A COGNITIVE STUDY OF
RESULTATIVE CONSTRUCTIONS IN ENGLISH

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The aim of this paper is to propose an alternative analysis of the English resultative construction in a framework of cognitive grammar and to illustrate its superiority over existing syntactic and lexical-semantic approaches to the phenomenon. The analysis here makes use of a graphic representation of an integrated cognitive model, based on Langacker’s (1990) canonical event model and Croft’s (1990) causal chain. Moreover, the cognitive linguistic account reveals that the manner in which an event is construed determines whether or not the resultative construction may be employed in a given context.*

1. Introduction

The present paper deals with the resultative construction, such as the examples in (1). The italicized predicates in (1) are called resultative complements, because they describe the resultant states of the object NPs which the actions denoted by the verbs bring about.

(1) a. Anna wiped the table [AP clean].
    b. John laughed himself [PP into a stupor].
    c. They painted the car [NP a strange shade of yellow].

A number of investigations have been made, on the basis of various properties of this construction, from both syntactic and lexical-semantic perspectives.

Let us first enumerate various properties of the resultative con-
struction on which most researchers agree. First, in the resultative constructions the verb is followed by a noun phrase and a resultative complement.

Secondly, the syntactic category of a resultative complement can be AP, PP, or NP,¹ but not VP in English, as shown in (2).

(2) *I shot him [VP die/died].

However, not all strings which meet these conditions are suitable as resultative constructions. Resultative complements apply to direct objects of some transitive verbs as in (1a, c), but they do not apply to others as in (3).

(3) a. *He watched the TV broken.
   b. *He believed the idea powerful. (Goldberg (1991b: 67))

Thirdly, resultative complements also apply to subjects of some unaccusative intransitive verbs as in (4), but they do not apply to the subjects of all unaccusative intransitive verbs, nor do they apply to the subjects of unergative intransitive verbs, as in (5) and (6).

(4) The ice froze solid.
(5) *A dreadful storm arose destructive.
(6) *Richard shouted hoarse.

Fourthly, resultative complements cannot co-occur with fake objects of unaccusative intransitive verbs, as (7) shows. However, they occasionally can co-occur with fake objects of unergative intransitive verbs, as in (8).

(7) *A dreadful storm arose itself destructive.
(8) Richard shouted himself hoarse.

Fifthly, most AP resultative complements deal with the endpoint on a scale, as shown by Goldberg (1991a, 1991b) and Napoli (1992).

(9) a. She wrung the shirt [AP dry/*damp].
   b. We heated the coffee [AP hot/*tepid]. (Napoli (1992: 79))

Finally, we will find the productive use of the resultative construction, although there are differences in judgements of acceptability among speakers in some cases, as (10) suggests.

(10) a. OK/?The rooster crowed the children awake.
   b. OK/*It rained the golfcourse useless.

¹ NP resultative complements are quite rare. Some researchers, therefore, argue that resultative complements must be AP or PP, and deal with a resultative NP like (1c) as an exceptional case.
In the next section, we will uncover some overarching problems with previous analyses, suggesting the necessity of a more effective analysis to explain the resultative construction.

2. Previous Analyses

Many researchers have investigated the resultative construction from both syntactic and lexical-semantic perspectives. First, there are three major syntactic analyses which have been proposed, employing the following notions: (i) the Binary Small Clause Analysis (Hoekstra (1988), etc.), (ii) the Hybrid Small Clause Analysis (Yamada (1987), etc.), and (iii) the Ternary Analysis (Carrier and Randall (1989, 1992), etc.). The three syntactic analyses make different predications about the structure of resultative constructions. However, we cannot show which is the correct analysis, because each analysis has revealed some defects of others’. Three types of syntactic analyses, therefore, have two strikes against them.

Let us now turn to lexical-semantic analyses of resultative constructions. We will take up three analyses by the following researchers: (i) Levin and Rapoport (1988), (ii) Carrier and Randall (1989), and (iii) Jackendoff (1990). Levin and Rapoport (1988) propose a semantic process whereby the basic meaning of a verb is extended. They call the process Lexical Subordination and claim that it is responsible for producing resultative constructions. Carrier and Randall (1989) claim that the resultative verbs are derived from the base verbs by what they call Resultative Formation. In contrast to the two analyses, which assume that there are two types of verbs, i.e., resultative verbs and their base verbs, Jackendoff (1990) argues that there is only one verb and that a resultative complement is not an argument mentioned in the verb’s lexical entry but rather an adjunct, interpreted by what he calls the Resultative Adjunct Rule.

However, none of these analyses can describe and explain three important properties of resultative constructions to be illustrated below.

First, let us look at the simple example in (11).

(11) He threw the suitcase open. (Goldberg (1991a: 371))

As Goldberg (1991a, 1991b) observes, (11) just means that he forcefully opened the suitcase and may not mean that the suitcase was thrown in some direction, although the verb throw normally entails that the theme moves along a physical path. If the path is literally
expressed alongside the resultative complement, then the sentence becomes unacceptable, as in (12).

(12)  
  a. *He threw the suitcase open into the room.
  b. *He threw the suitcase into the room open.

The previous analyses, however, provide no tenable account of this phenomenon; on the contrary, most of them do not even mention paths in discussing resultative constructions.

Secondly, as Goldberg (1991a, 1991b) and Napoli (1992) observe, most AP resultative complements denote an end of scale, as in (9). Nevertheless, the previous analyses completely miss this generation.

Thirdly, let us discuss one more property of resultative constructions, which concerns the acceptability of derived resultative constructions. Consider the following examples:

(13)  
  a. OK/?The rooster crowed the children awake. (=(10a))
  b. OK/?*In the movie's longest love scene, Troilus and Cressida kiss most audiences squirmy.

(14)  
  a. OK/*It snowed the roads slippery.
  b. OK/*It thundered the children awake.

As the array of judgements above indicates, this type of resultative construction, where the subject of the resultative complement (e.g. the children in (13a)) is not a participant of the preceding subevent (e.g. the rooster crowed in (13a)), exhibits great differences in judgements of acceptability among speakers (or dialects). In (14), where there is no argument which appears in both of the two subevents and in addition the preceding subevent has no Agent, the acceptability further degrades. On the other hand, resultative constructions like (15) and (16), where the subject of the resultative complement is the affected object of the preceding subevent or identical with the agent of that subevent, show no differences in judgements.

(15) John cooked the food black.
(16) Tom ran himself sick.

These complicated phenomena, however, cannot be dealt with by any of the previous analyses. Recall that they just assume a single uniform rule of resultative constructions which subsumes all cases, making no distinction among them, apart from a two-way distinction.

2 Carrier and Randall (1989) are more liberal about resultative constructions and regard all sentences in (13) and (14) as acceptable, while Jackendoff (1990) regards them as less acceptable or unacceptable.
between transitive and intransitive resultative constructions. Since (13), (14), and (16) are all intransitive resultative constructions, even the dichotomous grouping does not help.

Accordingly, we need an alternative analysis which can account for these important properties of resultative constructions. In order to describe the construction precisely, I would like to adopt the framework of cognitive linguistics in this paper. In the next section, we will begin by introducing cognitive models required to characterize resultative constructions.

3. Cognitive Models

3.1. Langacker's Cognitive Models and Croft's Causal Chain Model

First, Langacker (1990) notes that we tend to organize our conceptions of prototypical actions and events in terms of a canonical event model. The model contributes "the notion of an event occurring within a setting and a viewer (V) observing it from an external vantage point" (1991: 286), as reproduced in Figure 1.

The canonical event model is constructed by combining the billiard-ball model and the stage model. The canonical event model inherits from the billiard-ball model the minimal conception of an action chain, in which one discrete object transmits energy to another through forceful physical contact. In Figure 1, the head of the action chain is characterized as an agent (AG) that transmits energy (indicated by the double arrow), and its tail as a patient (PAT) that undergoes a resultant change of state (indicated by the wavy arrow). On the other hand, the stage model is a cognitive model which idealizes our observation of external events. In the stage model, an observer focuses attention on an action or event as if it were on stage, which can
be taken as a type of setting within which the participants interact and the event takes place.\(^3\)

Moreover, Langacker notes that we have a conception of certain typical roles that participants play in events, namely role archetypes such as Agent, Patient, and Experiencer. For example, Agents are prototypically human entities which volitionally initiate physical activity by means of the transmission of energy to other participants. Patients are prototypically inanimate entities that absorb the energy transmitted via externally initiated physical contact and thereby undergo an internal change of state.

The selection of the subject and object is linked with the relative salience which the figure/ground organization brings about. According to Langacker (1990), a subject, as figure within the profiled relationship, is the participant that is farthest upstream with respect to the energy flow, whereas an object is the prominent participant lying the farthest downstream from the subject in the flow of energy.

Let us review another type of cognitive model proposed by Croft (1990, 1991), who very explicitly identifies the conceptual basis of transitivity as causal and proposes another type of cognitive model, i.e. the causal chain. He defines the causal chain as “a series of causally related events such that the endpoint or affected entity of the causally preceding atomic event is the initiator of the next atomic causal event” (1991: 169).

Croft argues that a simple event consists of three segments, (i.e. CAUSE, BECOME, and STATE), and that the causal-aspectual type of the verbs (causative, inchoative, and stative) reflects what portion of the three segmented chain is selected, as illustrated in Figure 2.

![Figure 2](image)

Figure 2 shows us that the causative, inchoative, and stative event types

\(^3\) Setting is “a global, inclusive region within which an event unfolds or a situation obtains” (Langacker (1991: 553)), while a participant is “an entity thought of as participating in a relationship” (ibid.: 550).
are not independent. In fact, the causal chain model allows us to unify these three event types into one.

Croft also argues that the causal chain model of event structure provides the major structure to an idealized cognitive model of a single event. Simple events involve asymmetrical transmission of energy, and their structure consists of the three-segment causal chain. Their chains are non-branching causal chains and endpoint-oriented.

3.2. The Integrated Cognitive Model

The two foregoing theoretical notions and cognitive models give us an appropriate means of analysis for various constructions, but it seems that neither model is sufficient for an analysis of the resultative construction. Langacker’s model cannot represent a resultant state, and Croft’s model has trouble handling the difference in meaning between verbs in the same event type. Nakamura (1993) also takes these problems into consideration and proposes another cognitive model by incorporating Croft’s notion of causal relations into Langacker’s action chains in order to augment its efficiency.

There are two differences in form between Langacker’s model and this model. First, a change of state (i.e. wavy arrow) is represented outside a participant (a Patient), whereas it is represented inside a Patient in Langacker’s model. Secondly, in Nakamura’s model a resultant state can be represented after the change of state. These changes of representation allow us to unify the two foregoing cognitive models into one. In this integrated model, a circle symbolizes the initial state of a participant, a square representing the ultimate state. The double arrow indicates a transmission of energy, while the wavy arrow indicates a change of state without a transmission of energy. Each chain is enclosed in a dashed square which represents cognitive scope. Moreover, a figure/ground organization is incorporated into this model. The figure is depicted with bold lines, and the ground, with lighter lines.

Let us briefly look at how this model handles linguistic predications. For example, in the case of transitive verbs, e.g., kill and kick, the ungrammatical sentence (17a) indicates that kill specifies the change of state outside a participant, whereas kick specifies the change of state inside a participant.

Nakamura’s (1993, 1994) model was originally proposed to represent a network of various grammatical constructions in a comprehensive manner. See Nakamura (1993, 1994) for details.
state and the resultant state, whereas (17b) indicates that kick does not. (17c) indicates that kill does not specify the transmission of energy.

(17)  
a. *John killed the dog, but it didn’t die.  
b. John kicked the dog, but it didn’t die.  
c. John killed the dog by kicking it.

(Nakamura (1993: 254))

The specified portion is represented in boldfaced line as figure, while the unspecified portion is represented in lightfaced line as ground. The construals (or cognitive structures) of the two types of transitive verbs are illustrated as follows:

(a) \[
\begin{align*}
&x \xrightarrow{\text{kill/open/break}} y \\
&\text{Patient} \\
&\text{Agent}
\end{align*}
\]

(b) \[
\begin{align*}
&x \xrightarrow{\text{kick/hit}} y \\
&\text{Patient} \\
&\text{Agent}
\end{align*}
\]

(c) \[
\begin{align*}
y &\xrightarrow{\text{open}} \\
\text{Patient}
\end{align*}
\]

Figure 3

In the case of intransitive verbs, for example, open, the construals are represented as sketched in Figure 3 (c). Let us compare (a) with (c) in Figure 3. The difference between them is due to a difference in the cognitive scope. Thus the intransitive verb, open, implies neither Agent nor the transmission of energy.

4. The Cognitive Model Representing the Resultative Construction

Given the basic conceptions and framework of cognitive grammar in the previous section, we will explore how we recognize an event in using the resultative construction. In the construction, the action denoted by a verb has an effect on an entity denoted by a postverbal NP. As a result, the entity undergoes a change of state which a resultative complement characterizes. Based on Nakamura’s (1993) representation of cognitive structures, we will represent the following situation within a cognitive scope as the cognitive model of the resultative construction: a double arrow which denotes the transmission of energy reaches the Patient from the Agent and a wavy arrow which
denotes a non-energetic transition of the state reaches the resultant state.

Moreover, resultative constructions normally imply that the causation is direct and that no intervening time in a causal sequence is possible. We can give neither different spatial settings nor different temporal settings to the verb and the resultative complement, as in (18) and (19).

(18) *In a forest, Tom shot Bill dead in a hospital.
   (cf. Tom shot Bill dead.)
   (19) *Yesterday Tom ate himself sick today.
       (cf. Tom ate himself sick.)
This implication is a characteristic of resultative constructions. If these sentences just implied the causation, it would not be necessary for it to be limited to the direct one, as (20) suggests.

(20) At noon, Sam caused my balloon to break some time later by setting it on the hot sand under the blazing sun.
Thus, we can claim that the event denoted by a resultative construction is recognized as an event which takes place in one setting of space and time.

In accord with the fact mentioned above, I would like to diagram a cognitive model of a resultative construction, as in Figure 4. Note that what Figure 4 shows is a prototypical cognitive model involving an Agent and a Patient.

![Figure 4](image)

The tail of the chain is the resultant state described by a resultative complement in the model. The Agent, the Patient and the resultant state are all included in its scope and the whole chain within the scope is surrounded by one setting. Furthermore, the whole chain within the scope is prototypically given greater salience via profiling. Following Langacker's (1990) selection of the subject/object, the Agent is a subject, and the Patient is an object in Figure 4. This cognitive model can predict the various properties of a verb, two noun phrases (a subject and an object), and a resultative complement in the resultative construction. We will further examine this in what follows.
4.1. Implications for Verb Types

Not every verb can enter into the resultative construction. For example, not a prepositional object but an object is allowed to follow the verb in the resultative construction, as in (21).

\[(21) \quad \begin{align*}
a. & \quad I \text{ shot/shot at} \text{ the wolf dead.} \\
b. & \quad \text{They laughed/laughed at} \ John \text{ off the stage.} \\
\end{align*}
\]

(c.f. They \text{*laughed/laughed at} \ John.)

The semantic effect of assignment of an NP to object position instead of an oblique has been observed widely. For instance, Croft (1991) argues that, other things being equal, the object NP is conceptualized as being more affected by an action than the oblique NP. In the case of each prepositional object in (21), it seems reasonable to assume that no energy is transmitted from the subject to the object, or that the object is not affected by the designated action, as Figure 5 shows.

\[
x \overset{\text{ shoots at}}{\longrightarrow} y
\]

Figure 5

Accordingly, prepositional objects cannot appear in resultative constructions, even though they are not normally allowed to follow the verbs without any prepositions. Thus, a conception of the transmission of energy plays an important role in resultative constructions.

Moreover, this conception succeeds in excluding stative verbs from the resultative construction, as in (22), because a construal of stative verbs does not include the transmission of energy.

\[(22) \quad \begin{align*}
a. & \quad \text{*The Statue of Liberty stood green.} \\
b. & \quad \text{*Jesus lived into a legend. (Carrier & Randall (1989: 98))} \\
\end{align*}
\]

Langacker (1990) argues that a prototypical transitive clause profiles an action chain involving the transmission of energy from subject to object, with former being agentive and the latter undergoing a change of state. In the present framework, those transitive verbs are viewed as causative events. Note that the base of the resultative construction is also the causative construal. There are, in fact, many transitive verbs which can participate in the resultative construction as follows:

\[(23) \quad \begin{align*}
a. & \quad \text{Mary broke the vase into pieces.} \\
\end{align*}
\]

\[5 \text{ Though the construals depend on the verbs, the base of transitive verbs such as break and kick is certainly the causative base. See Figure 3(a−b) again.}\]
b. I kicked the door open.

The meaning of a verb, however, depends not only on the base but also on profiling. In fact, there are transitive clauses that do not appear to involve a transmission of energy from subject to object. For example, the transitive verb *touch* has a causative base, but it cannot normally participate in the resultative construction, as in (24).

(24)  a. *Midas touched the tree [golden/into gold].

    (Carrier & Randall (1989: 97))

    b. *I touched the door open.

This is because the verb doesn’t profile the transmission of energy and the change of state. It indicates just the contact with an entity, as sketched in Figure 6.6

Moreover, clauses describing perception, emotion, or cognition do not appear to involve a transmission of energy from subject to object. Langacker (1990) assumes that the subjects in these clauses are Experiencers (i.e., they engage in some type of mental activity), and that the object is totally unaffected by the designated process. The interactions can be represented as follows, where the broken arrow indicates the mental contact of the Experiencers with the objects of perception, emotion, or conception:

\[ x \rightarrow y \]

x sees y

Figure 7

Adding a resultative complement to a mental verb is, therefore, inconsistent with the resultative construction, as in (25).


    b. *Harry liked Betty to desperation.

    (Jackendoff (1990: 231))

  6 I make careful use of the representation proposed anew in Nakamura (1994) for the verb *touch*'s construal. The verb *touch* profiles only part of the double arrow, as diagrammed in Figure 6. Compare Figure 6 with Figure 3(b).
c. *He believed the idea powerful. (= (3b))

However, there are two ways to transmit energy, i.e. physically or metaphorically. Even if the construal of a verb, which has a causative base, does not profile the transmission of physical energy that brings about the resultant state, we can understand that the subject’s intention is a kind of metaphorical energy in some context. The intention is able to let an object change and undergo a change of state. For example, the verb see in (25a) does not depend on the will, whereas we can regard stare in (26) as an intentional act. Therefore, the verb can appear in a resultative construction, as in (26).

(26) a. We stared her into confusion.
    b. ??Tom stared him |dumb/speechless|.

Similarly, the verb touch does appear in resultative constructions only on its intentional reading, as in (27).

(27) a. *Over the course of many years, tourists’ backs have touched the statue’s nose smooth.
    b. Over the course of many years, tourists have touched (= patted, stroked) the statue’s nose smooth.

(Carrier & Randall (1989: 98))

Let us turn to intransitive verbs. They seem to lack a transmission of energy in their construals. Following Perlmutter and Postal (1984), we will here divide intransitive verbs into two classes, i.e. unaccusative verbs and unergative verbs. Here construals of these intransitive verbs are regarded as construals of a thematic relationship.\footnote{Langacker (1991) describes a thematic relationship as a comparatively simple, conceptually autonomous relationship involving just a single participant.} Under our framework, this thematic relationship is sketched as Figure 8.

Figure 8

We will see in what follows that unaccusative and unergative verbs are different in reference to energy in construals, though both construals are thematic relationships. The difference will be an important factor in deciding which verb can participate in resultative constructions.

Let us first look into unaccusative verbs. The verbs may be divided
into the two following types: one can be used either transitively or intransitively without any difference in form, as in (28). The other type can be used only intransitively, as in (29). We will tentatively label the former type as unaccusative verbs of the *freeze* type, and the latter type as unaccusative verbs of the *arrive* type.

(28) transitive : John froze the ice cream solid.
    intransitive: The ice cream froze solid.

(29) transitive : *A captain arrived the steamer in harbor.
    intransitive: The steamer arrived in harbor.

I suppose that unaccusative verbs of the *arrive* type are reasonably viewed in the present framework as single-participant thematic processes whose construal is absolute,\(^8\) because the verbs cannot be used transitively. Thus, in the case of the verb *arrive*, its construal is absolute and it specifies the goal (i.e. a kind of a resultant state), as sketched in Figure 9.

![Figure 9](image-url)

Figure 9

Even if a resultative complement (and a reflexive) is added to this type of unaccusative verb, the sentence will be ungrammatical, as in (30), because the new construal made by adding a resultative complement is inconsistent with a cognitive model of the resultative construction.

(30) *John arrived (himself) sick.

On the other hand, unaccusative verbs of the *freeze* type can be used transitively. The difference between an intransitive verb and a transitive verb is the difference in scope. In the case of the *freeze* type, since its construal has a causative base, it excludes the transmission of energy from an Agent out of the scope when used as an intransitive verb, whereas the transitive verb *freeze* involves it within the scope. Thus a construal of the verb *freeze* is shown as Figure 10 (transitive)

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\(^8\) As for an absolute construal, Langacker (1991) argues that “an absolute construal ... does not imply that the motion is conceived as being inherently non-energetic, but rather that only the thematic process itself (i.e. the movement per se) is saliently evoked and placed in profile” (p. 390).
If a resultative complement is added to this type of unaccusative verb, the verb can appear in the resultative construction, while the sentences are not prototypical resultative constructions.

(31) 

a. The water froze solid.

b. The vase broke into pieces.

In this case, since the head of a profiled portion of action chain is selected as a subject, a Patient is selected as a subject within the limited scope consisting of two segments, as shown in Figure 12.

Thus it is unaccusative verbs of not the arrive type but the freeze type that can appear in resultative constructions. This is because the cognitive structure of freeze subsumes the portion of the transmission of energy from an Agent even though it is outside of the scope, whereas the arrive type imposes an absolute construal on the movement it designates. This tells us that even in the case of intransitive verbs the problem of whether they can appear in resultative constructions has an important relation to the problem of whether the verb has a construal including the transmission of energy or not.

Let us now turn to unergative verbs. These verbs cannot appear in resultative constructions only by adding a resultative complement, as shown in (32).

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9 The transitive verb freeze, diagrammed in Figure 10, does not specify the transmission of energy. This is because we can freely specify the way of transmitting energy by adding a by-phrase, as (i) shows:

( i ) John froze the ice cream by exposing it to Dry Ice.
       b. *Richard shouted hoarse. (=(6))
The construal of unergative verbs is also a thematic relationship, but it is not an absolute construal. Many unergative verbs are verbs in which the same participant both undergoes the thematic process and supplies the energy that brings it about. For instance, the subject of run, walk, jump, or dive not only moves through space but also carries out a pattern of muscular exertion to propel itself along this path. Thus the subject itself is both an energy source and an energy sink, as diagrammed in Figure 13.

Recall that an energy source is distinct from an energy sink in the prototypical cognitive model of the resultative construction, as Figure 4 depicts. That is, it is necessary that energy is transmitted not internally but externally in order to bring about a resultant state denoted by an added resultative complement. Accordingly, we can mentally restructure the conceived event diagrammed in Figure 13, as sketched in Figure 14. Figure 14 indicates that physical or volitional energy is transmitted from one participant (a subject) to itself (a dummy object) externally.

Thus a resultative complement can be predicated of a subject of an unergative verb through the use of a fake reflexive or an inalienably possessed NP (e.g. a part of subject's body), as in (33) and (34).

(33) John danced himself sick.
(34) Mark walked his feet to pieces.
In this case, a fake reflexive or an inalienably possessed NP has to be coreferential to the subject, because this type of resultative construction supposes the cognitive model diagrammed in Figure 15 reflecting Figure 13 and Figure 14.
Having examined which type of verbs can appear in the resultative construction, we can summarize the description about verbs as follows:

(35) if a verb's construal includes a transmission of physical or metaphorical energy (within or without the scope) and profiles a portion of a non-energetic transition of the state or a potion of the state, the verb can occur in resultative constructions.

This succeeds in excluding verbs with prepositional objects, stative verbs, and the arrive type of unaccusative verbs from the resultative construction.

4.2. Implications for Noun Phrases

According to Croft (1990), it is required that causally related events share participants since the participant at the endpoint of one event is the initiator of the next, causally connected, event. In a resultative construction, it is necessary that an Agent and a Patient already exist in the cognitive scope as shown in Figure 4, excepting unaccusative verbs of the freeze type. We can, therefore, predict that the following sentences are ungrammatical as resultative constructions:

(36) a. *Mary laughed silly.
   b. *Peter ate full.

(37) a. *The ice froze itself solid.
   b. *He kicked the box Bill down the stairs.

(36a–b) are ungrammatical, because sentences lack a Patient. (37a–b) are also ruled out, because they have two distinct Patients.

Moreover, our approach can apply to the sentences in which an object disappears or is created as a result of the action denoted by a verb, as in (38) and (39).

(38) a. *He deleted a whole file useless.
   (Michael T. Wescoat (p.c.))
   b. *I exploded the bomb to smithereens. (Napoli (1992: 82))

(39) a. *Graham Bell invented the telephone useful.
   b. *He created a drama famous.
Since each object in (38) and (39) does not undergo any other change, it is incompatible with a resultative construction. Figure 16 shows that the energy flow is broken, because the object of these verbs cannot exist throughout the activity denoted by the verbs.

Figure 16

4.3. Implications for Resultative Complements

As we have seen in section 1, the state denoted by resultative complements is not the Agent’s state but the Patient’s one, as in (40) and (41).

(40) We cooked the food black. (cf. *We cooked the food sick.)
(41) Tom shouted himself hoarse. (cf. *Tom shouted hoarse.)

In Figure 4, the resultant state follows a Patient, so that we can account for the property that resultative complements are object-oriented. Moreover, many researchers have observed that APs, PPs, and only a few NPs can be resultative complements. However, in our model a resultant state is indicated as a square without any distinction of category. In what follows, we will look into these resultative complements respectively, and show that our representation is sufficient to handle the resultative complements.

Let us consider AP resultative complements first. It has been said that AP resultative complements in -ing and -ed are incompatible with resultative constructions as follows:

(42) The gardener watered the tulips {*flattened/*wilting/flat/soggy}. (Carrier & Randall (1992: note 212))

For -ed forms, a past participle describes a completed state. That is, resultative constructions using -ed resultative complements should suggest that the action of the verb results in the object already being in some particular state. This situation is causally too strange to be described by the resultative construction. Our approach thus can exclude this type of AP resultative complement.

For -ing forms, Smith (1983) claims that -ing adjectives designate events rather than states. If this claim is correct, our model could exclude -ing adjectives, because they don’t designate states.
However, some -ed or -ing adjectives are allowed, as follows:

(43) We ran our Nikes ragged.

(Carrier & Randall (1989: note 132))

(44) With the right kind of marijuana, people can smoke themselves {daring/loving/dashing}.

(ibid.: 51)

This is because they designate states, despite their morphology.

Thus we can not restrict resultative APs morphologically. Rather, we simply claim that APs which can designate a resultant state are allowed. A morphological restriction prohibiting -ing and -ed resultative complements would be incorrect.

Let us turn to PP resultative complements. According to Aske (1989), there are two types of directional or path phrases in English. One is a mere locative, i.e. locative path phrase, and the other one is a telic non-verbal predicate, i.e. telic path phrase. The locative path phrase adds the path or one-dimensional region in which the activity took place, as in (45). On the other hand, the telic path phrase, though similar in form, predicates an end-of-path of location/state of the figure, besides the path of motion, as in (46).

(45) Lou ran {in/through} the park.

(46) a. Pat swam into the cave.
    b. The leaf blew off the table.

(Aske (1989: 6))

It is probably easy to see that not a locative path phrase but a telic path phrase can be add to a verb as a resultative complement, as the following data show:

(47) a. They laughed Mary {*on the stage/off the stage}.
    b. Mary bullied John {*in leaving/*at leaving/into leaving}.

This is because the telic phrase can predicate a state of the figure (i.e. postverbal noun) as an end-of-path. We do claim that only PPs which denote an ultimate state can occur in resultative constructions.

As it turns out, resultative NPs are quite rare. A NP is not normally allowed to be added to a verb as a resultative complement, because a noun profiles a thing, not a state.

(48) a. *The baker pounded the dough a pancake.
    b. *She ground the coffee beans a fine powder.

(Carrier & Randall (1989: 45))

However, a very few NPs can be resultative complements.

(49) a. I painted the door a pale shade of yellow.
    b. She painted her barn a revolting shade of green.
Let us suppose that this type of noun is semantically close to adjectives and describes a state. If this supposition is correct, we will not need to make an exception for this type of NP.

Thus, we can claim that only resultative complements which denote a state can appear in the resultative construction irrespective of morphology or syntactic category.

5. Analysis

In this section, I will provide my own solutions to the problems with the previous analyses I pointed out in section 2, on the basis of the cognitive model.

5.1. A Notion of Path and Resultative Constructions

Croft (1990), who proposed the causal chain, assumes that "there is an experiential relation between motion and causation that strongly suggests the path-based metaphors in which direction of motion is extended to direction of causation" (p. 197). Thus, the chain denoting the directionality of motion and the one denoting the directionality of causation are on different levels. This idea may be reflected in the following Unique Path Constraint proposed in Goldberg (1991a):

(50) Unique Path Constraint
if an argument X refers to a physical object, then more than one distinct path cannot be predicated of X within a single clause.

This constraint can account for several co-occurrence restrictions on resultative complements. For example, resultative complements cannot co-occur with directionals, because the directionals coding a change of physical location would code a distinct path from the resultative complements coding a change of state:

(51) *Ann kicked her black and blue down the stairs. (ibid.: 369)

Moreover, resultative complements cannot co-occur with directed-motion verbs when used literally, as in (52).

(52) *She ascended sick. (meaning the ascension made her sick) (Goldberg (1991b: 86))

Note that we can also explain these co-occurrence restrictions by means of the cognitive model in Figure 4. In (51), the chain denoted by the verb is construed as a branching chain, because one resultative complement codes a metaphorical path and the other codes a physical
one. Moreover, (52) is ungrammatical, because the verb in (52) specifies a certain physical location within its scope and therefore its physical location does not accord with a resultant state denoted by the resultative complement. However, some verbs coding just a physical path, i.e. some directed-motion verbs, are used metaphorically to code a change of state.

(53) a. The milk went sour.
   b. John fell asleep.

When used in this way, these verbs imply no physical path. The difference between (52) and (53) is whether a verb specifies a physical location as well as a physical path, or codes only a physical path.

Let us first discuss a problem with the previous analyses, repeated here as (54).

(54) He threw the suitcase open.

In our framework, this can be explained as follows: throw can imply no path when used with a resultative complement, in order to avoid the conflict with the metaphorical path coded by the resultative complement, open. It is possible, because throw codes a physical path only. Therefore, (54) does not mean that the suitcase moved somewhere literally. Of course, the resultative complement cannot co-occur with a directional phrase, although it is conceivable that a suitcase could be thrown into the room and open simultaneously, as in (55) (= (12)).

(55) a. *He threw the suitcase open into the room.
   b. *He threw the suitcase into the room open.

Thus a path denoted by a verb must not be distinct from a path denoted by a resultative complement within a cognitive model.

Then, let us consider how our approach would handle the co-occurrence of two resultative complements in a resultative construction as in the following:

(56) a. He washed his face shiny clean.
   b. He nailed the door closed shut.

(Goldberg (1991b: 371), emphasis mine)

In these cases, one resultative complement serves to modify the other, and together they form a single constituent.\(^\text{10}\) That is, they can be

\(^{10}\text{We will consider two constituency tests to demonstrate our claim that the string } shiny clean \text{ forms a single constituent in (56a). First, } shiny clean \text{ may occur in the both } ... \text{ and } \text{construction, which is known to require in general that its conjuncts be single constituents:}
metaphorically understood in terms of a single path. On the other hand, we can successfully disallow the following sentences:

(57)  
   a. *She kicked him bloody dead.  
   b. *He wiped the table dry clean.

((ibid.: 370), emphasis mine)

This is because two resultative complements designate two distinct changes of state. Therefore, the chain is construed as a branching one in the cognitive model of these resultative constructions.

In sum, we have seen that it is necessary to mention a notion of path in discussing resultative constructions. A path defined by a verb and a resultative complement (or two resultative complements) must be a single path in a resultative construction, i.e., a chain must be a non-branching chain in a cognitive model of a resultative construction.

5.2. Restrictions on AP Resultative Complements

The type of resultative complements that can appear in resultative constructions is fairly limited. In this subsection, we will first look at a restriction on AP resultative complements proposed by Goldberg (1991a) and Napoli (1992). As they have pointed out, most AP resultative complements denote an end of scale, as in (58)(="(9)). However, they give us no sufficient explanation and motivation for this tendency.

(58)  
   a. She wrung the shirt \{dry/*damp\}.  
   b. We heated the coffee \{hot/*tepid\}.

We will, therefore, try handling this restriction in our approach here. Let us begin with the effect of an added resultative complement. The following example indicates that an unbounded event denoted by an activity verb comes to be considered as a bounded event when a resultative complement is added.¹¹

(i) He washed his face both shiny clean and more importantly free of blemish-causing oil.       (Michael T. Wescoat (p.c.))

Next, right node raising is known to affect only single constituents, and shiny clean may occur in critical position in this construction:

(ii) He washed his face and Mary scrubbed her hands shiny clean.      (Michael T. Wescoat (p.c.))

Thus, the two foregoing constituency tests lead the same conclusion that the string shiny clean is indeed a single constituent.

¹¹ According to Dowty (1979), in-phrase is used as a diagnostic for accomplishments or achievements (i.e. a bounded event), while for-phrase is for activities (i.e. an unbounded event).
(59)  a. He pushed the door |for/*in| 10 minutes.
   b. He pushed the door open |*for/in| 10 minutes.

The following examples show that resultative constructions are not consistent with while-readings:

(60)  a. ??While she sang the baby to sleep, I fell asleep.
   b. ??While she roared herself hoarse, she fainted.

Thus these facts indicate that resultative complements serve to delimit the events. As sketched in Figure 4, the event represented by resultative constructions is an event which occurs in one setting. Consequently, it is fair to say that an added resultative complement must delimit the boundary of the unbounded event.

However, resultative APs which do not deal with the endpoint are sometimes used in a resultative construction, as in (61).

(61)  a. He ate himself sick.
   b. He talked himself hoarse.

Since sick and hoarse are normally gradable adjectives, they can appear ceteris paribus with quantifying phrases, e.g., a little.

(62)  a little |sick/hoarse|
   (cf. ?a little |sober/flat/asleep/awake|)

However, when they appear in resultative constructions, they receive a non-gradable interpretation, as the facts in (61)-(63) suggest.

(63)  a. ?He ate himself a little sick.
   b. ?He talked himself a little hoarse. (Goldberg (1991b: 84))

That is, in (61) they are interpreted as delimiting the clear boundary beyond which the activity cannot continue. For instance, (61a) implies that he ate to a point where he could eat no more.

We can, therefore, claim that the reason why AP resultative complements like damp and tepid in (58) are ungrammatical is not only because they do not deal with the endpoint on a scale, but also because they cannot be interpreted as delimiting the clear boundary beyond the activity cannot continue; one can easily continue the activity beyond the state of affairs such as being damp, and tepid.

The view presented here also allows an account of the fact that not individual-level resultative complements but stage-level resultative complements, in the sense of Carlson (1977), are possible in resultative constructions.

(64)  a. John laughed himself |sick/*intelligent|.
   b. John ate himself |full/*tall|.

According to Carlson, stage-level predicates are those which apply to
spacio-temporal *stages* of individuals and are temporally bounded, and individual-level predicates are those which apply to individuals themselves and have temporally unbounded property. Since resultative complements serve to delimit the event, only stage-level resultative complements can occur in resultative constructions. If individual-level resultative complements describe a temporary state in some context, they may appear in resultative constructions, as in (65).

(65) John laughed himself stupid.

(66) Alice ate the cake tall. (Carrier & Randall (1989: 92))

The resultative complement *stupid* in (65) denotes a temporal state of stupidness, although it is normally a qualitative adjective. *Tall* in (66) is also temporary, because in Wonderland Alice is constantly changing heights.

On the other hand, in the case of the verbs which specify the resultant state, the event denoted by them is a bounded event. The added resultative complements, therefore, do not need to delimit the event. Actually, we can find gradable resultative complements with such verbs, e.g. *paint*, as in (67).

(67) I painted the door *a pale shade of yellow/pinkish*.

Moreover, the examples (68a–b) show that the acceptability is affected by whether we are led to focus on the endpoint of activity of the verb. The addition of *up* gives us an endpoint for the activity of scrubbing. In contrast to *shiny*, the resultative *clean* has a natural endpoint, so that it can be used without *up*, as in (68c).

(68) a. *That pot sure scrubbed shiny.*
    b. That pot sure scrubbed *up* shiny, didn’t it?
    c. That pot sure scrubbed *clean.* (Napoli (1992: 81))

Thus, in the case of the verbs which specify the resultant state, resultative complements do not need to act as delimiters, but the resultative complements which we can add to the verbs are restricted semantically.

(69) He broke the vase *open/*worthless*.

In (69), the resultative complement *open* further modifies the broken state, whereas *worthless* designates a distinct change of state.

To sum up, we have seen that the cognitive model can account for the fact that AP resultative complements tend to deal with the endpoint on a scale. In addition to this tendency, we can properly predict that gradable resultative complements are possible with verbs which specify the states. In that case, the added resultative complements are restricted to the meanings modifying the states.
5.3. The Derived Resultative Constructions and Their Acceptability

As we have seen in section 2, there are great differences in judgments of acceptability among the derived resultative constructions, as shown in (70)(= (13)) and (71)(= (14)).

(70)  a. OK/ The rooster crowed the children awake.
     b. OK/ *In the movie’s longest love scene, Troilus and
        Cressida kiss most audiences squirmy.

(71)  a. OK/ *It snowed the roads slippery.
     b. OK/ *It thundered the children awake.

On the other hand, there are no differences in judgments of acceptability among the following intransitive resultative constructions, where the postverbal NPs are fake reflexives in (72) and inalienable NPs in (73):

(72)  Mary laughed herself silly.

(73)  John walked his feet sore.

Following these data, it is, therefore, assumed that these judgments of acceptability depend on whether it is difficult (or easy) for us to cognitively construe the subject and object as an Agent and a Patient respectively. To be sure, in the case of fake reflexives or inalienable NP, it is easier to causally relate the preceding subevent denoted by a subject and a verb with the following subevent denoted by an object and a resultative complement, because the subject (Agent) is identical with the object (Patient). However, in the case of (70) and (71), there is no common participant in the two subevents. Thus we need to employ other factors, e.g., our encyclopedic knowledge, the pragmatic factors, a certain context and so on, in order to relate them. It is, therefore, assumed that cognitive plausibility raises the acceptability of (74).

(74)  a. The sopranos sang us sleepy.  (Hoekstra (1988: 116))
     b. They danced their competitors out of the contest.
     c. The child cried her mother into submission.
        (Michael T. Wescoat (p.c.))

We handle this use as an extension from more grammaticalized pattern of fake objects in our framework, and the fact that we can find these arbitrary relationship between the two subevents in the restricted setting supports the cognitive analysis of resultative constructions again.
6. Conclusion

In this paper we have considered the English resultative constructions from the perspective of cognitive grammar and have shown that the cognitive analysis can precisely describe various properties of resultative constructions. Moreover, by assuming the cognitive model in Figure 4, we have incorporated the three following notions in our analysis: a notion of the transmission of energy, a notion of path, and a notion of bounded/unbounded. We have made use of these notions in order to account not only for various properties of resultative constructions, but also for the reason why some resultative constructions are acceptable, while others are not. In addition, the argument presented here makes it clear that we can further apply the cognitive approach to a broader coverage of linguistic phenomena beyond the ones dealt with in this paper.

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