such a source for many of the fake reflexives or nonsubcategorized NPs. For example, consider what type of PP could be the source of the postverbal NPs in (6c) or (8b), repeated in (17).

(17) a. ... the system does not "hallucinate" arbitrary meanings into an expression ... [D. Stallard, "The Logical Analysis of Lexical Ambiguity," 184]

b. Sleep your wrinkles away. (ad)

We follow Carrier and Randall (1992, in press) in claiming that nonsubcategorized NPs are found only after verbs that can independently be intransitive (i.e., the verb is unergative or may take an unspecified object). (See section 2.4.1 for a discussion of the analysis presented in Hoekstra 1988, 1992, which explicitly denies this claim.)

2.1.4 Resultative Constructions with Passive and Unaccusative Verbs

The primary potential counterexamples to the DOR involve passive and unaccusative verbs. Passive and unaccusative verbs may appear with resultative phrases predicated of their surface subjects, as in (18) and (19), respectively.[3]

(18) a. The floor had also been swept quite clean of debris ... [P. Klass, *Other Women's Children*, 165]

b. In marked contrast with the outside land which had been eaten bare by goats and horses, the enclosed area was almost massed with native shrubs and grasses ... [A. W. Upfield, *Sinister Stones*, 172]

c. She was shaken awake by the earthquake.

(19) a. The river froze solid.

b. The prisoners froze to death.

c. The bottle broke open.

d. The gate swung shut.

e. This time the curtain rolled open on the court of the Caesars ... [Olivia (D. Bussy), *Olivia*, 35]

However, given a movement analysis of passives, the DOR can be maintained: the surface subject of a passive verb is an underlying object. Similarly, with unaccusative verbs the DOR can be maintained if the surface subject of an unaccusative verb, like the subject of a passive verb, is analyzed as a derived subject and an underlying object.

In contrast to unergative verbs, unaccusative verbs cannot appear with resultative phrases predicated of either fake reflexives or nonsubcategorized NPs.

(20) a. *During the spring thaw, the boulders rolled the hillside bare.

b. *The rice slowly cooked the pot black. (meaning: the pot became black as a result of the rice cooking)

c. *The snow melted the road slushy.

This observation is supported by corpus evidence. There are no examples of unaccusative verbs followed by either a fake reflexive or a nonsubcategorized NP and a resultative phrase in the entire corpus of resultative constructions that we have been collecting over the last several years.

Within the GB framework, these facts receive an explanation in the context of Burzio's Generalization (Burzio 1986), which states that unaccusative verbs cannot assign Case (see also section 1.1). In general, unaccusative verbs contrast with unergative verbs in not being able to take any surface objects, including cognate objects. Compare the ability of unergative verbs to take cognate objects (*Louisa slept a restful sleep, Malinda smiled her most enigmatic smile*) with the inability of unaccusative verbs to take such objects (**The glass broke a crooked break*, **The actress fainted a feigned faint*). Although there is no generally accepted satisfactory explanation of Burzio's Generalization, the correlation it describes is nonetheless considered to be well established, at least in English. As discussed in B. Levin and Rappaport 1989, Burzio's Generalization is implicated in the explanation of the ungrammaticality of (20), since these structures, on the syntactic account of the resultative construction, involve two postverbal NPs at D-Structure. One of these NPs can receive Case by movement to subject position, but there is no way for the second NP to receive Case.[4]

As pointed out by Carrier and Randall (1992, in press), middles pattern with unaccusative and passive verbs in that resultative phrases can be predicated of the surface subject of a middle (*This table wipes clean easily*). They claim that this fact supports a movement analysis of middles, as proposed, for example, by Keyser and Roeper (1984), Roberts (1987), and Stroik (1992). They also note that resultative phrases can be found in adjectival passives, as in *the spun-dry clothes*. At the same time, they adopt B. Levin and Rappaport's (1986) analysis of the formation of adjectival passives that involves lexical externalization of the verb's direct internal argument. There seems to be a conflict between an analysis of adjectival passive formation that involves nonderived subjects for adjectival passives and the use of resultative phrases as a diagnostic for derived subjects. Carrier and Randall (1992) avoid this problem by claiming that adjectival passive formation creates a new adjective consisting of the adjectival passive participle and the resultative phrase (e.g., *wiped clean*) with its own argument structure. It is important, however, to point out that whether or not adjectival passives pose a problem for the DOR depends on the explanation given for the DOR. Therefore, we defer addressing this question

until note 8, that is, until after we have provided our explanation for the DOR.

2.1.5 Resultative Phrases and Obliques

The DOR also predicts that resultative phrases cannot be predicated of VP-internal NPs that are not direct objects, such as obliques. And as noted by Simpson (1983a), among others, this prediction is borne out. Consider, for example, the following contrasts:

(21) a. John loaded the wagon full with hay.
      b. *John loaded the hay into the wagon full.
          (Williams 1980:204, (2a,d))

(22) a. John was shot dead.
      b. *John was shot at dead.
          (Simpson 1983a:147, (27a,b))

(23) a. The silversmith pounded the metal flat.
      b. *The silversmith pounded on the metal flat.

The DOR, therefore, is precisely a restriction involving postverbal NPs; other VP-internal arguments cannot have resultative phrases predicated of them.

2.1.6 The Distribution of Resultative Phrases: A Summary

To summarize, this survey of resultative constructions shows that the distribution of resultative phrases can be simply characterized by the DOR together with the assumption that English has a class of unaccusative verbs.

2.2 The Syntax of the Resultative Construction

We have shown, then, that the DOR descriptively captures the basic generalizations concerning the resultative construction and accounts for the contrasting behavior of unergative and unaccusative verbs: unaccusative verbs can appear with resultative phrases without the mediation of a fake reflexive, whereas unergative verbs cannot. At this point, the DOR is merely a generalization. The success of a syntactic account of the distribution of resultative phrases depends on the extent to which the DOR can be shown not to be a mere stipulation but to follow from independently motivated principles of grammar. We offer such an explanation in

this section, after establishing certain facts about the syntax of the construction.

2.2.1   The Argument Structure of Verbs in the Resultative Construction

Besides providing an explanation for the DOR, an analysis of the resultative construction must also establish what lexical relations exist between the NPs and the predicates of the construction. In particular, it must predict when the postverbal NP is an argument of the verb and when it is not.

We noted in the previous section that unergative verbs (and unspecified object verbs) in resultative constructions can be followed by NPs that are not arguments of the verb and hence are not θ-marked. This point is illustrated in (6), repeated here as (24).

(24)   a.   I ... ruthlessly roused Mr. Contreras by knocking on his door
            until the dog barked him awake. [S. Paretsky, *Blood Shot*, 183]
       b.   You may sleep it [= the unborn baby] quiet again ... [E.
            Bagnold, *The Squire*, 285]
       c.   ... the system does not "hallucinate" arbitrary meanings into an
            expression ... [D. Stallard, "The Logical Analysis of Lexical
            Ambiguity," 184]

Evidence that the postverbal NPs are not arguments of the verb came from the ungrammaticality of sentences such as those in (7), repeated here as (25).

(25)   a.   *The dog barked him.
       b.   *You may sleep it.
       c.   *The system hallucinates meanings.

However, these sentences show that the relevant NPs are nonsubcategorized only on the assumption that the verb in the resultative construction has the same lexical representation and, in particular, the same argument structure as it has when it appears in isolation. This assumption is by no means self-evident, and it is explicitly denied in a number of analyses, including those of B. Levin and Rapoport (1988), L. Levin, Mitamura, and Mahmoud (1988), and Hoekstra (1988, 1992). The first two works cited assume that the lexical semantic representation of a verb in the resultative construction is different from that of the verb in isolation. Hoekstra's work assumes that, although the verb has the same lexical semantic representation whether or not it is found in the resultative con-

struction, it projects arguments of distinct semantic and syntactic types in the resultative construction than it does outside of it. Our analysis differs from both these types of analyses; we will discuss the differences in section 2.4.

In this section, however, we cite syntactic evidence that the lexical representation of a verb in the resultative construction does *not* differ from that of the same verb in isolation, and that the verb projects the same argument structure as it does in isolation. The evidence is drawn from Carrier and Randall's (1992, in press) extensive studies of the syntax of the resultative construction, and particularly from their (1992) evaluation of competing syntactic analyses of the construction. They show that the postverbal NP in a transitive-based resultative construction behaves like an argument of the verb, whereas the postverbal NP in an unergative-based resultative construction does not behave like an argument of the verb. This pattern is exactly what one would expect if a verb has the same lexical representation (including argument structure) in the resultative construction as it has in isolation.

Carrier and Randall (1992) examine the behavior of postverbal NPs in middle constructions, adjectival passives, and nominalizations. The postverbal NP in a resultative construction based on a transitive verb can be externalized by middle formation and adjectival passive formation, as illustrated in the (a) examples in (26) and (27), as well as by (28). This behavior contrasts with that of the postverbal NP in resultative constructions based on unergative verbs, as shown in the (b) examples in (26) and (27).[5]

(26) a. This table wipes clean easily.
         This metal pounds flat easily.
     b. *This type of pavement runs thin easily. (C&R, in press, (69a))
         *This baby ticks awake easily.
         *This teapot drinks dry in no time at all.

(27) a. a wiped-clean table
         pounded-flat metal
     b. *the run-thin pavement (C&R, in press, (73c))
         *a ticked-awake baby
         *a drunk-dry teapot

(28) The pounded-thin beef ... was so unlike the thick, chewy London broil we ate on most nights. [D. Leimbach, "Wunderbar!" 69]

The adjectival passives and middles involving resultative constructions based on unergative verbs contrast in this respect with verbal passives based on the same resultative constructions, which are fully acceptable.

(29) a. The pavement in Central Park has been run thin by all the jogging enthusiasts.
b. The baby was ticked awake by the loud clock.
c. The teapot was drunk dry by the thirsty workers.

Before we consider the consequences of these data for the analysis of the resultative construction, a comment on the status of the adjectival passive data is in order. Jackendoff (1990) disagrees with Carrier and Randall's acceptability judgments for examples of the type given in (27a), finding examples such as *a swept-clean room* and *squashed-flat grapes* "at best marginal" (1990:236) and examples such as *washed-clean clothes* and *watered-flat tulips* unacceptable. He suggests that resultative phrases cannot in general be found in adjectival passives. Other English speakers agree with his judgments. There is evidence, however, that the unacceptability of the examples in (27a) should be treated differently from that of the examples in (27b). Although some English speakers may question the acceptability of examples of this type and may not find them as good as simple adjectival passives, the examples in (27a) are significantly better than those in (27b). We attribute the less-than-perfect status of the examples in (27a) to the fact that such adjectival passives violate the Head-Final Filter (Williams 1982), since the passive participle, which is the head of the adjectival passive, is to the left of the resultative phrase. The effects of the Head-Final Filter in prenominal position can be avoided by forming an adjectival passive where the order of the resultative phrase and the passive participle is reversed, as in *a clean-shaven man* or the examples in (30).

(30) a. Judy Ryan, Grandmother's servant-girl, always had my dinner ready for me on the white-scrubbed table that stood against the wall ... [M. Laverty, *Never No More*, 15]
b. In those few undertoned words of Grandcourt's she felt as absolute a resistance as if her thin fingers had been pushing at a fast-shut iron door. [G. Eliot, *Daniel Deronda*, 311]
c. There were extensive lanes of short-cropped, fortified-green lawns ... [J. Bailey, *Bagged*, 170–71]

This is the structure that is derived when the passive participle is made into the head of a compound. It is unclear to us why this option is not

more generally available; most such structures sound unacceptable (*flat-watered tulips*).

This approach gains support from adjectival passives based on resulta-tive constructions in Icelandic. In addition to having a resultative con-struction like the English one in which an adjective is predicated of a postverbal NP, Icelandic regularly forms compound verbs with result-denoting adjectives incorporated to the left of the verb. The following examples illustrate the availability of the two options:

(31) a. Þeir máluðu húsið   hvítt.
       they painted house the white
    b. Þeir hvítmáluðu   húsið.
       they whitepainted house the

(32) a. Ég bað   þá   að mala kaffið   fínt.
       I   asked them to grind coffee the fine
    b. Þeir fínmöluðu kaffið   fyrir mig.
       they fineground coffee the for   me

As we would predict, the adjectival passives based on the compound re-sultative verbs are fine since the Head-Final Filter is not relevant here.

(33) a. Hún býr í hvítmálaða   húsinu.
       she lives in whitepainted house the
    b. Fínmalað   kaffi er betra.
       fineground coffee is better

Another way the effects of the Head-Final Filter can be avoided in English is by placing the adjectival passive in other than prehead modifier position within an NP. One such position, which is known to be a diag-nostic environment for adjectives, and hence for adjectival passives, is as the complement to verbs such as *seem, remain,* and *feel* (Wasow 1977). In this environment the Head-Final Filter is inapplicable, so that adjectives, including adjectival passives, may be followed by their complements as the syntax dictates. And in such environments, adjectival passives based on the resultative construction are impeccable when they involve transi-tive verbs.

(34) I remember feeling rubbed raw in the wake of Kent State. [M. R. Drake, "A Message from the Director," 17]

But even in such environments, where the Head-Final Filter is irrelevant, adjectival passives based on resultative constructions involving unergative verbs are still impossible.

(35) a. *The pavement looked run thin.
     b. *The insomniac remained ticked awake night after night.
     c. *The pitcher looked drunk dry.

Assuming, then, that the data involving the interaction of the resultative construction with both middles and adjectival passives are valid, these data can be used as evidence that the postverbal NP is an argument in transitive-based resultative constructions and a nonargument in unergative-based resultative constructions. Since both adjectival passive formation and middle formation can externalize only arguments, as shown for adjectival passives by Wasow (1977) and for middles by Keyser and Roeper (1984) and Carrier and Randall (1992, in press), the unacceptability of middles and adjectival passives with resultative constructions based on unergative verbs suggests that the postverbal NP in such resultative constructions is not an argument.

Carrier and Randall (1992, in press) also note the following contrasts in nominalizations, which again support differing syntactic analyses of transitive-based and unergative-based resultative constructions:

(36) The watering of tulips flat is a criminal offense in Holland.
      The Surgeon General warns against the cooking of food black.
      (C&R 1992:201, (74a))

(37) *The drinking of oneself sick is commonplace in one's freshman
       year.
      *The jogging craze has resulted in the running of a lot of pairs of
       Nikes threadbare.
      (C&R 1992:201, (74b))

As pointed out by Chomsky (1970) and Stowell (1981), the posthead NP in a nominalization cannot be marked by the preposition *of* if it is the argument of an embedded clause. Thus, the unacceptability of the nominalizations involving resultative constructions based on unergative verbs is consistent with the nonargument status of the posthead NP in such nominalizations.

Further evidence that the postverbal NP in resultative constructions based on unergative verbs is not an argument of the verb, in contrast to the corresponding NP in resultative constructions based on transitive verbs, is presented by Rothstein (1992). The argument is based on the contrasting behavior of the two types of NPs with respect to extraction from *wh*-islands. Chomsky (1986a) notes that in general extraction of a θ-marked NP from a *wh*-island results in a Subjacency violation, whereas

extraction of an NP that is not θ-marked from a *wh*-island results in a severer violation—a violation of the Empty Category Principle (ECP). Bearing this in mind, note the contrast in the acceptability of extraction from resultative constructions based on transitive and unergative verbs.

(38) a.   ?Which people do you wonder whether he punched senseless?
     b.   ?Which counter do you wonder whether the cook wiped clean?

(39) a.   ??Which pavements do you wonder whether they ran thin?
     b.   ??Which neighbors do you wonder whether the dog barked awake?

Carrier and Randall (1992) deny that there is a difference in acceptability between extractions from the two kinds of constructions; however, the fact that some speakers do detect a difference, finding extractions from the unergative-based resultative constructions worse than those from the transitive-based constructions, can be considered evidence that strengthens the point that has already been made using the other diagnostics.[6]

We will, then, make the crucial assumption that the arguments of a verb are expressed in the same way in the resultative construction as they are when the verb appears in isolation. All that the formation of a resultative construction involves is the addition of a resultative XP (and sometimes, as we discuss below, a subject for that XP). The syntactic properties of the construction should follow from this assumption and from general principles of syntax. We discuss this point and its ramifications further in section 2.2.3.

In resultative constructions based on unergative verbs, the addition of a postverbal NP is required in order that the resultative XP can satisfy the predication requirement on its head. We have been assuming that the postverbal NP is not θ-marked by the verb. We may ask, however, what the syntactic position of that NP is. In some theories, the fact that the postverbal NP in unergative-based resultative constructions is not an argument of the verb must be reflected in the syntax. If so, the NP in these instances is not a direct object, but the subject of a small clause, as schematized in (40).

(40) The dog barked [$_{SC}$ him awake].

This assumption is consistent with the claim made by Chomsky (1986a) that only an argument NP may be the sister of a verb. This move would obviously require a change in the formulation of the DOR, since on this analysis, the resultative XP, although always predicated of the postverbal

NP, is in some instances not predicated of a direct object. However, there are theories that do countenance a direct object that is not assigned a θ-role by the verb, and hence such theories do not require a small clause in these instances (see, for example, Williams 1983). Theories making extensive use of small clauses usually assume that any predication relation must be represented by a clausal structure in syntax. Since in the case of the transitive resultative constructions we are allowing a predication relation to be expressed without a syntactic clausal structure, the predication relation between the resultative phrase and the postverbal NP in the unergative construction does not force us to posit a small clause there either. Our syntactic analysis would be consistent with a theory in which the structural conditions on predication are those outlined by Williams (1983); the subject of the predicate must be outside the maximal projection of the predicate, and the two must be in a relation of mutual c-command. Such a position is taken by Carrier and Randall (1992), who give all resultative constructions a ternary-branching analysis. We will not take a stand on this issue, however, and will just stress that it is important for us that the postverbal NP is not an argument of the verb in resultative constructions based on unergative verbs, although it is in resultative constructions based on transitive verbs. (See section 2.4.1 for a discussion of the analysis presented by Hoekstra (1988, 1992), which takes all resultative constructions to be based on small clauses.) Below we will show that our explanation for the DOR is consistent with both approaches to the syntactic representation.

2.2.2 Explaining the Direct Object Restriction

Having established the lexical relations between the NPs and predicates in the resultative construction, we give our explanation of the DOR. First, however, we show that a commonly cited purely syntactic explanation of the DOR based on mutual c-command is not tenable.

It has often been argued that the DOR can be reduced to a mutual c-command requirement on predication (Williams 1980, Rothstein 1983). The argument goes as follows. Verbs impose various semantic restrictions on the resultative phrases that can appear with them (for discussion, see Carrier and Randall, in press, Rapoport 1990, Simpson 1983a, among others), and hence resultative phrases can be considered to be selected by the verb. As selected constituents, they must appear inside the VP (or perhaps inside the V′) headed by the verb. If so, resultative phrases can be predicated neither of subjects nor of objects of prepositions, since they

cannot be in a relation of mutual c-command with such constituents. Only if they are predicated of direct objects is the mutual c-command requirement met.

This argument does not go through, however, a point also discussed by Carrier and Randall (1992). The fact that a resultative phrase or some other XP inside the VP does not c-command the subject of the VP does not preclude the possibility that the XP can be predicated of the subject. Depictive phrases show precisely this property. As shown by Andrews (1982), and more recently by Rapoport (1987) and Roberts (1988), traditional constituency tests indicate that depictive phrases are inside the VP, but as noted above, depictive phrases can be predicated of subjects.[7] Therefore, another explanation for the DOR must be found.

Various syntactic tests for VP constituency such as *do so*–substitution and VP-preposing show that resultative phrases are VP-internal and are attached at the same bar level as subcategorized PPs (the (a) sentences in (41) and (42)), whether the resultative construction is headed by a transitive verb (the (b) sentences) or an unergative verb (the (c) sentences).

(41) a. *Jason put the book on the table, and Bill did so on the floor.
     b. *Bill fastened the shutters open, and May did so shut.
     c. *The joggers ran the pavement thin, and the runners did so smooth.

(42) a. *Jason said that he would put the book on the table, and put the book he did on the table.
     b. *Bill said that he would fasten the shutters open, and fasten them he did open.
     c. *The joggers thought that they would run the pavement thin, and run the pavement they did thin.

In this respect, resultative phrases contrast with depictive phrases, which do not show the same pattern of behavior as subcategorized PPs with respect to these constituency tests.

(43) Jason wiped the table tired and May did so wide awake.

(44) Jason said that he would even wipe the table tired, and wipe the table he did tired.

The behavior of resultative phrases with respect to these tests suggests that the state denoted by the resultative XP is part of the core eventuality described in the VP. In fact, as noted by many researchers (see, for example, Dowty 1979, Hoekstra 1988, 1992, Pustejovsky 1991b, Tenny 1987,

1992, Van Valin 1990), resultative phrases often derive accomplishments from activities. Accomplishments are usually analyzed as complex eventualities consisting of an activity and a state, where the activity results in the bringing about of the state (see, for example, Dowty 1979, Grimshaw and Vikner 1993, Pustejovsky 1991b). Accomplishments, then, describe causative changes of state. Although accomplishments have a complex internal structure, there are simple nonderived verbs, such as *build*, *construct*, *destroy*, and *kill*, that are accomplishments. With such verbs, the result state is lexically specified, whereas the activity that causes the result state is left unspecified. For example, consider the verb *destroy:* there are many ways to destroy something, but no matter how the destruction is accomplished, the result is that that thing no longer exists. The resultative construction differs from lexically simple accomplishments in that both the activity and the result state are lexically specified, each by a different predicate: the former by the verb and the latter by the resultative XP. For example, in *Terry wiped the table clean*, the verb *wipe* specifies the activity and the AP *clean* specifies the result state.

Resultative constructions denote a change of state even when the verb in the construction does not denote a change of state when used in isolation. Verbs of contact by impact such as *pound*, *beat*, and *hammer* illustrate this point. Sentence (45a) does not necessarily entail a change in the state of the metal; in fact, the pounding may have no effect at all on the metal. The addition of a resultative phrase, as in (45b), produces an eventuality that specifies a change in the state of the metal: it becomes flat.

(45) a. The blacksmith pounded the metal.
     b. The blacksmith pounded the metal flat.

As discussed in B. Levin and Rapoport 1988 and Rapoport 1990, this shift in *pound*'s semantic type explains why *pound* can participate in the middle alternation, which is manifested by verbs of change of state (Hale and Keyser 1986, 1987, 1988), only when accompanied by a resultative phrase.

(46) a. *Metal pounds easily.
     b. Metal pounds flat easily.

As is well known, the NP that denotes an entity that changes state is always expressed as a direct object. This generalization is often formalized in a linking rule that states that arguments bearing the patient or theme semantic roles—the semantic roles typically associated with such NPs—are expressed as direct objects (Anderson 1977, Marantz 1984, among

others). We can assume that this linking rule applies to the NP denoting the entity that undergoes the change of state in a resultative construction as well. The linking rule could take one of the two forms in (47). (This linking rule is really a subcase of the Directed Change Linking Rule, which we formulate in section 4.1.2.)

(47) *The Change-of-State Linking Rule*
Version (a): An NP that refers to the entity that undergoes the change of state in the eventuality described in the VP must be governed by the verb heading the VP.
Version (b): An NP that refers to the entity that undergoes the change of state in the eventuality described in the VP must be the direct object of the verb heading the VP.

As we mentioned earlier, it is not important for our purposes whether the postverbal NP in unergative resultative constructions is a direct object or the subject of a small clause. Depending on which option turns out to be correct, the rule could be formulated to make reference either to the NP governed by the verb, as in version (a), or to the direct object of the verb, as in version (b). The version (a) formulation will be necessary if the postverbal NP in a resultative construction based on an unergative verb is not the direct object of the verb, but the subject of a small clause. Both direct objects of verbs and subjects of postverbal small clauses are governed by the verb. Throughout this section our discussion takes both versions of the linking rule into account.

If this linking rule is correct, then it is clear why resultative phrases can only be predicated of direct objects or NPs governed by the verb. Resultative phrases specify the state that is brought about as the result of the action described in the VP. Following our assumption that the expression of a verb's arguments does not change with the addition of a resultative XP, then each resultative construction must simultaneously meet two requirements on argument expression: the verb's arguments must be expressed according to the lexical specifications of the verb and in accordance with the general linking rules, and the NP denoting the entity that changes state must be the verb's direct object or governed by the verb.[8] In addition, this NP must be in the appropriate structural relation—presumably mutual c-command—with the resultative XP.

The transitive-based resultative construction *Terry wiped the table clean* meets all the requirements: the arguments of *wipe* are appropriately expressed according to the linking rules, *Terry* as subject and *the table* as

direct object, and *clean* is predicated of the direct object, satisfying the mutual c-command relation on predication. This example cannot receive the interpretation 'Terry became clean as a result of wiping the table', because, under that interpretation, the argument of *wipe* denoting the entity undergoing the change of state is not governed by the verb.

The same analysis applies to resultative constructions based on unaccusative verbs, such as *The door rolled open*. Assuming the unaccusative analysis of *roll* (see chapter 4), the argument of the verb is appropriately expressed as a D-Structure object and an S-Structure subject. The resultative phrase *open* predicates a change of state of *the door*, which as a D-Structure object is governed by the verb, satisfying either version of the Change-of-State Linking Rule. If the single argument of an unaccusative verb were a D-Structure subject, then this argument would not meet the requirement that the argument undergoing a change of state be a direct object or governed by the verb. For the same reasons, since the single argument of an unergative verb is a D-Structure subject, the Change-of-State Linking Rule would be violated if a resultative phrase were predicated of this argument directly.

Thus, if nothing more is added to the grammar of English, we would assume that resultative phrases cannot be added to unergative verbs. In fact, according to Doron (1991), this is the situation in Modern Hebrew. As the sentences in (48) show, a resultative phrase can be added to unaccusative verbs and passive verbs, but, as shown in (49), not to unergative verbs.

(48) a. Ha-kad nišbar le-xatixot.
         the-vase broke to-pieces
         'The vase broke to pieces.'
     b. Moše huka   la-mavet.
         Moshe was beaten to the-death
         'Moshe was beaten to death.'

(49) a. *Ha-cevaot nilxemu le-xatixot.
          the-armies fought   to-pieces
          'The armies fought each other to pieces.'
     b. *Rina raca la-mavet.
          Rina ran to the-death
          'Rina ran herself to death.'

However, English (and, as reported by Hoekstra (1988), Dutch as well) allows unergative verbs to be followed by a resultative phrase that expresses a change of state in an entity denoted by an NP that is not an

argument of the verb. That is, English allows resultative constructions of the form in (50).

(50) The joggers ran the pavement thin.

A resultative construction based on an unergative verb, such as that in (50), meets all the syntactic requirements on the construction. The single argument of the verb is expressed appropriately, and the NP that denotes the entity undergoing a change of state is either the direct object of the verb or (if the analysis where this NP is the subject of a small clause is adopted) at least governed by the verb, as required by the Change-of-State Linking Rule. This NP is also a sister of the resultative phrase that is predicated of it, so that the predication requirement is satisfied. Finally, since this NP is governed by the verb, it can also be assigned Case by the verb.

Once structures such as these are allowed by the grammar, then structures with fake reflexives are immediately allowed as well. The only difference between a resultative construction with a fake reflexive and structures such as (50) is that in the former, but not in the latter, the nonsubcategorized NP is coreferential with the matrix subject. With either the direct object analysis of the postverbal NP or the small clause analysis, the postverbal NP, being coreferential with the matrix subject and also governed by the verb, is expressed as a reflexive. However, nonsubcategorized NPs, as illustrated in (20), will not be available for resultative constructions based on unaccusative verbs. This property is explained, as mentioned in section 2.1.4, by the Case-assigning properties of unaccusative verbs.

On this analysis, the fake reflexive is not a pleonastic element introduced simply to ensure that in some narrow sense the DOR is satisfied. It functions as a "subject" for the predicate heading the resultative phrase. Its introduction is forced by the Change-of-State Linking Rule, because without it the resultative phrase would not be predicated of an element to which the linking rule could apply. (Presumably the Change-of-State Linking Rule could not force the appearance of a pleonastic element.) At the same time it allows the predicate to meet the linking rule without any change in the verb's lexical properties. (Body part objects fulfill the same function.)

2.2.3 Ramifications

The analysis just presented is based on the assumption that the lexical representation of a verb, and hence the way it maps its arguments to the

syntax, does not change when the verb is in a resultative construction. Given this assumption, the resultative phrase on our account is not licensed by the lexical representation of the verb. Rather, the interpretation of the resultative construction is compositionally derived: specifically, it is derived from the meaning of the verb plus that of the resultative XP.[9] The only additional aspect of meaning associated with the resultative construction that is not explicitly represented in the syntax is the causal relation between the action described by the verb and the state denoted by the resultative XP, to which we return immediately. Therefore, since the verb and the resultative phrase are expressed as distinct predicates, and the meaning of neither changes, the null hypothesis would postulate no change in lexical representation. Since the predicates are distinct constituents in syntax, each imposes its own requirements on the expression of its arguments. To make this point somewhat differently, a language learner knows not to postulate a different lexical representation for the verb in the resultative construction precisely because the resultative construction is interpreted compositionally.

Support for this hypothesis comes from phenomena that at first glance appear to pose a problem for the approach developed here. In chapter 5 we will show that the syntax of some verbs *does* change in the resultative construction. But it turns out that this happens only when there is independent evidence that the verbs have a dual classification, that is, when there is an independent lexical rule that allows the verbs to be associated with more than one syntactic configuration. In effect, this is evidence that the resultative construction does make use of independently existing lexical entries. See chapter 5 for illustration of this point.

As just mentioned, the causal relation between the eventuality described by the verb and the result state must be accounted for. That is, in *Terry wiped the table clean* the fact that the clean state of the table is a *result* of Terry's wiping the table must be derived. In addition, the derived change-of-state reading for verbs such as *pound, hammer*, and *roll* in the resultative construction must be accounted for. We offer the following analysis. The resultative XP must be licensed and integrated into the semantic representation of the sentence. If the resultative XP is added at the lowest bar level within the VP, then it must be integrated into the core eventuality named by the verb. There is a limited ontological typology of eventuality types. The only type of eventuality with a state following any kind of process is an accomplishment. As we have already shown, accomplishments always describe causative changes of state. Therefore, an XP

denoting a state that follows an activity verb can only be interpreted as denoting the result state of an accomplishment. The causal relation between the activity and the change of state follows from the interpretation of the eventuality as an accomplishment. If the resultative XP is added to a verb that is already an achievement or an accomplishment, then, once again, given the typology of basic eventuality types, it can only be interpreted as further specifying an already encoded change of state (see section 2.3.2). The analysis falls out from the natural assumption that the eventualities created by the composition of predicates can only belong to types for which there are underived lexical items. As mentioned above, the event type of *wipe the table clean* is essentially the same as the event type of *build a house*. A similar account is offered by Pustejovsky (1991b), who draws on earlier versions of this work.

These suggestions answer the question of how the resultative phrase is interpreted, although it is not projected from the lexical representation of the verb. We now turn to the question of how the resultative phrase is syntactically licensed. This question must be asked since on our analysis it is not the Projection Principle that licenses the phrase. Here, we extend to the resultative construction a suggestion made by Rapoport (1991) concerning the licensing of depictives. Rapoport suggests that the syntactic licensing of depictives involves identifying two event positions: (i) the event position in the argument structure of the verb whose argument the depictive is predicated of and (ii) the event position in the argument structure of the head of the depictive phrase. This identification ensures the proper semantic interpretation of the depictive. As support for this account, Rapoport points out that only stage-level verbs are found with depictives, and also that only stage-level adjectives can be used to head depictives; according to Kratzer (1989), only stage-level predicates have argument structures with an event position. As also noted by Hoekstra (1992) and Rapoport (1990), similar constraints apply to the resultative construction: stative verbs—a class that subsumes individual-level verbs —are not found in this construction (see section 2.3.3), and the resultative phrase cannot be headed by an individual-level predicate (*The witch frightened the children intelligent*), suggesting that Rapoport's account can be extended to the resultative construction.[10]

2.3 Semantic Restrictions on the Resultative Construction

We turn next to certain semantic restrictions on the resultative construction. The DOR or its reformulation in terms of the Change-of-State

Linking Rule would lead us to expect that resultative phrases should be able to appear with all unaccusative verbs, since the S-Structure subject of these verbs is an underlying direct object. However, resultative phrases are not compatible with all unaccusative verbs. We argue that the Change-of-State Linking Rule imposes a necessary, but not a sufficient, condition on resultative constructions, and that there are independently motivated semantic restrictions that prevent resultative phrases from occurring with certain unaccusative verbs. This point is important methodologically, since, as mentioned in chapter 1, the fact that not all unaccusative verbs uniformly pass all unaccusative tests has been taken by some as evidence undermining the Unaccusative Hypothesis. We discuss in turn the two classes of unaccusative verbs that may not appear with resultative phrases: stative verbs such as *remain* and verbs of inherently directed motion such as *come*, *go*, and *arrive*. Although such verbs may be found with XPs inside the VPs they head, these XPs may only be interpreted as depictive phrases. Sentence (51a) cannot mean that Carla became bored by remaining in the country, and (51b) cannot mean that Willa became breathless as a result of arriving.

(51) a. Carla remained in the country bored.
     b. Willa arrived breathless.

2.3.1 Resultative Phrases as Delimiters

The restriction on resultative phrases with unaccusative verbs of inherently directed motion such as *come*, *go*, and *arrive* can be understood in the context of the function of resultative phrases as delimiters, in conjunction with Tenny's (1987, 1992) Aspectual Principles of Argument Structure.

Aspectual classifications of eventualities distinguish between *telic* (*delimited* in Tenny's terminology, which we adopt) eventualities—those that are bounded in time—and *atelic* (*nondelimited*) eventualities—those with no specific temporal delimitation (Declerck 1979, Dowty 1979, among others). Some verbs such as *break*, *ripen*, *build*, and *devour* describe eventualities that are inherently delimited. Brinton (1988:26) describes a delimited (telic) eventuality as

one which necessarily includes a goal, aim, or conclusion. The goal is an inherent part of the situation, without which the situation could not be what it is. Thus, a telic situation, such as fruit ripening, necessarily implies a final state of ripeness; if that end state is not attained, then the fruit cannot be said to have ripened. If the fruit is eaten before it is ripe, then the process of ripening is terminated rather than concluded.

A delimited eventuality can be differentiated from a nondelimited one by a variety of tests. For instance, a nondelimited, but not a delimited, eventuality can occur with durative phrases.

(52)   Sylvia ran for an hour.

(53)   *Karen built the house for an hour.

As pointed out in the literature on verbal aspect (Declerck 1979, Dowty 1979, among others), there are various syntactic processes that serve to produce delimited eventualities involving verbs that are inherently activity verbs and would otherwise name nondelimited eventualities. If the verb in a sentence does not describe an inherently delimited eventuality, then some verbs allow the eventuality to be delimited (i) by a particular choice of direct object, or (ii) by an appropriate choice of XP internal to the VP. We illustrate the first possibility with verbs of consumption and creation, which Dowty (1991) describes as verbs with incremental themes, and the second with goal phrases and resultative phrases.

Verbs of consumption such as *eat* and *drink* and verbs of creation such as *paint* and *knit* describe nondelimited activities, as indicated by their ability to cooccur with durative phrases.

(54)   Patricia ate (grapes) for an hour.

When the direct object of these verbs is an NP that denotes a specific quantity, as in (55), the eventuality described becomes delimited, as indicated by the sentence's compatibility with a nondurative time adverbial.

(55)   Patricia ate a bunch of grapes in/*for an hour.

Sometimes the direct object does not serve to delimit the eventuality, but some other constituent inside the VP—for example, a PP—does. This situation holds with verbs of exerting force, such as *push* and *pull*.

(56)   a. Martha pushed the cart.
       b. Martha pushed the cart to the shed.

The eventuality in (56a) is nondelimited, whereas the addition of the PP in (b) provides an endpoint, thus delimiting the eventuality.

Resultative phrases resemble the goal phrases found with verbs like *push* and *pull*, in that they too serve to delimit an eventuality; in fact, this insight might be behind L. Levin and Simpson's (1981) analysis of both *to* phrases and resultative phrases as goals. Most resultative phrases do not specify an achieved location but rather specify an achieved state. The

delimiting function of resultative phrases can be seen by examining the effect of adding a resultative phrase to a sentence that in the absence of such a phrase may receive a nondelimited interpretation. This property is observed in sentences with verbs such as *wipe*, as illustrated in (57a), where both the delimited and nondelimited interpretations are available in the absence of an explicit delimiter. But the addition of a resultative phrase affects the interpretation: (57b), in contrast to (57a), has only a delimited interpretation.

(57) a. The waiter wiped the table (in/for two minutes).
     b. The waiter wiped the table dry (in/*for two minutes).

With verbs that are lexically delimited, the resultative phrase provides a further specification of the achieved state, as in sentences like *The river froze solid* and *The climbers froze to death*.

2.3.2 The Incompatibility of Resultative Phrases with Verbs of Inherently Directed Motion

We return now to the question of the incompatibility of resultative phrases with verbs of inherently directed motion. Verbs of inherently directed motion are achievement verbs; they specify an achieved endpoint—an attained location. Tenny suggests that an eventuality may have only one delimitation: "There may be at most one 'delimiting' associated with a verb phrase" (1987:190).[11] This is a grammatical constraint, since there is nothing incoherent in a proposition such as *Willa became breathless as a result of arriving*, which is what a resultative interpretation of (51b), repeated as (58), would be intended to convey.

(58) Willa arrived breathless.

As mentioned earlier, the delimitation of an eventuality in a sentence may be a consequence of the meaning of the verb in the sentence, if the verb is inherently delimited, or the eventuality may be explicitly delimited through the use of a PP or other XP that functions as a delimiter. Given that verbs of inherently directed motion are lexically delimited, since their meaning involves an achieved change of location, they may not take a second syntactically encoded delimiter specifying a change of state. Thus, these verbs can appear with goal phrases only if they serve to specify further the endpoint inherent in the verb's meaning, as in (59).

(59) We arrived at the airport.

Support for this approach comes from verbs of manner of motion such as *run*, *swim*, and *walk*. These verbs, which do not describe inherently delimited eventualities, can appear with resultative phrases, but only in the absence of a goal phrase, a restriction that arises because both types of phrases act as delimiters.

(60) a.   We ran the soles off our shoes.
     b.   *We ran the soles off our shoes into the town. (meaning: we
          wore our soles down as a result of running into town)

Additional support comes from the incompatibility of resultative phrases with transitive verbs such as *bring* and *take*, whose meanings, like those of the verbs of inherently directed motion, involve an inherently specified direction (Simpson 1983a). Like the verbs of inherently directed motion, these verbs allow only a depictive interpretation of an XP.

(61) *Sharon took/brought Willa breathless.

Still more support derives from the contrast in behavior with respect to the resultative construction between verbs of inherently directed motion and a second class of unaccusative achievement verbs, verbs of change of state such as *break* in their intransitive use, as in *The window broke*. The verb of change of state *break*, like the verb *arrive*, is lexically delimited; however, unlike *arrive, break* describes the attainment of a state, not the attainment of a location. Despite the lexical delimitation, *break* can occur with a resultative phrase.

(62) The bottle broke open.

The resultative phrase in (62) can be seen as a further specification of the inherent state that is part of *break*'s meaning, in the sense that something can break without breaking open, so that breaking open is a very specific type of breaking, which contrasts, for example, with breaking apart. The resultative phrase in (62), then, does not describe a second result state in addition to the state inherently specified by *break;* therefore, it is not prohibited from occurring with the verb.[12]

The XP found with a verb of inherently directed motion can sometimes be understood as specifying an achieved state, as in (63), but when the XP receives this interpretation, the verb no longer describes physical displacement, and the construction is no longer a resultative construction. That is, (63) does not mean 'the child came to be asleep/silent as a result of a change of position'; rather, it simply means that 'the child came to be asleep/silent'.

(63) The child fell asleep/silent.

It appears that the component of meaning in the verb that is incompatible with the change of state has been lost, and only the notion of achievement inherent in the meaning of the verb is preserved; that is, the verb means something like 'become' or 'come to be', with the XP specifying the achieved state. An XP can be understood as specifying an achieved state with a verb of inherently directed motion if the verb loses its motion sense, as the prohibition against two delimitations suggests. To cite another example, a sentence such as *The letter came open* is only two-ways ambiguous. It can mean either 'the letter arrived without having been sealed', where the AP receives a depictive interpretation, or 'the letter came to be unsealed', where the AP is interpreted as an achieved state. This sentence cannot receive the interpretation that would have been expected if it involved a resultative construction: it cannot mean 'the letter became unsealed as a result of coming'. That is, *open* cannot be understood as a delimiter, if *come* retains its displacement sense.

An example cited by A. Goldberg (1991), *We broke the walnuts into the bowl* (Goldberg's (41)), poses a potential problem for the claim that there may be at most one delimiter per clause, as do the similar examples in (64).

(64) a. The cook cracked the eggs into the glass.
      b. Daphne shelled the peas onto the plate.

These examples describe both a change of state and a change of location. However, the noun heading the postverbal NP in these examples is of a very special type. The noun *walnut* can refer to the nut as a whole (i.e., both the nutshell and the nutmeat) or to the nutmeat alone; the nouns *egg* and *peas* also have two senses showing a similar relation. In Goldberg's example, the nut is broken (a change of state) and the nutmeat goes into the bowl (a change of location). This suggests that the restriction may be that only one change per entity may be expressed in a single clause. In most instances, this amounts to a restriction of one change per clause, because the entity that undergoes the change must be expressed as the direct object. There is no way to predicate a change of more than one entity, since only one argument can be expressed as a direct object. In the examples under discussion here, the NP can be understood to refer "inherently" to two entities, each of which can have a change predicated of it. We assume that examples such as *slice the mushrooms into the bowl*, which might appear problematic since mushrooms differ from peas, eggs,

and nuts in not having a shell and contents, should actually be handled in the same way, in that the noun *mushrooms* can be used to refer to the whole mushrooms or to the cut-up mushrooms. NPs that do not have this property cannot appear in this kind of resultative construction (*I broke the mirror into the garbage pail*); that is, pieces of a mirror are not generally referred to as "mirrors." Goldberg makes the interesting point that the verbs that appear in these kinds of sentences all describe changes of state that are typically accompanied by a change in position. A similar analysis can be applied to a type of example discussed by Parsons (1990), *I emptied the tank into the sink*, where, as discussed by Apresjan (1973, 1992), Ostler and Atkins (1991), and others, container nouns such as *tank* regularly refer to both the container and its contents.

2.3.3 Resultative Phrases and Stative Unaccusative Verbs

The incompatibility of resultative phrases with stative unaccusative verbs such as *remain* is subsumed under the more general fact that resultative phrases are incompatible with all statives, whether expressed by transitive or unaccusative verbs, as pointed out by Carrier and Randall (in press) and Hoekstra (1992).

(65) a. *The appraisers felt the rug threadbare through their shoes.
     b. *The botanist smelled the moss dry from across the room.
        (C&R, in press, (255b,c))

(66) a. *The Loch Ness monster appeared famous.
     b. *The POWs survived into frustration.
        (C&R, in press, (257))

The postverbal AP in (65b) cannot be interpreted as a resultative phrase; that is, the interpretation where the smelling actually dries out the moss is unavailable. Compare this example to the identical example where the verb has been replaced by *sniff*—a nonstative verb of perception using the sense of smell.

(67) The botanist sniffed the moss dry. (C&R, in press, (256c))

We attribute the absence of such resultative constructions to the typology of ontological categories of eventualities: there is no such eventuality type as a delimited state. In Vendler's (1957) classification of eventuality types, as well as in the subsequent classifications based on his work, there are two categories of delimited eventualities: accomplishments and

achievements. Both of these are nonstative. There is also a systematic relation between activities and accomplishments, in that accomplishments are merely delimited activities. In English there appears to be a productive relation between activities and accomplishments. For almost any activity, a corresponding accomplishment can be formed. Resultative formation can be seen as an instance of this strategy. The addition of a resultative phrase can be used to map an activity into an accomplishment. However, since there is no eventuality type of delimited state, resultative phrases cannot be used to create eventualities of this type from stative verbs.

2.4   Alternative Accounts of the Resultative Construction

The salient features of our analysis are that the DOR is given a quasi-syntactic explanation, with unaccusativity being represented syntactically, and that the arguments of verbs are projected in the resultative construction in the same way as they are when the verb is found in isolation. In this section we compare our account with accounts that differ in both respects. First, we compare our account with one that, although it also assumes unaccusativity is syntactically represented, also assumes the arguments of the verb are projected differently in the resultative construction. Then, we compare our syntactic account with a number of accounts that are purely semantic in that they do not appeal to the syntactic properties of unaccusative verbs in order to explain the difference between the behavior of unaccusative and unergative verbs in the resultative construction.

2.4.1 A Comparison with Hoekstra's Account
In sections 2.2.2 and 2.2.3 we provided a syntactic explanation for why the DOR holds and showed that our proposal has interesting ramifications for the nature of lexical representation. Here we compare our explanation of the DOR with the rather different syntactic explanation presented by Hoekstra (1988, 1992). Hoekstra's account assumes a uniform syntactic structure for all resultative constructions independent of the type of verb; thus, it rejects the central assumption in our account, that the verb in the resultative construction projects its arguments in exactly the same way as it does when it is in isolation. Although either position could potentially be correct, we will show that the syntactic properties of the resultative construction favor our approach over Hoekstra's. In addition, we will argue that the examples that appear to support Hoekstra's uniform structure assumption are actually not instances of the resultative construction.

The central feature of Hoekstra's analysis is the assumption that the resultative phrase and the NP that it is predicated of always form a small clause no matter what type of verb is found in the resultative construction. This approach is consistent with the theory first put forth by Stowell (1981)—but challenged by others (see, for example, Williams 1983, Schein 1982, Rothstein 1983, Rapoport 1987, Carrier and Randall 1992)—that the predication relation is always encoded syntactically in a clausal structure. In Hoekstra's account, most of the syntactic properties of the resultative construction are reduced to properties of the small clause structure assigned to these constructions. (Semantic constraints on the construction are generally reduced to aspectual properties as they are in our account.)

Consider first constructions based on transitive or intransitive unergative verbs, which, as illustrated in (68), are given identical structures.

(68) a. Terry [$_{VP}$ wiped [$_{SC}$ the table clean]].
   b. She [$_{VP}$ slept [$_{SC}$ her wrinkles away]].

In this account, the crucial property of the small clause in both instances is that it is L-marked by the verb in the terminology of Chomsky (1986a). Since the small clause denotes the state resulting from the activity described by the verb, it serves to delimit the eventuality described by the VP. The delimiting function of the small clause is what licenses its appearance in the sentence, and also what allows the relation between the verb and the small clause to be one of L-marking. Since the small clause is L-marked, it is transparent to government, allowing the subject of the small clause to be either a lexical NP, as it is in (68a–b), or an NP-trace, as it is when the verb in the construction is a passive or unaccusative verb.

(69) a. The table$_i$ was [$_{VP}$ wiped [$_{SC}$ t_i clean]].
   b. The gate$_i$ [$_{VP}$ swung [$_{SC}$ t_i open]].

The inability of resultative phrases to be predicated directly of unergative verb subjects follows from the assumption that even in such instances the resultative phrase would have to be part of a postverbal small clause. Since small clauses must have subjects and since the single argument of an unergative verb will not qualify, a PRO must be introduced as the subject of the small clause. The single argument of the unergative verb—its subject—would presumably control the interpretation of this PRO, giving rise to the intended interpretation. This structure is schematized in (70).

(70) *Dora$_i$ [$_{VP}$ talked [$_{SC}$ PRO$_i$ hoarse]].

This structure is unacceptable because the small clause is governed by the verb, but PRO is precluded from appearing in this position by the PRO Theorem (Chomsky 1981). The use of a fake reflexive in resultative constructions based on unergative verbs allows this problem to be circumvented.[13]

In Hoekstra's approach to the resultative construction, transitive verbs do not project their arguments in the resultative construction in the same way as they do when they appear in isolation, since in the resultative construction, they appear without an NP direct object, selecting a small clause instead, as shown in (68a). Hoekstra tries to motivate this analysis by claiming that all activity verbs—and many transitive verbs found in the resultative construction are activity verbs (e.g., *pound* and *wipe*)—can become accomplishments by the appropriate projection of arguments. In particular, activity verbs have the option of projecting a small clause that denotes a state resulting from the activity; this small clause delimits the activity described by the verb, turning it into an accomplishment.

This solution, however, runs into problems precisely because, as we showed in section 2.2.1, the facts seem to indicate that verbs project their arguments in the resultative construction in the same way as they do in isolation. So, for example, the fact that resultative constructions based on transitive and intransitive verbs differ with respect to middle formation, adjectival passive formation, nominalization, and extraction, as noted in section 2.2.1, receives no explanation on Hoekstra's account. Stated in a slightly different way, Hoekstra's analysis essentially claims that the postverbal NP in a resultative construction based on a transitive verb is not an argument of the verb. As Carrier and Randall (1992) stress, this analysis is therefore unable to account for the fact that in (68a), for example, the table becomes clean as a result of Terry's wiping the table itself, and not as the result of her wiping something other than the table. Contrast the interpretation of such transitive-based resultative constructions with that of constructions based on unergative intransitive verbs, where the postverbal NP has a greater degree of freedom in interpretation. As we showed in section 2.1.2, the postverbal NP in the latter may correspond to an argument of the verb loosely speaking, as in examples such as (6a), repeated here as (71), which Jackendoff (1990), among others, would take to be related to *The dog barked at him*.

(71) I ... ruthlessly roused Mr. Contreras by knocking on his door until the dog barked him awake. [S. Paretsky, *Blood Shot*, 183]

But there are also examples of such resultative constructions where the postverbal NP cannot be taken to be a participant in the event that the verb denotes on its own; one such case is (6c), repeated here as (72).

(72) ... the system does not "hallucinate" arbitrary meanings into an expression ... [D. Stallard, "The Logical Analysis of Lexical Ambiguity," 184]

As mentioned in section 2.2.2, our analysis makes a different prediction: the postverbal NP following a transitive verb needs to correspond to the regular direct object of the verb. The only exception is when the verb independently allows intransitive uses because it permits unspecified objects, as in (10c), repeated here.

(73) Having ... drunk the teapot dry ... [E. Dark, *Lantana Lane*, 94]

However, Hoekstra cites some examples that do not conform to this prediction, including those listed in (74).

(74) a. He washed the soap out of his eyes. (Hoekstra 1988:116, (35a))
         (cf. *He washed the soap.)
         (cf. *He washed—acceptable on wrong interpretation)
     b. He shaved his hair off. (Hoekstra 1988:116, (35b))
         (cf. *He shaved his hair.)
         (cf. *He shaved—acceptable on wrong interpretation)
     c. He rubbed the tiredness out of his eyes. (Hoekstra 1988:116, (35d))
         (cf. *He rubbed the tiredness./*He rubbed.)

Additional similar examples can be constructed.

(75) a. The weaver rinsed the dye out of the material.
         (cf. *The weaver rinsed (the dye).)
     b. The builder scraped the putty off the window frames.
         (cf. *The builder scraped (the putty)—acceptable on wrong interpretation)
     c. Sylvia filed the serial number off. (B. Levin and Rapoport 1988:276, (3a))
         (cf. *Sylvia filed (the serial number)—acceptable on wrong interpretation)

Hoekstra takes such examples to be representative of resultative constructions based on transitive verbs and formulates his analysis so that it can account for them. The consequence is that he is unable to account for the

data that do not conform to this pattern—the data suggesting that the postverbal NP in transitive constructions is an argument of the verb. Since we take these other examples to be representative of the nature of the construction and have built our analysis on the pattern they suggest, it is incumbent upon us to provide an explanation for the examples that suggest that the postverbal NP in a transitive-based resultative construction need not be an argument of the verb.

Our claim is that these problematic examples, which we will refer to as the *wash* sentences, should not be considered instances of the resultative construction. Rather, they involve an alternate projection of the arguments of certain verbs into the syntax that comes about because verbs from a variety of semantic classes (usually, but not exclusively, verbs of contact through motion such as *wipe* and *rub*) can also become verbs of removal, a phenomenon we describe in detail in B. Levin and Rappaport Hovav 1991.[14] This is an instance of the more general phenomenon of meaning shifts described at greater length in chapter 5. We must, however, show that there is a principled reason for assuming that the *wash* sentences require a different treatment, since otherwise our argument is vacuous. We would be claiming that since there is an alternative analysis for the examples that do not conform to the predictions of our theory, there is no way to come up with counterexamples to our theory. It is not simply sufficient to claim that the *wash* sentences can receive an alternative analysis; we must also show that there is good reason to favor this analysis.

As evidence that the *wash* sentences are not instances of the resultative construction, we will show not only that the phenomenon is restricted in scope, but also that it is possible to delimit its scope rather precisely. To begin with, all the *wash* sentences involve a verb-of-removal interpretation. In all the relevant examples the purported resultative phrase is a PP describing the location that something is removed from; it is never an AP: **I washed the soap slippery*, **I filed my parents edgy*. Furthermore, the object of the preposition in each instance is an NP that would otherwise be the "normal" direct object of the verb. For example, the NP *his eyes* bears roughly the same semantic relation to the verb in both *He washed the soap out of his eyes*, where it is the object of a preposition, and *He washed his eyes*, where it is the direct object. These properties of the problematic transitive examples are in striking contrast with the resultative constructions based on unergative or unspecified object verbs, where the resultative phrase can be either an AP or a PP, as shown in (76), and,

if it is a PP, the object of the preposition does not have to correspond to anything that is normally considered an argument of the verb, as shown in (77).

(76) a. The clock ticked the baby awake.
     b. The phone rang me out of my slumber.

(77) a. The phone rang me out of my slumber.
       (cf. *The phone rang my slumber.)
     b. The system doesn't hallucinate meanings into the text.
       (cf. *The system doesn't hallucinate the text.)

In fact, it is likely that the *wash* sentences must include a PP since that is the only way to "bring in" the original object of the verb. If the original object is not actually present, as in *She washed the soap out*, then, as in this example, it is implied. In fact, the verbs found in the *wash* sentences cannot be found in resultative constructions that do not meet these properties.

(78) *Phil rubbed the cloth dirty. (on the interpretation where Phil
      causes the cloth to become dirty by rubbing things with it)

Our suggestion is that the verbs in the *wash* sentences have indeed undergone a meaning shift, becoming verbs of removal, and they therefore project their arguments differently. Thus, these verbs qualify as variable behavior verbs in the sense introduced in section 1.2.1 (see also the further discussion in section 5.1). The pattern of argument expression exhibited by these verbs is associated with the class of *wipe* verbs in B. Levin and Rappaport Hovav 1991; in fact, many of the verbs in the *wash* sentences are included on the list of members of the *wipe* verb class. In that paper we analyze the alternative expression of arguments shown by the *wipe* verbs, and we argue that it reflects a meaning shift, with the alternative argument expressions arising from the expression of arguments typical of each meaning. For instance, we suggest there that the verb *scrape* has undergone a meaning shift in the purported resultative sentence (75b), from a verb of contact through motion to a verb of removal by contact, an analysis for which we provide independent support.

These properties also correlate with the very important fact that the postverbal NP in the *wash* sentences *can* be the derived subject of the related middle, suggesting that the NPs are in fact arguments of the verb.

(79) This dye rinses/washes out easily.

It can also become the external argument of an adjectival passive.

(80) a. the rinsed-out/washed-out soap
      b. All the soap seemed washed out of my hair.

On the basis of the properties discussed here, it appears that the post-verbal NP in these examples is indeed an argument of the verb, and that in these instances the verb does have more than one option of projecting its arguments. The striking differences between these constructions and true resultative constructions based on unergative verbs suggest that these constructions were wrongly included among the resultative constructions and that there are therefore no instances of resultative constructions based on transitive verbs where the postverbal NP is not an argument of the verb. If so, we can maintain our assumption that the verb retains its argument structure in the resultative construction and that a uniform syntactic analysis of all resultative constructions, such as the one Hoekstra suggests, is unwarranted.

Before ending this section, we would like to address one more type of evidence that Hoekstra cites as favoring his analysis. Following Kayne (1984), Hoekstra suggests that the small clause analysis of the resultative construction receives support from so-called Subject Condition effects. *Subject Condition effect* is the name given to the unacceptability that typically results when a subpart of a constituent in subject position is extracted (Chomsky 1973). The following examples illustrate this effect:

(81) a. *Who$_i$ would [[for John to visit t_i] bother you]?
      b.   Who$_i$ would it bother you [for John to visit t_i]?
           (Stowell 1991:191, (22a–b))

Subject Condition effects associated with extractions from a postverbal NP have often been taken as evidence for a postverbal small clause, as in (82); it is for this reason that such effects are of interest in studies of the resultative construction.

(82) ??Which politician$_i$ do you consider [$_{SC}$ [the book about t_i]
      scandalous]?

As Stowell points out, although Subject Condition effects may be an indication that a postverbal NP is the subject of a small clause, depending on the explanation given for the Subject Condition effects themselves, they may also merely indicate that a postverbal NP is not L-marked by the verb unless it is the subject of a small clause. This second option of course depends in part on which theory of the syntactic encoding of the predication relation is adopted. In any event, on our analysis of the resultative

construction, the postverbal NP in a resultative construction based on a transitive verb is not the subject of a small clause, nor is it not L-marked by the verb. Therefore, if a Subject Condition effect associated with a postverbal NP is a valid diagnostic for nonargument status and if this effect shows up in all resultative constructions, we would have to provide an explanation.

Acceptability judgments involving extractions intended to test for the Subject Condition effect in resultative constructions are not all that clear. In soliciting such judgments, we have found a clear preference for extractions out of transitive-based resultative constructions over those out of unergative-based resultative constructions.

(83) a. Which tables did you wipe the tops of clean?
     b. Which gang did you shoot the leader of dead?

(84) a. ?Which shoes did you run the soles of thin?
     b. *Which man did the dog bark the neighbors of awake?

This pattern would seem to indicate that, consistent with the analysis we have been developing, the postverbal NP is an argument of the verb in the resultative construction only if it is an argument of the verb in isolation. However, Carrier and Randall (1992) present a different set of judgments, claiming that there is no distinction in acceptability in the two types of resultative constructions. Therefore, since the judgments in these instances do not yield clear results and since the rest of the evidence conforms to our analysis, we do not take the purported Subject Condition effects to argue against our analysis. If the judgments we have solicited reflect a general pattern, it is likely that the Subject Condition effects actually support our analysis.

2.4.2 Semantic Accounts

Some researchers have argued for a purely semantic account of the distribution of resultative phrases rather than the mixed syntactic/semantic account we have presented here. In this section we review and discuss three semantic analyses of the resultative construction. One explains the DOR by appeal to aspectual notions, a second appeals to notions of thematic roles, and the third essentially stipulates the DOR. We then show that the mixed syntactic/semantic analysis presented here is better equipped to describe and explain the range of data associated with the resultative construction than these alternatives.

2.4.2.1 Van Valin's Aspectual Account As mentioned in chapter 1, Van Valin (1990) claims that all unaccusative diagnostics can receive a semantic explanation. Within the context of this general assertion, he provides an account of the resultative construction in terms of Aktionsart—lexical aspect. This account is supposed to explain the difference in behavior of unaccusative and unergative verbs without attributing different syntactic representations to the two kinds of verbs. As should be clear from our analysis in the previous section, we also take the Aktionsart of the resultative construction into consideration in explaining some of its properties. Therefore, at first glance, Van Valin's account may seem similar to our own. However, we will show that careful scrutiny of the behavior of a variety of verb classes in the resultative construction indicates that there are both syntactic and semantic aspects to the explanation of the properties of the construction, and that some of the syntactic facts are best explained by appeal to the syntactic properties of unaccusativity.

Van Valin's account is couched in terms of Role and Reference Grammar (RRG; Foley and Van Valin 1984, Van Valin 1990, 1993). In this framework, the mapping between the semantic representation of a predicate (its "logical structure" or LS) and the morphosyntactic expression of its arguments is mediated by the assignment of two macroroles—actor and undergoer—to the arguments. The linking rules and many morphosyntactic rules, such as passive, are formulated in terms of these macroroles. Van Valin claims that the DOR can be replaced with a restriction that refers to the notion "undergoer" instead of the notion "direct object."[15] He writes (1990:254–55),

> The argument of which the resultative phrase is predicated is an undergoer in every case. The direct object restriction proposed by Levin and Rappaport is captured in RRG in terms of a restriction to undergoers. This correlates naturally with the Aktionsart of the construction, since constructions allowing resultatives are either accomplishments (53a,e) [= *Terry wiped the table clean; He talked himself hoarse*] or achievements (53c) [= *The river froze solid*], all of which code a result state as part of their inherent meaning. Activity verbs, which are inherently atelic and therefore cannot in principle code a result state or have an undergoer argument, do not take resultative phrases.

RRG's LS uses predicate decompositions based on those proposed by Dowty (1979) as a lexical semantic representation. The elements in these decompositions are motivated on the basis of Aktionsart and capture the properties of and the interrelationships between the various Vendler (1957) verb classes. Van Valin's explanation of the resultative construc-

tion essentially claims that the resultative phrase is always predicated of the argument of the predicates BECOME (STATE) in the LS of the verb. Because only achievements and accomplishments have this substructure in their LS, resultative constructions are possible only with achievements and accomplishments. With achievements and accomplishments, the state is always predicated of an undergoer argument; hence the undergoer restriction. A resultative phrase cannot be directly predicated of an unergative verb such as *talk*, because unergative verbs are typically activity verbs that have no state in their LS and thus lack an undergoer for the resultative phrase to be predicated of. On the other hand, unaccusative verbs, such as *freeze*, are typically achievement verbs that code a result state predicated of an undergoer.

Van Valin must also provide an explanation of the fake reflexive in resultative constructions such as *talk oneself hoarse*. Van Valin's claim is that such constructions no longer describe activities, but instead describe accomplishments, and the fake reflexive serves to signal the change in Aktionsart and not to fulfill a syntactic requirement. However, this last claim merely begs the question of why the fake reflexive is needed for deriving an accomplishment from an unergative activity verb, since the fake reflexive is not needed to derive an accomplishment from an activity with transitive and unaccusative verbs. There are transitive activity verbs and unaccusative activity verbs, and both can be turned into accomplishments through the addition of resultative phrases but without the use of fake reflexives. In isolation, the transitive verb *pound* and the unaccusative verb *roll* are atelic and therefore do not have undergoers or encode a result state. The question is why resultative phrases can be added directly to these verbs without the mediation of a fake reflexive, thereby changing their Aktionsart, whereas the same option is not available for unergative verbs such as *talk*. This contrast is precisely what the syntactic account explains.[16]

The purely aspectual account also fails to explain the restriction, noted in section 2.1.4, against adding a nonsubcategorized NP and resultative phrase to an unaccusative verb as in (20), repeated here.

(85) a. *During the spring thaw, the boulders rolled the hillside bare.
     b. *The rice slowly cooked the pot black. (meaning: the pot became black as a result of the rice cooking)
     c. *The snow melted the road slushy.

Van Valin (personal communication) suggests that this restriction is derived from the fact that Dowty's decomposition system allows LSs of the form in (86) but not (87).

(86)   [activity LS] CAUSE [achievement LS]

(87)   *[achievement LS] CAUSE [achievement LS]

Since unaccusative verbs are typically achievements, the presence of an additional result state predicated of a second NP is ruled out since this situation would give rise to the problematic LS in (87). However, this explanation cannot be extended to unaccusative verbs such as *roll, bounce,* and *cook* (on the appropriate interpretation). These verbs are all atelic, as their ability to appear with durative phrases indicates, so that a resultative construction with these verbs could not take the form in (87).

(88)   a. The ball rolled for two minutes.
       b. The ball bounced for a full minute.
       c. The stew cooked for almost an hour.

Furthermore, this restriction cannot be reduced to Tenny's principle against two delimiters per VP (or, in Van Valin's terms, against two undergoers), since some of these atelic unaccusative verbs, such as *roll* and *bounce,* do not describe a change of state and do not, in isolation, take undergoers.

2.4.2.2 A Thematic Account of the Resultative Construction   Although we know of no comprehensive published account along these lines, a semantic analysis of the resultative construction can also be formulated in terms of an analysis of verb meaning based on thematic roles. If such an approach is taken, the DOR restriction or the Change-of-State Linking Rule would be replaced with a restriction stated in terms of thematic roles. Here we develop and critique as complete an analysis as we can along these lines, building on the analysis presented by L. Levin, Mitamura, and Mahmoud (1988), which in turn draws on B. Levin and Rapoport 1988. In order to bring out the problems facing such an account, we elaborate on it more fully than we might otherwise, filling in some details that have been left unexplored.

Suppose that the DOR is replaced by the following thematic restriction: a resultative phrase can be predicated only of an argument bearing the *theme* role (i.e., following Anderson (1977), Gruber (1965), and Jackendoff (1972), an entity that undergoes a change of state or position or

whose state or position is described). Although the use of thematic role labels such as "theme" is eschewed in much recent work (Grimshaw 1990, Rappaport and B. Levin 1988, Zubizarreta 1987), let us assume for the sake of argument that some appropriately defined notion of theme can be found. L. Levin, Mitamura, and Mahmoud (1988) present such an analysis, which assimilates resultative constructions to directed motion constructions with goal phrases. On this analysis, both *We floated the bottle into the cave* and *We hammered the nail flat* are associated with the thematic structure ⟨*agent, theme, goal*⟩, where both the *into* phrase and the resultative phrase are analyzed as goals. (We showed in section 2.3 that both kinds of phrases are delimiters, justifying to some extent the common thematic analysis.) Typically, goals appear only with themes, and, if there is a thematic restriction allowing resultative phrases only to be predicated of themes, then this restriction could be used to distinguish between the grammaticality of *The river froze solid*, in which the resultative phrase is predicated of a theme, and the ungrammaticality of **Dora shouted hoarse*, which lacks a theme that the resultative phrase could be predicated of.[17]

The appearance of fake reflexive postverbal NPs with unergative verbs must also receive an explanation. Given that the verbs that appear with fake reflexives do not select direct objects, it might seem that these fake reflexives cannot bear any thematic role at all, let alone the role of theme. L. Levin, Mitamura, and Mahmoud (1988) suggest that the appearance of fake reflexives can be explained, while preserving the theme restriction. They propose that this will be possible if the lexical semantic representation of a verb in the resultative construction differs from that of the same verb when it appears without a resultative phrase in a way that requires the presence of a fake reflexive with unergative verbs.

This approach takes the resultative construction to be both lexically specified and lexically derived, rather than derived by compositional means in the syntax as we have been suggesting in this chapter. It essentially assimilates verbs in the resultative construction to other instances of variable behavior verbs, taking them all to involve a meaning shift, accompanied by a shift in syntactic behavior. The particular mode of representing the meaning shift that L. Levin, Mitamura, and Mahmoud adopt is the one sketched in B. Levin and Rapoport 1988, called there "lexical subordination."

L. Levin, Mitamura, and Mahmoud and B. Levin and Rapoport propose that lexical subordination relates the meaning of a verb in the

resultative construction to the simple meaning of the same verb. Consider the transitive verb *pound*, which is basically a verb of contact by impact. When this verb is found in a resultative construction such as *Pam pounded the metal flat*, the verb means 'cause to change state by means of contact-by-impact *pound*'. The original meaning of *pound* is subordinated under a causative change-of-state predicate, as sketched in the lexical semantic representation in (89).

(89) *pound* (resultative): [x CAUSE [y BECOME z] BY [x POUND y]]

Support for considering that the verb in the resultative construction has an extended meaning comes from the fact that *pound* behaves like a verb of change of state when followed by a resultative phrase, even though it does not in the absence of a resultative phrase (see also section 2.2.2).

According to accounts of lexical subordination, the newly created verb derives its syntactic properties from the "main clause" of its lexical semantic representation (i.e., the clause to the left of BY in (89)), and its "name" is derived from the subordinated clause (Laughren 1988, Rappaport and B. Levin 1988). In this case the causative main clause will dictate a transitive syntax. But the fact that the sentence *Pam pounded the metal flat* means that the metal became flat *as a result of* Pam's pounding is not explicitly represented in the syntax in this approach. The lexical semantic representation in (89) makes this aspect of the sentence's interpretation explicit.

Neither L. Levin, Mitamura, and Mahmoud nor B. Levin and Rapoport give an explicit representation for resultative constructions with unaccusative verbs. A potential lexical semantic representation of an unaccusative verb such as intransitive *freeze* when it is found in a resultative construction such as *The river froze solid* is given in (90).

(90) *freeze* (resultative): [x BECOME y BY [x FREEZE]]

However, L. Levin, Mitamura, and Mahmoud consider the appearance of the fake reflexive with an unergative verb and attribute its presence to the causative nature of the "main clause." Suppose that the verb *shout*, when found in a sentence like *Dora shouted herself hoarse*, has the representation in (91).

(91) *shout* (resultative): [x CAUSE [x BECOME y] BY [x SHOUT]]

On this analysis, the reflexive is not a "fake" reflexive, but the reflex of the second occurrence of the variable x in the main clause of the lexical semantic representation in (91): the occurrence of x that is the left argument

of BECOME. The analysis extends naturally to unergative verbs followed by a nonsubcategorized NP and a resultative phrase. *The joggers ran the pavement thin* will be associated with the following extended lexical semantic representation for *run:*

(92) [x CAUSE [y BECOME z] BY [x RUN]]

In each instance it seems that the thematic approach relies crucially on the assumption that the verb in a resultative construction does not have the same lexical semantic representation as the same verb in isolation. Certain aspects of the meaning of the construction, which are not reflected directly in the syntax, are projected from the lexical semantic representation associated with the extended meaning of the verb.

However, this approach faces a significant limitation: it assigns all transitive and unergative verbs in resultative constructions a lexical semantic representation with the same main clause substructure. This substructure is shown in (93).

(93) [x CAUSE [y BECOME $STATE$]]

As a consequence, this approach loses the insight discussed in section 2.2 that the syntax of the resultative construction is determined by the syntax of the verb in isolation. In particular, this analysis does not account for the fact that the NP corresponding to the y variable in (93) behaves like an argument of the verb when the subordinated verb is transitive, but not when the subordinated verb is intransitive. Recall from section 2.2.1 that the postverbal NP in *Terry wiped the table clean* behaves like an argument of the verb, whereas the postverbal NP in *The joggers ran the pavement thin* does not. If the postverbal NP in both instances corresponds to the same variable in the same substructure of the lexical semantic representation, then a significant syntactic insight is lost.

On the thematic approach, one way to deal with the difference in syntax is to assume that resultative constructions based on transitive verbs do not have the lexical semantic representation associated with the extended meaning, whereas those based on unergative verbs do. Then a representation of the verb in *Dora shouted herself hoarse* could be assumed to give rise to a syntactic structure in which the postverbal NP is part of a small clause, whereas a representation for *Terry wiped the table clean* would give rise to a regular transitive syntactic structure. This approach is unsatisfactory, however, since it precludes a unified account of resultative constructions. The lexical semantic representation associated with the extended meaning is designed to capture certain aspects of meaning that are

present in resultative constructions based on both transitive and unerga-
tive verbs (for example, the fact that the state denoted by the resultative
XP is achieved as a result of the action described by the verb and the fact
that all verbs in resultative constructions have a change-of-state reading).
But if the lexical semantic representation of a resultative construction
based on a transitive verb does not involve a meaning shift, then, at
least for transitive verbs, these aspects of the meaning of the construction
would have to be derived in some other way, for example, along the lines
we suggested in section 2.2.3. If these aspects of meaning are derived
compositionally for the transitive-based resultatives, then there would
seem to be little motivation for retaining the thematic approach at all.

2.4.2.3 Jackendoff's Account Jackendoff (1990) presents an analysis of
the resultative construction in the context of what he calls "superordinate
adjunct rules." These adjunct rules are rather similar to the rule of "lexical
subordination" found in B. Levin and Rapoport 1988, in that they subor-
dinate the meaning (and the syntax) of the verb to a newly introduced
predicate. The newly introduced predicate is what Jackendoff refers to as
a "superordinate adjunct."

Conceptually, Jackendoff conceives of the resultative construction as a
"constructional idiom," in that the conceptual structure and the syntactic
structure of the entire construction are lexically given, and the conceptual
structure of the verb is "plugged in" as a variable. Jackendoff offers two
rules for the construction. The rule for resultative constructions based on
transitive and unergative verbs is given in (94), and the rule for unaccusa-
tive verbs is given in (95).

(94) *Resultative Adjunct Rule* (version 3: constructional idiom)
$[_{VP}\ V_h\ NP_j\ AP_k]$ may correspond to
$$\begin{bmatrix} \text{CAUSE}\ ([\alpha],\ [\text{INCH}\ [\text{BE}_{\text{Ident}}\ ([\beta],\ [\text{AT}\ [\quad]_k])]]) \\ \text{AFF}^-\ ([\quad]^{\alpha}_i,\ [\{\alpha\}]^{\beta}_j) \\ [\text{BY}\ [\text{AFF}^-\ ([\alpha],\ \{[\beta]\})]_h] \end{bmatrix}$$
(Jackendoff 1990:231, (48))

(95) *Noncausative AP Resultative Adjunct Rule*
$[_{VP}\ V_h\ AP_k]$ may correspond to
$$\begin{bmatrix} \text{INCH}\ [\text{BE}_{\text{Ident}}\ ([\alpha],\ [\text{AT}\ [_{\text{Property}}\quad]_k])] \\ \text{AFF}\ ([\quad]^{\alpha}_i,\ ) \\ [\text{BY}\ [\text{AFF}^-\ (\quad,\ [\alpha])]_h] \end{bmatrix}$$
(Jackendoff 1990:239, (73))

These rules stipulate the meaning and the syntax of the construction in each instance, as well as the correspondence between the arguments of the subordinated verb and the syntactic positions. The first line of the structures enclosed in the large square brackets in (94) and (95) sets out the basic meaning of the constructions. The material on the remaining two lines sets out certain semantic restrictions on the verbs that can appear in each structure.

Although these rules capture the semantics of the construction quite accurately, there are two major problems we see with this approach. First, it is similar to the approach of L. Levin, Mitamura, and Mahmoud (1988) that we just reviewed in that the syntax of the verb in the construction is subordinated to the syntax of the entire construction. Therefore, it cannot in principle distinguish between resultative constructions based on transitive verbs and those based on unergative intransitive verbs. In fact, Jackendoff explicitly claims that "even in the transitive cases..., the direct object as well as the predicate AP is actually an adjunct—not part of the verb's argument structure" (1990:228). This, we showed, is simply not true, since it disregards the syntactic properties of the postverbal NP in resultative constructions based on transitive verbs. In fact, it needs to be stipulated in the appropriate rule that the object of the main clause is identical to that of the subordinated clause. This property falls out naturally, without stipulation, in the account we gave.

The second problem is the way in which Jackendoff derives the fact that unergative and unaccusative verbs appear in different types of resultative constructions. Jackendoff accounts for this difference by stipulating that the verb in the intransitive (objectless) resultative constructions must take an undergoer or patient, whereas the verb in the resultative constructions containing a fake reflexive takes only an actor. Although this statement perhaps accurately captures the distinction required here, it is essentially a stipulation. For instance, could English have been different only in that unergative verbs appeared in the intransitive structure? Essentially, our analysis, which preserves the syntax of the verb and derives the semantics of the structure compositionally based on general rules of syntax and semantic composition, derives the same results as Jackendoff's, while capturing the syntactic properties of the construction more accurately. In fact, Marantz (1992) levels a criticism along the same lines against Jackendoff's analysis of the similar *X's way* construction, introduced in chapter 4 and more extensively discussed in section 5.1.3.

2.5 Conclusion

In this chapter we have explored whether there is evidence for unaccusativity in English through a study of the resultative construction, a construction that has been claimed to be sensitive to the unaccusative/ unergative distinction. We have presented a mixed syntactic/semantic approach to the resultative construction in which unaccusativity is syntactically represented and have argued that this approach is to be preferred over semantic ones.

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