On the Syntax and Semantics of Resultative Adjectives in English[*]

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Chang, Kyungchul. 2008. On the Syntax and Semantics of Resultative Adjectives in English. *The Linguistic Association of Korea Journal, 16*(4), 147-171. This paper shows a fairly tight relationship between the syntax and semantics of resultative adjectives with lexical verbs in English (e.g., *wipe the table clean*). It is argued that the resultative adjective (RA) is part of the predicate it forms with the lexical verb (V) immediately and restrictively. The resulting complex predicate is a grammatical and semantic unit that is syntactically intricate. The paper supports the argument using morphological operations including *-ing* nominalisation and semantic tests for contradiction and telicity. In line with constructionists, it also proposes an analysis of the V-RA combination as a construction. The construction is a template that is stored in the lexicon with the constructional meaning of direct causation and is integrated with a resultative adjective and/or a lexical verb therein by means of fusion. A relatively flat structure is used to represent this lexical construction in phrasal syntax.

Key Words: resultative adjective, lexical verb, complex predicate, V-RA combination, construction, template, constructional meaning, direct causation, fusion, the lexicon, phrasal syntax

1. Introduction

This article is primarily concerned with those adjectives (or adjective phrases) which have been called "resultatives".[1] Resultative adjectives

1) The term 'resultative' was putatively originated from Halliday (1967) who calls it a 'resultative attribute'. The present study adopts the former term rather

(RA) combine with lexical verbs (V) to describe the result state of the actions denoted by the verbs. When these V-RA combinations are used transitively, an object is in a certain manner interposed between their parts. A set of examples is given in (1):[2]

(1) a. Ben threw the window open.
    b. Tom drove Jo mad.
    c. Sue wiped the table clean.

The central problem is that the syntax and semantics of such V-RA combinations are not completely determined by their parts. They denote a single meaning that exceeds the sum of the meanings of their parts, as in (1a) and (1b). They also build a verb phrase that is not properly governed by the verb part in that the resultative part in (1c) can be omitted with no significant change of the verb meaning.

One way of coping with this problem is to consider the approaches of Goldberg (1995) and Jackendoff (2002). In these approaches, resultatives are "constructions" or "constructional idioms" into which a lexical verb and an object (and subject) can be integrated. The resulting "template" bears the "constructional meaning" of "causation" and takes on an array of "arguments" in Goldberg or a "lexical verb phrase" in Jackendoff.

This article presents an alternative to these argument and lexical VP

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than the latter and confines the scope of its use to a class of adjectives.

2) How far the class of resultatives in (1) goes is another interesting question. The class may be extended to include noun phrases, prepositional phrases and particles with "subject-oriented" resultatives. These are illustrated in (i) and (ii):

(i) a. I painted the car a pale shade of yellow.
    b. I cooked the meat to a cinder.
    c. The boxer knocked John out.   (Simpson, 1983, p. 143)
(ii) The wise men followed the star out of *Bethlehem*.
                                 (Wechsler & Noh, 2001, p. 397)

Although the present investigation is not concerned with this extended class, the proposed analysis will have certain implications for an account of it. See also Goldberg & Jackendoff (2004) who regard the class of resultatives as a 'family of constructions' in which they are systematically organised according to their syntactic and semantic properties.

analyses. It argues for a treatment of the resultative adjective as part of the predicate it forms with the verb immediately and restrictively (cf. Bach, 1979). The resulting "complex predicate" is a grammatical and semantic unit that is separable at surface syntax for an object.

In order to justify this argument, the paper presents morphological derivations including *-ing* nominalisation, and semantic tests for telicity and contradiction. It also proposes an analysis of the V-RA unit as a construction. The construction is held in the lexicon as a template with the constructional meaning of "direct causation" and is integrated with a resultative adjective and/or a lexical verb therein by means of "fusion". A flat structure built from constituency and linear order constraints is used to represent this lexical construction in phrasal syntax.

The remaining sections are organised as follows. Section 2 provides preliminaries of resultative adjectives with associated lexical verbs and addresses problems and issues about the syntax and semantics of their combinations. Section 3 outlines constructional accounts and identifies problems with them on the nature of so-called resultative constructions. Section 4 introduces the complex predicate hypothesis and supports it using operations such as *-ing* nominalisation and tests for telicity and contradiction. Section 5 proposes an analysis of V-RA combinations as lexical constructions and brings implications for a grammatical theory of these constructions. Section 6 summaries the analysis with a conclusion.

2. Preliminaries

It is argued in this section that the syntax and semantics of V-RA combinations are not completely determined by their parts. The meaning they denote is greater than the sum of the meanings of their parts. The verb phrase they build is not properly governed by the verb part.

2.1. The Single Meaning

Although resultatives adjectives may combine with various lexical verbs under certain restrictions, they constantly describe the result of the actions denoted by the verbs. They designate not merely a "state"

but also a "change" into that state in terms of "entailment" (Weschler, 2005). For example, (2a) entails that the window became open, (2b) that Jo became mad, and (2c) that the table became clean:

(2) a. Ben threw the window open.
   b. Tom drove Jo mad.
   c. Sue wiped the table clean.

The main problem, however, is that the result meaning is not always entailed by associated lexical verbs in typical use. Although (2c) does indeed entail that Sue wiped the table, this does not guarantee that a change of state is being denoted here. In addition, (2a) and (2b) fail to entail that Ben threw the window and that Tom drove, respectively.

A general assumption on this result meaning is that it is subsumed under the notion of causation (Tenny & Pustejovsky, 2000). Causation basically consists of two separate but related events. One is a "causing" event and the other a "resulting" (or caused) event. These two events are often captured by 'semantic functions', notated CAUSE (or MAKE) and BECOME. Since the result meaning amounts to the BECOME function, it is definitely an integral part of the semantics of causation.

A question arises from the BECOME function concerning the nature of the semantic structure it forms with the CAUSE function. In general, this semantic structure is built in such a way that the former and its argument are "subordinated" to the latter and its argument. However, various versions of it have been suggested, as illustrated in (3) below:[3]

(3) a. 'X causes Y to become AP by V-ing'   (Goldberg, 1995)
b. 'X's V-ing (Y) causes Y to become AP'   (Van Valin, 2005)[4]
c. 'X makes Y become AP by V-ing'   (Culicover & Jackendoff, 2005)

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3) Another relevant issue is the nature of the argument component of the semantic structures (see also Tenny & Pustejovsky, 2000). As may be noticed in (3), the external argument of the semantic function CAUSE or MAKE is either an event ($X's$ $V-ing$) in Van Valin or an individual (X) in Goldberg and Culicover & Jackendoff. The present inquiry are not concerned with this issue.

4) This is a shorthand of Van Valin's original semantic structure *[do' (Vince, [wipe' (Vince, table)])] CAUSE [BECOME **clean'** (table)]* for the sentence *Vince has wiped the table clean.*

The present study approaches the semantics of resultative adjectives in terms of "direct causation" (cf., Van Valin & LaPolla, 1997). The semantic functions in question are together combined and computed as a single meaning, notated CAUSE-BECOME. Telicity and contradiction tests are used in Section 4 to justify this treatment.

2.2. The Grammatical Pattern

The resultative adjective denoting part of (direct) causation forms a verb phrase (VP) with a lexical verb and/or an object. This verb phrase is a grammatical pattern that may undergo such grammatical operations as VP-fronting, *though*-movement and pseudo-clefting. To illustrate this, compare the examples in (4) and (5) (see also Roberts, 1988):

(4) a. Sue wanted to wipe the table clean,
      and wipe the table clean she did.   (VP-Fronting)
   b. Wipe the table clean though Sue may... (Though Movement)
   c. What Sue did was wipe the table clean.   (Pseudo-clefting)
(5) a. Sue wanted to wipe the table clean,
      *and wipe the table she did clean.   (VP-Fronting)
   b. *Wipe the table though Sue may clean,.... (Though Movement)
   c. *What Sue did clean was wipe the table.   (Pseudo-clefting)

The central problem, however, is that the verb phrase is outside the domain of the main verb. The resultative part of this VP is not strictly subcategorised by the verb part. Neither is the object of it necessarily involved in this subcategorisation frame. Examples are given below.

Firstly, resultatives may be optional, as illustrated in (6), when used with transitive verbs like *wipe* with no significant change of the verb meanings (see also Aarts, 1995):

(6) a. Sue wiped the table (clean).
   b. *Sue wiped.

Secondly, resultatives may be used with intransitive verbs like *shout,* as

illustrated in (7), where an object is required under so-called "direct object restrictions" (Rappaport Hovav & Levin, 2001). Carrier & Randall (1992) call these particular uses "intransitive resultatives" and those in (6) "transitive resultatives":

(7) a. Meg shouted him *(awake).
    b. Meg shouted.

Thirdly, intransitive resultatives may be further used with so-called "fake reflexive" pronouns, as illustrated in (8), though in an intransitive context (Simpson, 1983):

(8) a. Meg shouted herself *(hoarse).
    b. *Meg shouted hoarse.

These characteristics pose a question concerning the internal structure of the verb phrase. Although most studies agree, based on (4) and (5), that the resultative is integrated into the verb phrase, they disagree on the syntactic status of it therein. Some argue that the resultative is a complement that forms either a binary structure with the verb, as in (9a), or a triadic structure with the verb and object, as in (9b). Others contend that the resultative is either a complement that forms a "small clause (SC)" with the object, as in (9c), or an adjunct that is added to the verb phrase while forming a SC with the null pronoun (PRO) which is "predicated" of the object through "co-indices", as in (9d) below:

(9) a. [$_{VP}$ [$_V$ **wiped**] [$_{NP}$ the table] [$_{AP}$ **clean**]]   (Bach, 1979)[5]
     b. [$_{VP}$ [$_V$ wiped] [$_{NP}$ the table] [$_{AP}$ clean]].   (Roberts, 1988)
     c. [$_{VP}$ [$_V$ wiped] [$_{SC}$ the table clean]].   (Hoekstra, 1988)
     d. [$_{VP}$ [$_{VP}$ wiped the table$_i$] [$_{SC}$ PRO$_i$ clean]].   (Aarts, 1995)

The present inquiry argues for the analysis in (9a). The resultative

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5) The verb-plus-resultative unit between whose parts the object is interposed is marked in bold letters.

adjective immediately combines with the verb to form a semantic and grammatical unit whose parts are separable at surface syntax. The object of this unit immediately follows the verb part of it under the general pattern of the English transitive verb phrase. The resulting VP is a discontinuous structure that differs from the flat version in (9b). To see the difference, compare the representations illustrated in (12) below:6)
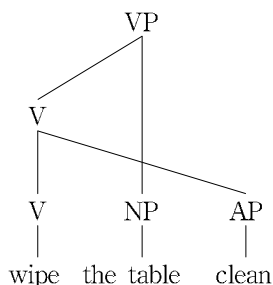
(10) a.   b.
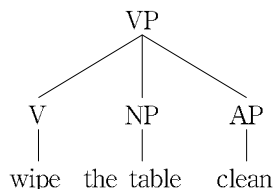
To justify the first analysis, morphological operations are presented in Section 4.

The key issue is then the way of accounting for those syntactic and semantic properties. As observed, these are not completely determined by associated lexical verbs. They should thus be coped with outside the domain of the verbs.

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6) One might be against the branch-crossing representation of tree structures in general (see Radford (1988) for one source of opposition). This opposition however seems to rest on visual preferences rather than strong motivations both conceptual and empirical. On the contrary, the discontinuous structure adopted here will be tenable if we take into account the interpretation of PS rules as separate constraints on constituency and linear order (see Culicover & Jackendoff 2005). This constraint-based view has already been extensively used to elaborate on a discontinuous analysis of unbounded dependency constructions like interrogatives, with no critical change of the established assumptions (see Blevins 1994). Although the present investigation does not discuss the representational issue in further detail, it is due to suggest below that the discontinuous structure is merely part of the model developed here in terms of Culicover & Jackendoff's (2005) 'representational modularity'.

3. Constructional Approaches

One way of dealing with the issue just addressed is to consider the constructional approaches of Goldberg (1995) and Jackendoff (2002). In these approaches. a construction is an "autonomous" unit that associates form and meaning in a conventional way. The meaning side involves lexical semantics and pragmatic-discourse functions, and the form side contains words and word combinations, including prosodic patterns.

3.1. Goldberg's Template Construction

In Goldberg (1995), a construction is a "template" into which a lexical verb can be integrated. And the participant roles of the lexical verb and the argument roles of the construction are separate but connected. The template for resultative constructions is illustrated in (11) below:

(11) The Template for Resultative Constructions

Semantics	CAUSE-BECOME	<AGENT,	PATIENT,	RESULT>
	PRED	< ,	,	>
Syntax	V	SUBJ	OBJ	OBL$_{PP/AP}$

In this template, the lexical verb is inserted in the PRED by means of "fusion". The participant roles and the argument roles are also connected in a similar manner. Since the argument role RESULT is not part of the verb meaning, an adjective for that role is selected not by the verb but by the whole construction. This analysis is applied as illustrated in (12) to the sentence *Sue wiped the table open*:

(12) The Resultative Construction for *Sue wiped the table open*

Semantics	CAUSE-BECOME	<AGENT,	PATIENT,	RESULT>
	wipe	< Sue ,	the table ,	open >
Syntax	V	SUBJ	OBJ	OBL$_{PP/AP}$

However, Goldberg's account is questionable. It is difficult to conceive of the resultative adjective as an argument.[7] The adjective is assigned no such normal thematic roles as typical arguments like object usually receive, such as Agent and Patient.[8] It could rather be part of the predicate it forms with the lexical verb, perhaps being "predicated" of the object argument.[9]

3.2. Jackendoff's Constructional Idiom

Jackendoff (2002, p. 167 ff.) argues that it would be absurd to claim that those "idiom-like" expressions illustrated in (13) are completely frozen units:[10]

(13) a. take advantage of NP, make much of NP, take umbrage at NP
    b. sing one's head off, talk one's head off, drink one's head off
    c. belch one's way out of the restaurant, drink one's way

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7) See also Carrier & Randall (1992) and Simpson (1983) for similar analyses.

8) See also Aarts (1995) for further discussion of this point.

9) Concerning the nature of resultative adjectives, one anonymous reviewer points out that it is possible to treat an adjective as an argument of *be* as in *John is happy*. If we take this possibility seriously, the resultative adjective could be an argument of the main verb.

However, this is a general problem arising from different views in linguistics rather than a matter of truth in language. Whereas some linguists may pursue an argument analysis of *happy* in the example just mentioned, this analysis might fall out of favour to others. Ackerman & Webelhuth (1998) take a notional view of generalising analytic and synthetic predicates across languages into a single predicate. In this view, for example, passives like (*He*) *was killed* are analysed as an analytic predicate that is merely extended from the its head verb (*kill*) for passivisation. If this is the case, then *be happy* is an extended predicate of *happy* in such a way that the underlying predicate pattern *be-AP* is integrated with the adjective predicate rather than that the verb part takes the adjective part as its argument. This analysis may be plausible crosslinguistically. This is because the synthetic predicate form of *yeppuda* in Korean directly corresponds to the analytic predicate of *be pretty* in *She is pretty*.

10) The examples are minimal modifications of the original counterparts from Jackendoff (2002a, pp. 173-175).

across the country, sing one's way through dinner
d. twist the night away, drink the whole afternoon away, knit
two hours away
e. water the tulips flat, cook the pot black, drive one's engine
clean

Jackendoff's suggestion is that these idiomatic expressions conform to their more general patterns. According to him, the patterns are a "lexical verb phrase" or "lexical VP" that may have, in varying degrees, fixed parts and empty slots for words and/or phrases, as illustrated in (14) below, where uppercase indicates a fixed combination, and lowercase a free combination:

(14) a. [$_{VP}$ V NP [PP P np]]: take advantage of np,...
b. [$_{VP}$ v NP PRT]: v pro's head/butt, v pro's heart out 'v excessively'
c. [$_{VP}$ v NP pp]: v pro's way pp, 'go pp while/by v-ing'
d. [$_{VP}$ v np PRT]: v np [time period] away, 'spend np v-ing'
e. [$_{VP}$ v np ap]: 'cause np to become ap by V-ing'

Jackendoff also considers that the lexical verb phrases form a "family of constructional idioms", and that the resultative lexical VP belongs to this family.

The key issue in Jackendoff is the way of constructing resultative expressions from the resultative lexical VP in (14e). Jackendoff suggests that the empty places of the constructional idiom are fused or unified with many other items. He takes this fusion to be a "free combination" that occurs at phrasal syntax.

However, Jackendoff's account is not entirely clear with regard to free combination. In fact, not all parts of the resultative lexical VP are equally involved in free combination. Although the object part may be freely fused with many other nominals if they enter into the range of semantic roles the VP prescribes, the verb and resultative parts show no such quality. They are rather considerably restrictive in combination, as illustrated in (15), in terms of "lexical selection" (Green, 1972) and

"lexical subordination" (Rapoport & Levin, 1988):

(15) a. He hammered it {flat/smooth/shiny/*beautiful/*safe/*tubular}.
    b. He wiped it {clean/dry/smooth/*damp/*dirty/*stained}
    c. She wrenched it {free/loose/*broken/*tight}
    d. She shot him {dead/*lame/*paranoid/*wounded}

<div align="right">(Green, 1972, pp. 83-4)</div>

4. The Complex Predicate Hypothesis

I argue that the resultative adjective is part of the predicate it forms with the lexical verb immediately and restrictively. The resulting 'complex predicate' such as *wipe clean* is a grammatical and semantic unit that is syntactically intricate. The object of this unit is simply interposed between the parts of it under the general patterns of English.

Although this hypothesis is adopted by some scholars, it has not been richly supported on empirical grounds.[11] Neither is it explicitly justified in regard to the correlation between the syntax and semantics of V-RA combinations. Using Google Search, I show that the tight relationship between the verb and resultative parts correlates with the direct relationship between the CAUSE and BECOME functions.

4.2. Morphological Derivations

V-RA combinations are grammatical units from which an object is excluded. They may be nominalised and adjectivalised by the addition of -*ing* and -*ed* to the verb part. Examples are given below.

V-RA combinations such as *throw open* and *drive mad* may undergo -*ing* nominalisation:

(16) a. ...abruptly by the throwing open of a door.
    (http://community.livejournal.com/redemptionday/29036.html)

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11) For a similar view, see Bach (1979), Embick (2004) and Müller (2006).

b. The driving mad of his parents affected Neville greatly.
(http://www.wikipedia.ws/wikipedia/ne/Neville_Longbottom.html)

These combinations may also participate in *-ed* adjectivalisation:

(17) a. Muskets bristled from the thrown-open windows ...
(http://www.treasurenet.com/westeast/200001/relichunter)
b. McAlester is the driven mad scientist,...
(http://www.haro-online.com/movies/deep_blue_sea.html)

Likewise, V-RA combinations such as *wipe clean*, *paint white*, and *shoot dead* may be nominalised using the *-ing* form, as shown below:

(18) a. the wiping clean of the table (Williams, 1994, p. 105)
b. ...the painting white of woodwork in various rooms...
(http://www.british-history.ac.uk/report.aspx?compid=40548)
c. The shooting dead of Jean Charles de Menezes...
(http://news.bbc.co.uk/2/hi/uk_news/politics/4261136.stm)

These combinations may also be adjectivalised using the *-ed* form:

(19) a. I frowned and sat down at the wiped clean chair,...
(http://www.freewebs.com/unhappysmilech1/chapter2.htm)
b. The painted white sofas and window benches signified purity.
(http://www.tfaoi.com/aa/2aa/2aa141.htm)
c. The shot dead police officer, Ian James Terry,...
(http://www.digitaljournal.com/article/255926)

In particular, *-able* and agentive *-er* might be added to the resultative part or perhaps whole predicate of *wipe open*:

(20) a. ...wipe-cleanable Hytrel water hose...
(http://www.manufacturingtalk.com/news/mka/mka100.html)
b. Straight d-Limonene can be used as a wipe cleaner,...
(http://www.floridachemical.com/whatisd-limonene.htm)

There are three notes to be made on these illustrations. First, V-RA combinations are, more specifically, morphological units if the operations they undergo are assumed to be morphological derivations. Second, they may also be lexical units if these operations are posited to occur in the lexicon. Third, they may have a part-whole structure if *-ing* and *-ed* are added to the inner verb, e.g. *[wipe]-ing/-ed clean*, and *-er* and *-able* to the outer verb or whole predicate, e.g. *[wipe clean]-er/-able*. These three points are all incorporated into the proposed analysis below.

4.2. Semantic Tests for Direct Causation

The unithood of V-RA combinations is partly due to the meaning of the combinations. The relationship between the V and RA parts is tight in proportion to the close connection between the CAUSE and BECOME functions. This correlation is particularly significant when V-RA combinations like *hammer flat* and lexical verbs of "accomplishment" like *open* are compared, as illustrated in (21) and (22) respectively, to test for "telicity" using *for-* and *in*-phrases (see also Rothstein, 2004):

(21) a. He hammered the metal flat in an hour/*for an hour.
     b. He hammered the metal for an hour/*in an hour.
(22) Sam opened the door in/*for an hour.

The acceptable examples demonstrate that V-PA combinations behave like simple lexical verbs as semantic (or telic) units.

In addition, tests for contradiction show that V-RA combinations are semantically closer to causative-*make* than to causative-*cause*:

(23) a. # Sam pushed the door open, but it wasn't.
     b. # Sam made the door open, but it wasn't.
     c. Sam caused the door to open, but it wasn't.

In contrast to (23c), both (23a) and (21b) are semantically anomalous and are marked by #. Van Valine & LaPolla (1997, ch. 8) treat the

semantics of causative-*make* as "direct" causation and that of causative-*cause* as "indirect" causation, though the difference is surely a matter of degree. Since V-RA combinations behave like causative-*make* in these tests, they deserve the treatment of direct causation.

5. A Lexical and Constructional Analysis

Drawing on this syntax-semantics correlation, I assume that V-RA combinations are complex predicates and are grammatical and semantic units. In this section, I adopt a constructional approach and propose an analysis of the complex predicates as lexical constructions. I also note theoretical implications for a theory of those constructions.

5.1. Idiomatic and Productive V-RA Combinations

It is generally assumed that idioms are not completely determined by their parts. They are permanently frozen with a single meaning that exceeds the sum of the meanings of their parts. For example, *kick the bucket* may be a frozen unit, meaning 'die'.

V-RA combinations show similar behaviour. The meaning of a V-RA combination is greater than the sum of the meanings of its parts. An example is reproduced in (24):[12]

(24) Ben threw the window open.

The adjective part of *throw open* in (24) is a resultative by definition. It denotes not only the state of being open but also a change into that state ('becoming open'). The verb part, however, does not entail the throwing action. The sentence fails to have no such an entailment that Ben threw the window. Hence, the V-PA combination is idiomatic.

Yet, not all V-RA combinations are eternally frozen units. They are

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12) *Throw open* is registered in *Cambridge Advanced Learner's Dictionary* (3rd ed) as an entry under the heading of *throw*, meaning 'to open something which was closed, usually suddenly and completely'.

rather to some extent productive, though under certain restrictions. For example, the resultative part of *throw open* in (24) might be available for adjectives like *closed*, as given in (25), though the class is limited:

(25) Ben threw the window closed.

In addition, the resultative part of *drive mad*, as illustrated in (26) below, may be replaceable with other adjectives (or nominals) denoting a negative mental state (Boas, 2003; Goldberg, 1995):

(26) Tom drove Jo mad/crazy/insane.../*sane.

Even both parts are allowed to produce a large number of V-RA combinations, some of which are taken from the examples above and are given in (27):

(27) a. Sue wiped the table clean.
     b. He hammered the metal flat.
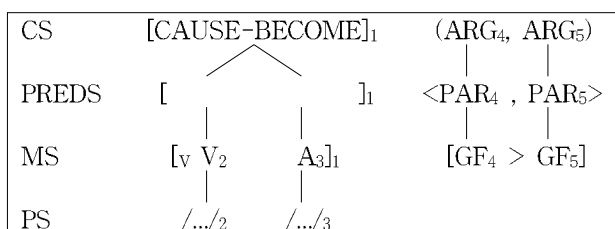   c. Meg shouted him awake

   Goldberg (1995) and Jackendoff (2005) identifies such regularities as constructions and constructional idioms respectively. Though the authors take different views on some facts of the notion of construction, they show similar assumptions on many others.[13] First, linguistic expressions form a "family of constructions" from non-compositional to transparently compositional. Second, constructions denote a "constructional meaning" that is decomposable into a limited set of semantic functions in terms of "lexical decomposition". Third, constructions are stored in the lexicon as a form of "template" fully or partially specified or even unspecified. Fourth, template constructions are integrated with words and/or phrases by means of "fusion" in the lexicon through phrasal syntax.

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13) See also Goldberg & Jackendoff (2004).

5.2. V-RA Constructions as Templates

Once we adopt this approach, V-RA combinations are constructions that conform to their more general pattern(s). The pattern may be a template that is listed in the lexicon with the constructional meaning of direct causation. The proposed template for various V-RA combinations is the modular representation illustrated in (26) below in terms of the notion of "representational modularity" (Culicover & Jackendoff, 2005):

(28) Template for the V-RA (or Resultative) Construction[14)]

$$
\begin{array}{llll}
\text{CS} & [\text{CAUSE-BECOME}]_1 & (\text{ARG}_4,\ \text{ARG}_5) \\
\text{PREDS} & [\quad\quad\quad\quad\quad\quad]_1 & <\text{PAR}_4\ ,\ \text{PAR}_5> \\
\text{MS} & [_V\ V_2 \quad A_3]_1 & [\text{GF}_4 > \text{GF}_5] \\
\text{PS} & /.../_2 \quad /.../_3 &
\end{array}
$$

There are several notes to be made on the modular representation in (28). First, it consists of two major components: predicate on the left and argument on the right. Second, conceptual structure (CS) exhibits the constructional meaning of direct causation for V-RA combinations,

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14) One anonymous reviewer raises the question of whether this template can possibly be applied to all different types of resultative including unaccusative and unergative cases. Although the present inquiry is not concerned with those sub-classes, my tentative answer would be "perhaps" if the proposed template is modified in a principled way. If the construction from which the semantic function CAUSE is excluded together with the relevant argument and participant roles and GF is considered to be a "subpart" of the matrix template, it will allow V-RA combinations to carry a single argument (cf. Goldberg, 1995). If this is the case, then the predicate component of the sub-template will be fused with a lexical verb and a resultative adjective, which we will see in due course, yielding an unaccusative (or intransitive) resultative such as (*The table) wipes clean*. Concerning this possibility, however, it should be noted that unaccusativity in general might be a construction-level property rather than a word-level or verb category. This is because there is a case in which, when an unaccusative resultative occurs as a true "middle", it is always required, as in *This kind of meat pounds thin easily/*This kind of meat pounds easily* (Levin & Rapoport, 1988, p. 285). Taken together, I shall leave the raised question as a topic for future research.

notated CAUSE-BECOME. Third, predicate structure (PREDS) captures "semantic forms" of V-PA combinations which are often posited in the standard LFG (Dalrymple, 2001). Fourth, morphological structure (MS) reflects the possibility that V-RA combinations undergo morphological operations, as illustrated above. It also shows the part-whole structure of V-RA combinations which may permit two possible arrangements of an object either after the inner verb, or after the outer verb or whole predicate, as given in (29) below (cf. Jackendoff's (2002) lexical VP):[15)]

(29) Ben threw the window open/threw open the window.

Fifth, and more importantly, the difference in subscript between V_1, V_2 in MS, and elements in other structures, indicates the constructional nature of the proposed template. Sixth, phonological structure (PS) also allows for the template nature of the V-RA construction by using the blank style of transcription for it, such as /.../.[16)] Seventh, the argument component displays Goldberg's (1995) division between argument (ARG) and participant (PAR) roles which are separate but linked. These are, via an array of "grammatical functions" (GF), mapped onto argument noun phrases in (Phrasal) Syntactic Structure (SS), which we will see. In line with Culicover & Jackendoff (2005), all these modular structures are assumed to link to each other via mapping mechanism.

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15) A choice of one of these two arrangements surely depends upon which one of the postverbal elements receives semantic focus at clause-final position, as also readily observed in the use of phrasal verbs (e.g., *look the word up/look up the word*). When the result state denoted by *open* is semantically focused, the adjective is most likely to come last, resulting in *throw the door open*. When the entity referred to by *the window* is semantically focused, on the other hand, the object NP in turn is most likely to come last, yielding *throw open the window*. In both cases each element receiving semantic focus also tends to be phonetically accented, as illustrated in *throw the window OPEN* and *throw open THE WINDOW*. Although the present study is not concerned with information values and prosodic features as such, it is not difficult to incorporate their interactions into the proposed model. To this end Information Structure (IS) can be added to the model as one of its modular structures, and Phonological Structure (PS) should be elaborated on accordingly.

16) For typographical convenience, the conventional English spelling system rather than a phonological transcription practice is used throughout the remaining analyses.

The proposed template may then be frozen with *throw* for *Ben threw the window open*, As observed, the sentence does not entail that Ben threw the window. This property is captured by the identical subscript number 1 between [CAUSE-BECOME]$_1$ in CS, [THROW$_1$ ...]$_1$ in PREDS, [v V$_1$ ...]$_1$ in MS and *throw*$_1$ in PS, as illustrated in (30) below:

(30) <u>Lexical Entry for *throw open*</u>

CS	[CAUSE-BECOME]$_1$	(AGT$_4$, PAT$_5$)
PREDS	[THROW$_1$ OPEN$_{1/2}$]$_1$	< , >
MS	[v V$_1$ A$_{1/2}$]$_1$	[GF$_4$ > GF$_5$]
PS	throw$_1$ open$_{1/2}$	

It should be noted, however, that the resultative part of *throw open* in (30) may be assigned the subscript number 1 or 2. Whereas the first choice suggests that the resultative is fixed with the verb, the second reveals that *open* is one of the larger class of adjectives that may combine with the verb. As noted above, *throw* can be used with *closed*.

A similar analysis is also applied to *Tom drove Jo mad*. For the same reason as just mentioned, the template in question is frozen with *drive*, and the modular structures share the subscript number 1. The resultative part, nevertheless, may not be fixed with *mad* because it is, as seen above, available for other adjectives under the given restriction. The proposed lexical entry may thus be the template illustrated in (31), where the resultative part is assigned the subscript number 2, not 1:

(31) <u>Lexical Entry and Template for *drive-RA* in the Lexicon</u>

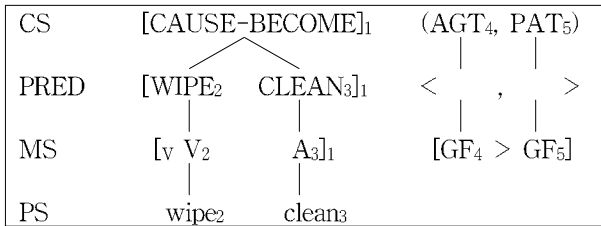|		
CS	[CAUSE-BECOME]$_1$	(AGT$_4$, PAT$_5$)
PREDS	[DRIVE$_1$]$_1$	< , >
MS	[v V$_1$ A$_2$]$_1$	[GF$_4$ > GF$_5$]
PS	drive$_1$ /.../$_2$	

This template is then fused with *mad* in the lexicon, perhaps by, in Jackendoff's term, (semi-)productive (derivational) morphology to yield the lexical construction illustrated in (32) below:

(32) Fusion of the Template *drive-RA* with *mad* in the Lexicon

CS	$[CAUSE\text{-}BECOME]_1$		(AGT_4, PAT_5)
PREDS	$[DRIVE_1$ $MAD_2]_1$	$<$, $>$	
MS	$[_V V_1$ $A_2]_1$	$[GF_4 > GF_5]$	
PS	$drive_1$ mad_2		
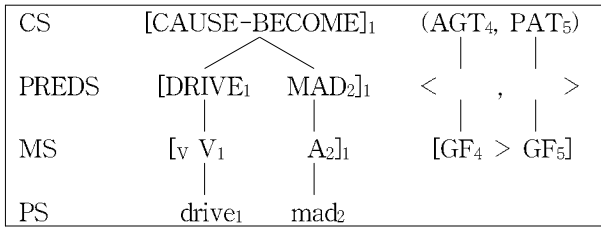
Unlike *throw open* and *drive mad*, however, *wipe* and *clean* are each fused with the proposed template for *Sue wiped the table clean*. This is because, as already witnessed, the sentence entails both that Sue wiped the table and that the table became clean. The discrepancy in subscript between V_1, V_2 and A_3 indicates this fusion, as illustrated in (33) below:

(33) Fusion of the Template with *wipe* and *open* in the Lexicon

CS	$[CAUSE\text{-}BECOME]_1$		(AGT_4, PAT_5)
PRED	$[WIPE_2$ $CLEAN_3]_1$	$<$, $>$	
MS	$[_V V_2$ $A_3]_1$	$[GF_4 > GF_5]$	
PS	$wipe_2$ $clean_3$		

This lexical construction is then plugged into phrasal syntax by normal phrase structure rules to build a verb phrase and sentence.[17]

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17) One anonymous reviewer addresses the issue of how the lexically-formed unit is realized into two separate syntactic elements and the question of whether there is any grammatical mechanism that licenses this. In English there is indeed a grammatical (or, more specifically, morphological) process of combining two or more existing words to form a word denoting a new or extended meaning, such
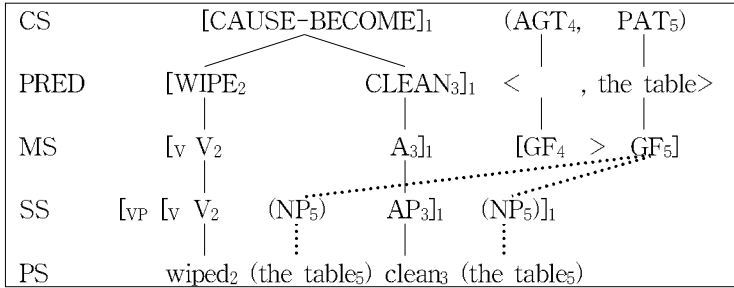
5.3. Constituency and Linear Order at Phrasal Syntax

The study of phrase structure rules in generative grammar has been approached from two different directions under the general assumption that they are internally complex. One direction is to elaborate on tree structures, such as "Aspect Phrase (or AspP)" above the vP (Embick, 2004). The other is to reinterpret the rules as "hierarchically linearised structures" using constraints on the constituency and linear order of possible tree structures (Culicover & Jackendoff, 2005, ch.4)

The present study adopts the second view for the (phrasal) syntactic structure (SS) of *Sue wiped the table clean*. The V-RA construction built in the lexicon, *wipe clean*, is brought into phrasal syntax by normal PS rules. The noun phrase (NP$_5$) combined with the construction via constituency constraints, *the boy*, immediately follows the verb part of it via linear order constraints. In this case, the part-whole structure of the construction may permit an analysis of placing the NP right after either the inner verb (V$_2$) or the outer verb (V$_1$). These two possibilities are marked by dotted lines, as illustrated in (34):
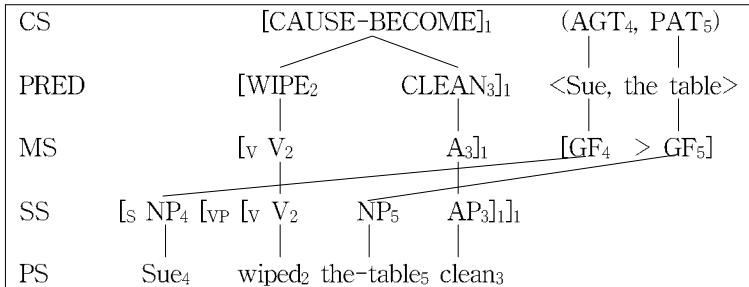
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as *sunglass, sugar-free, junk mail*. This process is called "compounding", and the terminology has been extensively used to characterise so-called phrasal verbs such as *make up*. One of the sources is Chomsky (1975[1955]). He names phrasal verbs "compound verbs" and analyses them as *Verb → Verb + Particle*. He also uses his analysis and term for a larger class of "verb-plus-complement" constructions including *find guilty* from *find him guilt*. In this vein, it is not particularly difficult to extend the class to include the V-RA combinations in question and call them compound verbs. The verb part of these combinations surely is immediately followed by an object at phrasal syntax under the general pattern of the English transitive verb phrase, thereby being separated from the RA part at surface.

(34) Fusion of the Construction with *the table* at Phrasal Syntax

CS	$[CAUSE-BECOME]_1$	$(AGT_4, \quad PAT_5)$
PRED	$[WIPE_2 \qquad CLEAN_3]_1$	$< \quad , \text{the table}>$
MS	$[_V V_2 \qquad A_3]_1$	$[GF_4 > GF_5]$
SS	$[_{VP} [_V V_2 \quad (NP_5) \quad AP_3]_1 \quad (NP_5)]_1$	
PS	$wiped_2 \text{ (the table}_5) \text{ clean}_3 \text{ (the table}_5)$	

The VP construction built in this way at phrasal syntax forms a sentence with argument noun phrases. The noun phrase combined with this VP via constituency constraints precedes that VP via linear order constraints. The result is the sentence illustrated in (35):

(35) Fusion of the Verb Phrase with *Sue* at Phrasal Syntax

CS	$[CAUSE-BECOME]_1$	(AGT_4, PAT_5)
PRED	$[WIPE_2 \qquad CLEAN_3]_1$	$<\text{Sue, the table}>$
MS	$[_V V_2 \qquad A_3]_1$	$[GF_4 > GF_5]$
SS	$[_S NP_4 [_{VP} [_V V_2 \quad NP_5 \quad AP_3]_1]_1$	
PS	$Sue_4 \quad wiped_2 \text{ the-table}_5 \text{ clean}_3$	

Again, the difference in subscript between V_2, V_1 and S_1 indicates the constructional nature of not only the V-RA combination but also the sentence built out of it.

5.4. Theoretical Implications

The proposed analysis has three implications for a theory of grammar.

First, the analysis illuminates the nature of the English resultative. The resultative is not part of the array of arguments it builds with subject and object but of the predicate it forms with the main verb immediately and restrictively. This hypothesis enables a definition of the resultative construction as a straightforward relationship between the syntax and semantics of it. As shown, the construction proves a tighter pairing of form and meaning than Goldberg (1995) and Jackendoff (2002) propose.

Second, the analysis bears out Jackendoff's family of constructional idioms. As described above, V-RA combinations form a small cline of constructions from fully specified (*throw open*) through underspecified (*drive-RA*) to unspecified (*V-RA*). This cline is surely subsumed in a larger family of constructions which includes resultative prepositional phrases such as *break X into pieces* (Goldberg & Jackendoff, 2004). If this is the case, then the grammar of resultatives is very much like a "structured inventory" of those constructions (Langacker, 1987, p. 477).

Third, the analysis sheds light on the nature of the lexicon and the role of it in the grammar. The version adopted here is not a mere repository of adjectives and verbs for V-RA combinations but also a storage of the patterns generalised over these combinations. It is also a dynamic system of fusing these patterns with associated lexical verbs and adjectives to produce various V-RA expressions. This suggests, as Culicover & Jackendoff (2005) assume, that the lexicon is an "interface component" of grammar.

6. Summary and Conclusion

This paper has explored a small class of English V-RA combinations. It showed that the combinations comply with their more general pattern. The pattern basically assumes the syntax of a normal verb phrase and the semantics of causation, which are not completely determined by its parts. The paper nevertheless argued that the pattern is not an array of arguments but a predicate that solely consists of a resultative adjective and a lexical verb. The resulting complex predicate is a grammatical and semantic unit that is separable at phrasal syntax for an object. In

support of this argument, the paper offered morphological operations and semantic diagnostics. It also adopted and adapted a constructional approach for a more constrained analysis of the suggested class than is advanced by Goldberg and Jackendoff. The proposed template is stored in the lexicon with the constructional meaning of direct causation. In the component, it may be frozen with a resultative adjective and lexical verb (e.g., *throw open*), or frozen with one of these two and fused with the other (e.g, *drive mad*), or fused with both (e.g., *wipe clean*). The constituency and linear order constraints assumed to underlie phrase structure rules enable these constructions to build a verb phrase and a sentence with argument noun phrases in a stepwise manner. The paper also touched on the tight nature of V-RA constructions in form and meaning, the possibility of forming a larger family of resultative constructions with prepositional phrases, and the role of the lexicon in the family of those constructions. At the heart of research into grammar are the lexicon and a family of constructions with word classes.

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