Argument-Function Linking in Resultatives[*]

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This paper challenges one prominent common feature in Carrier and Randall's (1992) account of English resultative constructions and Li's (1995) account of Chinese resultative compounds: a weakening of the θ-Criterion by allowing more than one theta role to be assigned to an argument position. While accepting the argument structures and the constituent structures these two papers have argued for, this paper demonstrates that strict one-to-one argument-function linking should not and need not be relaxed and how it is maintained in an account formulated in a simplified lexical mapping theory of LFG, where a feature structure interfaces between the constituent structure and the argument structure. The account of Chinese resultatives hinges upon role suppression, a notion independently motivated; the account of English resultatives relies on functional control, also an independently motivated notion.

Key words: θ-Criterion, linking, resultatives, LFG, absorb, suppress, control

1. Introduction

Resultatives in English involve a syntactic construction where an additional predicative XP indicates the result state of the causing event in the matrix clause, as in (1b) and (2b), while Chinese resultative compounds[1] fuse the causing verb and result verb into a single lexical item, as in (1a) and (2a).[2]

(1) a. Ta   ku-shi-le   shoupa.
       she   weep-soggy-ASP handkerchief
   b. 'She wept the handkerchief soggy.'

(2) a. Ta chuan-lan-le   nan jian hanshan.
       he wear-threadbare-ASP that CL   T-shirt
   b. 'He wore that T-shirt threadbare.'

[1] Clear distinction is made in this paper among the following terms: 'resultative compound' refers to a lexical item, 'resultative construction' refers to a syntactic structure, and 'resultatives' is a cover term for both lexical and syntactic structures.
[2] Syntactically derived resultatives are also available in Mandarin Chinese, which involve the *de* complementizer. However, in this paper we will be concerned with resultative compounds only due to the limitation of space and the fact that the linking in *de*-resultatives is not remarkable.

While the constituent structures of the Chinese examples are quite straightforwardly those of simple [$_{VP}$V-O] (e.g., Li 1995), those of their English counterparts had been quite controversial until the work by Carrier and Randall (1992), where a unified ternary structure of [$_{VP}$V-O-XP] was convincingly argued for. Resultatives in the two languages, however, are very much alike in that the argument structure of the causing verb may 'overlap' with that of the result predicate. This is the nature of linking argument roles to syntactic expressions, in resultatives and beyond, which this paper intends to explore. This paper takes for granted that something like the θ-Criterion, whether as an independent principle in grammar or as a derived notion from event structures, is necessary to constrain this linking.[3] The goal of this paper is to argue that the simplest version of this principle need not be compromised in the analyses for the data of English and Chinese resultatives presented.

The rest of the paper is organized into six sections. Section 2 presents Carrier and Randall's (1992) account of English resultatives and discusses the drawbacks of the relaxed θ-Criterion it requires. A simplified lexical mapping theory (LMT) is presented in Section 3 as an alternative framework, within which an account of the same data covered in Carrier and Randall (1992) is offered in Section 4. Section 5 then moves on to Chinese resultative compounds and an LMT account is provided, which again adheres to the strict one-to-one argument-function linking. Section 6 further discusses a computational aspect of the LFG account and certain implications, followed by some concluding remarks in Section 7.

2. English resultaives

Resultative constructions in English involve a matrix verb denoting the causing event and an embedded XP indicating the resulting state (cf., Levin 1993:101). While the matrix predicate is always headed by a verb, either transitive or intransitive, the embedded result phrase is most commonly an AP but can also be a predicative PP or NP. In both the 'transitive resultatives', as in (3), and the 'intransitive resultatives', as in (4), following the terminologies of Carrier and Randall (1992), the logical subject of the result phrase appears to occupy the same syntactic position of the matrix verb's object.

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[3] The bigger issue concerns whether argument structure is an independent plane in grammar, an issue that is beyond the scope of this paper. I will continue to treat theta roles as independent.

(3) *Transitive resultatives*

    a.   The little girl watered the tulip flat.

    b.   John painted the truck a horrible green.

    c.   The herbalist grounded the leaves into a paste.

(4) *Intransitive resultatives*

    a.   Sue has run her sneakers threadbare.

    b.   The dog barked us awake.

    c.   She wept her handkerchief soggy.

A result state, or r-state, again following Carrier and Randall (1992), that is without a lexically specified overt subject in the postverbal position must be predicated of an intransitive matrix verb. However, intransitive verbs present a split as only unaccusative verbs, not unergative verbs, allow this construction, as in (5). Unergative resultatives require a lexically specified subject; thus, note that in cases where this NP corefers to the matrix subject it must be in a reflexive form, known as the 'fake' reflexive, as in (6).
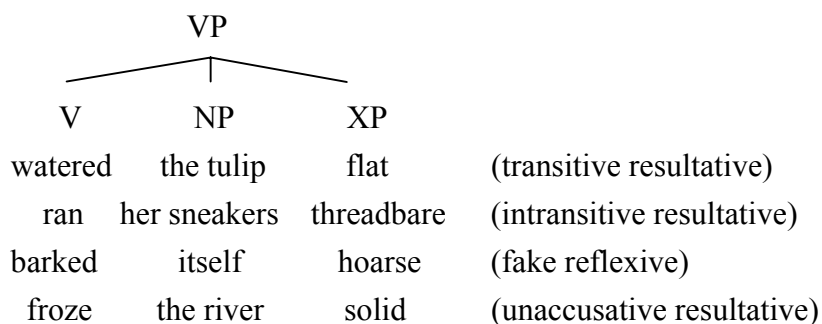
(5) *Unaccusative resultatives*

    a.   The river froze solid.

    b.   The glass smashed to pieces.

    c.   The house burned black.

(6) *Unergative resultatives or 'fake' reflexives*

    a.   The dog barked *(itself) hoarse.

    b.   She shouted *(herself) beet red.

    c.   The kids laughed *(themselves) into a frenzy.

Carrier and Randall (1992), CR hereafter, argued quite convincingly that all resultatives in English share the same ternary VP at D-Structure and thus rejected analyses where the result phrases are treated as small clauses.

(7) The unified ternary analysis

```
                    VP
           _____|_____
          |        |        |
          V        NP       XP
       watered   the tulip  flat       (transitive resultative)
         ran   her sneakers threadbare (intransitive resultative)
       barked     itself    hoarse     (fake reflexive)
       froze     the river  solid      (unaccusative resultative)
```
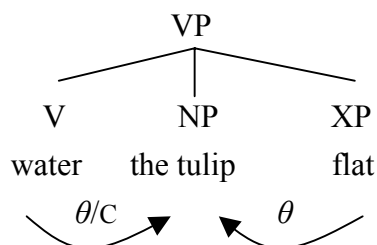
3

First, let's take a closer look at the transitive resultative. In this construction, the matrix verb is transitive and thus requires a postverbal NP, in other words, an object. As shown in (8a), in the argument structure of the transitive verb *water*, there are the external role agent, the internal role theme, and also an added role r-state[4]. As (8b) shows, the result AP phrase of *flat* also takes an external theme argument. Given the ternary analysis in (8c), the postverbal NP receives case only from the main verb but must receive two argument roles, one from the matrix verb, by way of being its internal argument, and one from the result predicate, by way of being its external argument.

(8) Theta assignment in transitive resultatives
   a. *water*   agent [<u>theme</u> r-state][5,]
   b. *flat*   theme [   ]
   c.

$$
\begin{array}{ccc}
 & \text{VP} & \\
\diagup & | & \diagdown \\
\text{V} & \text{NP} & \text{XP} \\
\text{water} & \text{the tulip} & \text{flat}
\end{array}
$$

$\theta/c \quad\rightarrow\quad \leftarrow\quad \theta$

However, regarding the dual theta assignment, an explanation is needed as to technically why this does not violate a strict interpretation of the θ-Criterion, which would require a one-to-one linking. It is thus necessary for CR to propose a relativized θ-Criterion. ('AS' stands for 'argument structure' in the definition below.)

(9) Relativized θ-Criterion (CR 1992: 180)
   An XP chain can be associated with at most one argument position
   in any given AS. Each AS position must be satisfied by one and
   only one XP chain in the syntax.

This revised formulation essentially states that an XP can bear at most one θ-role *assigned by a head*; thus, an XP can have two roles, or more, as long as each

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[4] Note that, the term 'r-state' is used in Carrier and Randall to simply give this argument role a name. The role is, however, undoubtedly of propositional content and thus should fall under the role of proposition.

[5] The model of argument structure adopted by Carrier and Randall (1992) is proposed by Levin and Rappaport (1986, 1995). The role outside the square brackets is the external argument, and the underscored is the direct internal argument. Note that in subsequent sections I will follow the model in LFG and enclose all thematic arguments in angled brackets and leave outside only the athematic arguments.

role is assigned by a different head. As CR (1992:180) pointed out, this point is not novel and had been previously proposed in Rappaport (1986) and Emonds (1985: chp 2). In fact, a similar conception goes back to Chomsky (1981:335). Likewise, it is found in the latest Minimalist approach to syntax (cf., e.g., Hornstein 1998, 2001).

In CR's analysis, this dual assignment of theta roles also occurs in the unaccusative resultative construction. It is commonly assumed in the derivational framework that unaccusatives have an internal theta role. In unaccusative resultatives, an additional theta role, r-state, is again appended to the argument structure of the unaccusative verb, as in (10a). The result predicate, *solid* in (10b) for example, also takes an external argument. The postverbal NP, which receives both the internal role of the matrix verb and the external role from the result predicate as shown in (10c), moves from the object position to the subject position to satisfy EPP[6], as in (10d).

(10)   Theta and case assignment in unaccusative resultatives

    a. *freeze*   [theme r-state]

    b. *solid*   theme [   ]

    c.
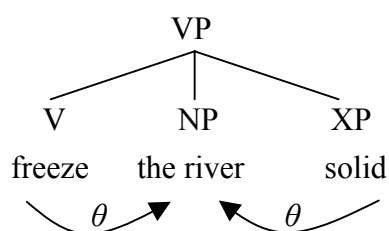
    d.
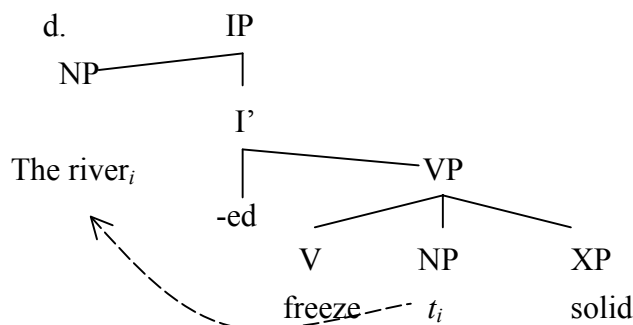
In intransitive resultatives, the matrix unergative verb requires an external argument and an additional r-state, shown in (11a). The result XP phrase also takes an external theme argument; see (11b) for example. With the ternary VP structure, the postverbal NP now only receives the result predicate's external argument. However, as shown in (11c), this NP, by virtue of being in the main verb's object position, is case-marked by the main verb.

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[6] Clause (b) of the Extended Projection Principle, or EPP, requires that all clauses have subjects (e.g., Chomsky (1982:8). EPP is thus a well-formedness constraint on S-Structure.

(11)   Theta assignment in an intransitive resultative
   a. *run*   agent [r-state]
   b. *threadbare*   theme [   ]
   c.

```
                VP
         ┌──────┼──────┐
         V      NP      XP
        run  her sneakers  threadbare
              C   ▼      ◄   θ
```
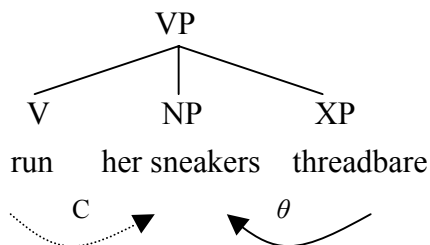
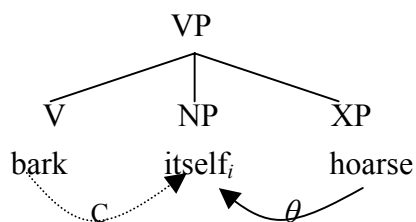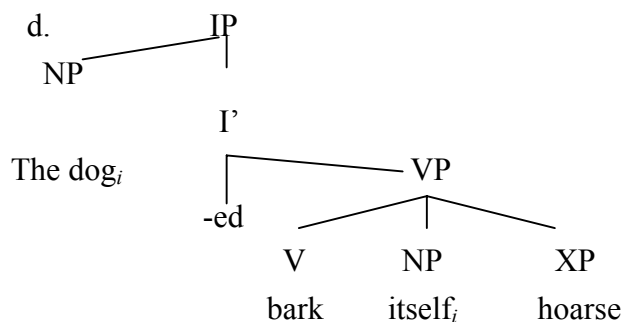Finally, the so-called 'fake' reflexive construction in (12) has exactly the same structure as the intransitive resultatives in (11). The postverbal NP pronominal here, though again not an argument of the main verb, by virtue of being in the same clause as its antecedent, must be in the reflexive form, due to Binding Principle A.

(12)   Theta assignment in a fake reflexive construction
   a. *bark*   agent [r-state]
   b. *hoarse*   theme [   ]
   c.

```
                VP
         ┌──────┼──────┐
         V      NP      XP
        bark  itself_i  hoarse
              C   ▼    ◄  θ
```

   d.

```
         IP
      ┌──┴──┐
     NP     
  The dog_i  I'
          ┌──┴────── VP
         -ed      ┌───┼───┐
                  V   NP    XP
                bark itself_i hoarse
```

One of the significant implications of the unified ternary analysis is that even in a heavily configurational language like English, a certain degree of non-configurationality exists and that binary branching is not universal. However, the advantages of this analysis go far beyond its unity. For example, it also successfully accounts for the fact that result XPs are selected by, and thus must be arguments of, the causing verb, that *wh*-result XPs can be extracted long distance and thus must be lexically governed, and that a subpart of all postverbal NPs can be extracted.

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However, this analysis is at the cost of having drawbacks on the meta-theoretical level, i.e., the weakening the θ-Criterion, which in its simplest interpretation enforces a strict one-to-one linking between an argument role and a syntactic expression. Similar to CR's relativized θ-Criterion, one position in the Minimalist syntax, where the notion of d-structure no longer exists, also permits an argument to receive more than one role (e.g., Hornstein 1998, 2001). Note that under this view, logically, an object raised out of VP should be able to receive another role from v; however, as pointed out by Zhang (2004:195), it never does and no syntactician ever claims that it does. Furthermore, even though in CR's analysis at most two roles are linked to an XP, such a view predicts that *in principle* an XP may be associated with an *infinite* number of theta roles. This position cannot be substantiated empirically and would also drastically increase the complexity of language acquisition. Limiting the number of arguments to anything other than one would be an *ad hoc* stipulation. Thus, the relaxation of the θ-Criterion in its strictest form weakens the UG.

It would be ideal, of course, if CR's ternary analysis can be upheld without this undesirable side effect. However, this cannot be achieved within the derivational framework, where argument roles are linked directly to syntactic positions. Thus, the importance of how the θ-Criterion is interpreted lies in the fact that it dictates what analyses are possible and what are not. CR's analyses are only possible under a relaxed version. It is a worthy question as to whether an alternative under the simplest interpretation can be obtained. In the next section of this paper, an alternative account is offered within the lexical mapping theory, a sub-theory under LFG, or Lexical-Functional Grammar (cf., e.g., Kaplan and Bresnan 1982, Bresnan 2001, Falk 2001, Dalrymple 2001). In this alternative account, strict one-to-one mapping between the argument roles and the syntactic functions under the same ternary analysis is maintained.[7]

3. A simplified lexical mapping theory

Rather than leaving the syntactic assignment of argument roles to lexical idiosyncrasies, a syntactic theory aiming at characterizing UG should attempt a general account (e.g., Pesetsky 1995: 11-13). The LFG framework assumes three distinct, parallel planes of grammatical description: the argument structure, the functional structure, and the constituent structure. The argument structure, or

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[7] Note I do not argue for the θ-Criterion *per se*, and thus certainly not the GB version of it. As pointed out earlier, relaxed versions of this principle have always been around, since GB till now. Rather, I argue specifically that strict one-to-one linking can be maintained and its relaxation is unnecessary.

a-structure, is composed of the predicate's thematic and non-thematic argument roles; the constituent structure, or c-structure, is the surface tree structure without any syntactic derivation. The functional structure, or f-structure, is formally a feature structure that is independent of, and interfaces between, the a-structure and the c-structure. It is the central locus of grammatical information, such as grammatical functions (e.g., SUBJ and OBJ), case, person, number, gender, etc. These parallel structures are linked by correspondence principles and together provide the complete syntactic description. The lexical mapping theory (LMT) is the UG component that constrains the linking between a-structure roles and f-structure functions.

Two prominence scales are assumed in LMT: a thematic hierarchy for argument roles and a markedness hierarchy for argument functions (cf., Bresnan and Kanerva 1989, l992). The concept of thematic hierarchy, where roles descend from the most prominent agent, is well-established (cf., e.g., Li 1995, Grimshaw 1990). The hierarchy adopted in (13), which is based on Bresnan and Kanerva (1989, 1992) and Bresnan (1994), might also be derived from the Dowtyan proto-role properties (e.g., Bresnan 2001: 321fn, Ackerman and Moore: 2001). An additional role, *proposition*, is placed below *patient/theme* to accommodate all propositional themes, including the result state in the resultative construction.

(13)   Thematic Hierarchy
       ag > ben > go/exp > inst > pt/th > prop > loc

(14)   Markedness Hierarchy of Grammatical Functions
       $\text{SUBJ}(\textit{-r -o}) \quad > \quad \text{OBJ}(\textit{-r +o})/\text{OBL}_\theta(\textit{+r -o}) \quad > \quad \text{OBJ}_\theta(\textit{+r +o})$

Note that the markedness hierarchy in (14) is in turn based on a classification of argument functions in terms of [$\pm r$] (thematically restricted) and [$\pm o$] (objective). Only [$-r$] functions may link to an athematic argument, while [$+o$] functions must complement a transitive predicate. Minus features are assumed to be unmarked; thus, SUBJ is the least marked, most prominent function, and OBJ_θ is the least prominent. The features also allow grammatical functions to form natural classes, for example SUBJ and OBJ are [$-r$] and OBL_θ and OBJ_θ are [$+r$]. Following Zaenen and Engdahl (1994), I extend this theory to the other two propositional argument functions COMP and XCOMP, which include adjectival, verbal, and sentential compliments, as instances of the restricted oblique function, or OBL_θ. Both COMP and XCOMP are therefore instances of OBL_{prop}. In this paper I further develop the simplified version of LMT evolved from Her (1997, 2003, 2004), where only theme/patient roles in an a-structure receive intrinsic syntactic assignment.

(15)   Intrinsic Classification of Argument Roles for Functions (IC)

   a. *pt/th* → [*-r*]

   b. (secondary *pt/th* → [*+o*])

Note that (15b) is a parameterized option; it is needed for asymmetrical languages, Chinese and English included, which distinguish between the primary and secondary patient/theme. In symmetrical languages, e.g., the African language Chichaga, all patient/theme roles may be linked to unrestricted functions (e.g., Bresnan and Moshi 1990, Alsina and Mchombo 1993). Between patient and theme exactly which is secondary is again parameterized. In English it is the non-patient theme, while in Romance languages it is the non-theme patient (e.g., Falk 2001:115, Alsina 1996a). Chinese is like English in having theme secondary, and thus less prominent, to patient (cf., Huang 1993). All a-structure roles except the most prominent role, known as $\hat{\theta}$ (pronounced 'theta-hat'), link to a restricted function by default. A restricted function is typically marked by morphological or syntactic means.

(16)   Default Morphosyntactic Classification of Argument Roles (DC)

   $\theta \neq \hat{\theta}, \ \theta \rightarrow [+r]$

Each a-structure role is thus either unspecified or underspecified for syntactic assignment. A role can only be fully specified with additional language-specific morphological specifications. A unified mapping principle consistently aligns each and every argument, whether thematic or athematic, to the most prominent compatible function.[8]

(17)   The Unified Mapping Principle (UMP)

   Each argument role in an a-structure with no higher role available[*] is mapped onto the highest compatible function available.

   (*A role is *available* iff it is not linked to a function, and conversely.)

Like the true θ-Criterion, the UMP enforces a strict one-to-one argument-function linking. The lexical mapping of three predicates is given in (18-20)

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[8] Note that, unlike the EPP or LFG's Subject Condition, this mapping principle does not stipulate that every clause should have a SUBJ. As cited in Ackerman and Moore (2001a:149), clauses may truly be without a subject (e.g., Babby 1989, Simpson 1991, and McCloskey 1999). However, note that SUBJ is the most preferred function in linking due to its unmarkedness.

as examples: the unaccusative verb *freeze*, the unergative verb *bark*, and the transitive verb *water*, respectively.

(18)   The river froze.

$$froze < \quad x \quad > \quad (x = th)$$

IC: [-*r*]

DC:

                        S/O

UMP: S

(19)   The dog barked.

$$barked < \quad x \quad > \quad (x = ag)$$

IC:

DC:

                        S/O/…

UMP: S

(20)   The girl watered the tulip.

$$watered < x \qquad y > \quad (x = ag, y = th)$$

IC: -*r*

DC:

                S/O/…   S/O

UMP: S   O

As mentioned earlier, language-specific morphological operations may further specify syntactic assignment (e.g., Ackerman 1992) and/or alter the a-structure by adding, suppressing, or binding argument roles (e.g., Bresnan 2001: 310). The passive lexical rule, which suppresses the logical subject, or $\hat{\theta}$, in an a-structure, is a good example.

(21)   Passivization: $<\theta…>$

                        ↓

                        ∅

(22)   The tulip was watered.

$$watered < x \qquad y > \quad (x = ag, y = th)$$

IC: -r

Passive: $\varnothing$

DC:

                        S/O

UMP: S

4.   English resultatives revisited

Note first of all I do not intend to comprehensively account for the entire range of English resultatives, which, as shown in Rappaport Hovav and Levin (2001), may not be as neat as previously assumed.[9] However, the range of data and constructions covered here are limited to those of CR. CR (sec. 5) rejected treating the transitive resultatives as object control verbs, e.g., *persuade* in (23a) and (24), and the intransitive resultatives as ECM verbs, e.g., *believe* in (23b) and (25) (cf., Kayne 1985, Hoekstra 1988). The postverbal NP in (25) receives exceptional case marking (ECM) by the verb[10]; in other words, SC does not constitute a barrier. This is immediately rejected by (24), where SC does form a barrier because PRO by definition cannot be case-marked. Quite simply, the structures in (24) and (25) for transitive and intransitive resultatives require conflicting assumptions whether resultative SCs form a barrier to government.

(23)   a. She persuaded *them* to leave.
        b. She considered *them* heroes.

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[9] For example, they show that subject-predicated resultatives, as in (i-ii), though rare, do exist in English. See also Wechsler (1997) and Verspoor (1997).

(i) We followed his car out of the city.
(ii) The surfer caught a good wave and rode it all the way to shore.

These are counterexamples to the DOR, or Direct Object Restriction, that most previous syntactic solutions, including CR, assumed. Rappaport Hovav and Levin (2001) rejected syntactic accounts and argued for an event structure account instead. However, see Fontanals (2002) for arguments for preserving the DOR and a syntactic analysis.

[10] ECM verbs are also known as object raising verbs or subject-to-object raising verbs due to a later analysis where the postverbal NP object is derived by movement from the initial embedded subject position. I will continue to use the term ECM verbs despite the lexicalist LFG adopted.

(24)   Control analysis of the transitive resultatives

```
                    VP
         ┌──────────┼──────────┐
         V          NP          SC
      persuade     them_i      ╱╲
      water        them_i
              θ/C          PRO_i    to leave
                                        flat
              ECM??                 θ
```

(25)   ECM analysis of the transitive resultatives

```
                    VP
         ┌──────────────┬──────────┐
         V                         SC
      consider                    ╱╲
      run
                          NP              XP
                         them           heroes
                         them        threadbare
              ECM                    θ
```

The two structures are entirely ruled out in LFG. The structure of (24) contains a superfluous empty constituent and is thus ruled out by the Economy Principle[11]; (25) is also ill-formed as exceptional case marking is prohibited in the theory. Therefore, given the WYSIWYG characteristic of LFG's c-structure[12], which allows no superfluous empty categories, the flat ternary analysis is preferred over the deeper small clause analysis. Also, it is the only syntactic structure for English resultatives, given the fact that the postverbal NPs must *all* be assigned the accusative case by the verb, as shown in (26). Case marking can be easily accounted for in the ternary structure as the accusative NP immediately follows, and is sister of, the main verb, as in (27).

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[11] The Economy Principle states that "All syntactic phrase structure nodes are optional and are not used unless required by independent principles (completeness, coherence, semantic expressivity) (Bresnan 2001:93).

[12] LFG's c-structure does not allow syntactic derivation and thus has only the surface level. Thus, as in other lexicalist frameworks, the c-structure has a strong WYSIWYG (what-you-see-is-what-you-get) flavor. Even though empty categories are in general prohibited due to the Economy Principle, in inside-out long-distance dependencies a lexically empty c-structure gap is allowed to achieve completeness in the f-structure (see Falk 2001: chapter 6 for a detailed discussion).

(26)   a. She watered *them* flat.

   b. She ran *them* threadbare.

   c. They laughed *themselves* into a frenzy.

(27)   The ternary c-structure of resultatives with postverbal NPs

```
                VP
        ┌────────┼────────┐
        V        NP        XP
     watered    them      flat        (transitive)
       ran      them      threadbare  (intransitive)
     laughed  themselves  into a frenzy   (fake reflexive)
```
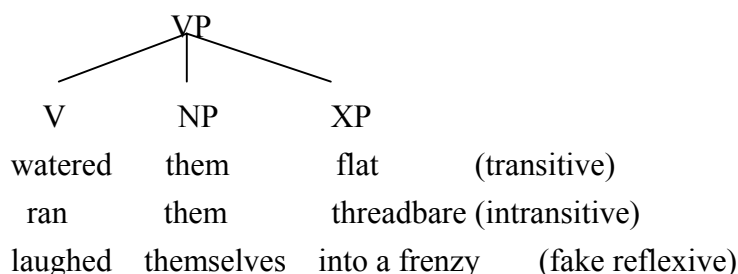
However, in the lexicalist framework of LFG, this ternary analysis cannot possibly be accepted for the unaccusative resultatives, which allow no postverbal NPs, as shown in (28). It thus must have a binary structure, as in (29).

(28)   a. The river froze (*itself) solid.

   b. The glass smashed (*itself) to pieces.

   c. The house burned (*itself) black.

(29)   The binary c-structure of unaccusative resultatives

```
            VP
        ┌────────┐
        V        XP
      froze    solid
```
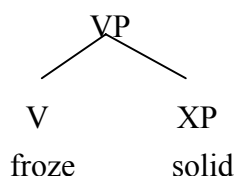
The c-structure analyses seem straightforward. Now the central issue of linking arrives: how can the LFG account maintain the θ-Criterion, or the strict one-to-one argument-function linking dictated by LMT's unified mapping principle? Recall that in LFG argument roles are not linked directly to c-structure constituents, but to grammatical functions in the f-structure, which interfaces between the a-structure and the f-structure.

As argued in Simpson (1983), English resultatives involve the adding of an argument role of *r-state* to the lexical stock of the main verb's a-structure. However, that is where the commonality ends. In transitive resultatives and unaccusative resultatives, the $\hat{\Theta}$, or the logical subject, in the *r-state*'s argument structure is bound with the internal argument of the main verb, as seen earlier in (8c) and (10c); whereas in the unergative intransitive resultatives the $\hat{\Theta}$ in the *r-state*, in spite of its case-marking by the main verb, is thematically unrelated to the main verb, as seen in

the earlier (11c) and (12c). In CR's analysis, only the (un)accusative[13] resultatives require the weakening of the θ-Criterion. There is thus indeed an (un)accusative versus unergative split in English resultatives (cf., Falk 2001:110-111). We will first examine the (un)accusative resultatives.

(30)   (Un)accusative Resultative Formation
$$V<(x) \quad y[\text{-}r]> \quad \rightarrow \quad V<(x) \quad y_i[\text{-}r] \quad z<w_i...>>, \quad z = \text{r-state}$$

The distinctive characteristic of an (un)accusative verb, e.g., the transitive *water* and the unaccusative *freeze*, is the internal argument, or in LFG terms an argument role in the a-structure with an intrinsic classification (IC) of [*-r*] (Bresnan and Zaenen 1990, Bresnan 2001:313). The presence or absence of an external argument, or a more prominent role, is inconsequential. The lexical rule binds the $\hat{\theta}$ of the additional *r-state* proposition with the [*-r*] role of the main verb. The argument-function mapping in (un)accusative resultatives can now be accounted for. Let's first look at the example of a transitive resultative.

(31)   Argument-function mapping in transitive resultatives
   a. *flat   <w>*   ($w = th[\text{-}r]$)
   b. *water <x y_i z<w_i>>*   ($x = ag$, $y = th[\text{-}r]$, $z = \text{r-state}$)
   c. The girl watered the tulip flat.

$$watered < ag \quad th_i \quad \text{r-state}< th_i> >$$

IC:		-r	-r
DC:			+r

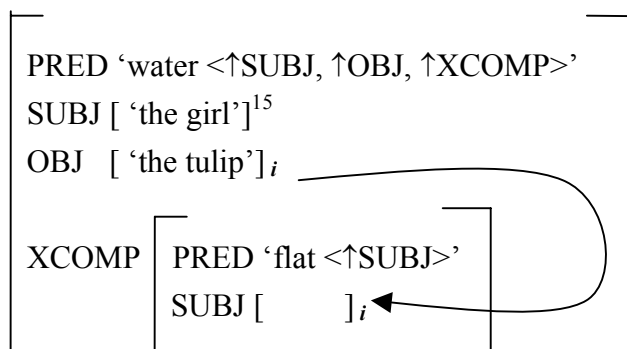|			
	S/O/…	S/O	O_θ/OBL_θ<S/O>
UMP:	S	O_i	OBL_θ<S_i>

LMT predicts the linking of *agent* to SUBJ, *theme* to OBJ, *r-state* to a controlled OBL_{prop} function, thus an XCOMP[14], and the theme in the embedded clause to SUBJ. The one-to-one argument-function linking is strictly enforced by the UMP. The (partial) f-structure of (31c) is illustrated in (32), where the binding of the matrix *theme* with the embedded *theme* is syntactically expressed by the matrix SUBJ's control of the XCOMP's SUBJ. The controller and the controlled thus inherit

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[13] '(Un)accusative verbs' is thus used as a cover term to include both transitive (accusative) verbs and unaccusative verbs.

[14] As mentioned earlier, OBL_{prop} may be either COMP or XCOMP; yet, the fact that its SUBJ is controlled indicates it is an open complement, thus XCOMP.

the co-indexing from the respective argument role they are associated with. The control relation between the matrix OBJ and an embedded SUBJ, graphically linked by a connecting line, indicates the sharing of an identical set of features. The transitive resultatives are thus treated exactly as object control verbs like *persuade* in (23a) (cf., Bresnan 2001:270-1).

(32)   The (partial) f-structure of a transitive resultative

PRED 'water <↑SUBJ, ↑OBJ, ↑XCOMP>'
SUBJ ['the girl']^{15}
OBJ   ['the tulip'] $_i$

XCOMP   PRED 'flat <↑SUBJ>'
          SUBJ [   ] $_i$

Now, let's look at the argument-function linking in an unaccusative intransitive resultative, where the main verb's a-structure consists of an internal argument only, which binds with the logical subject of the added *r-state*.

(33)   Argument-function mapping in unaccusative resultatives
   a. *solid <w>*   ($w = th$[-r])
   b. *freeze <y_i $z<w_i>$>*   ($y = th$[-r], $z = r$-state)
   c. The river froze solid.

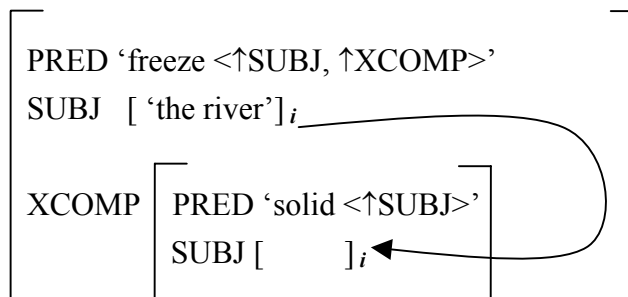|	*froze* < th_i	*r-state*< th_i> >
IC:	-r	-r
DC:		+r

	S/O O$_\theta$/OBL$_\theta$<S/O>	
UMP:	S$_i$	OBL$_\theta$<S$_i$>

The (partial) f-structure of (33c) is illustrated in (34). The control relation here is between the matrix SUBJ and the embedded XCOMP's SUBJ, reflecting the fact that the two argument roles they link to are bound. Thus, the unaccusative intransitive

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[15] Note that, following the LFG convention, 'the girl' here is only meant to be a convenient abbreviation for the full set of grammatical information, including PRED, CASE, NUM, PERSON, GENDER, DEFINITE, etc. I will continue to use this notation wherever the detailed functional information is not immediately relevant.

resultatives are treated exactly as the subject control verbs, like *intend* as in 'I intend to leave' (cf., Bresnan 2001:270-1).

(34)   The (partial) f-structure of an unaccusative intransitive resultative

$$
\begin{bmatrix}
\text{PRED 'freeze} <\uparrow\text{SUBJ}, \uparrow\text{XCOMP}>\text{'} \\
\text{SUBJ} \quad [\text{ 'the river'}]_i \\
\\
\text{XCOMP} \begin{bmatrix} \text{PRED 'solid} <\uparrow\text{SUBJ}>\text{'} \\ \text{SUBJ} [\qquad]_i \end{bmatrix}
\end{bmatrix}
$$

Next, unergative resultative formation is formulated in (35). Here the input a-structure must consists of an external argument only. The lexical operation, besides the addition of an *r-state* role, also binds its logical subject, or $\hat{\theta}$, with an *athematic* argument of the main verb. Note that the *athematic* argument is indicated by the underscore outside of the angled brackets; thematic arguments are all within the angled brackets. As I will show below, this binding relation reflects the fact that the postverbal NP in unergative resultatives are syntactically related to the main verb, yet not thematically.[16]

(35)   Unergative Resultative Formation
        $V<x>, x = ag \quad \rightarrow \quad V<x \quad z<w_i...>>_{\_i}, \quad z = r\text{-}state$

First, let's look at an example of an unergative resultative with a full NP in the postverbal position. Note that in (36c) the athematic argument must receive an intrinsic $[-r]$ classification by the very nature of $[r]$ (e.g., Bresnan 2001:309). A $[+r]$ function is restricted to having a thematic argument; thus, athematic arguments can only be linked to unrestricted functions, i.e., SUBJ and OBJ.

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[16] Alsina (1996b) however argues that this argument is thematic and formulates an analysis in a variant LFG framework where an additional GS, or grammatical semantic structure, is central to the resultative construction. In this framework, argument structures of resultatives are derived syntactically, rather than lexically.
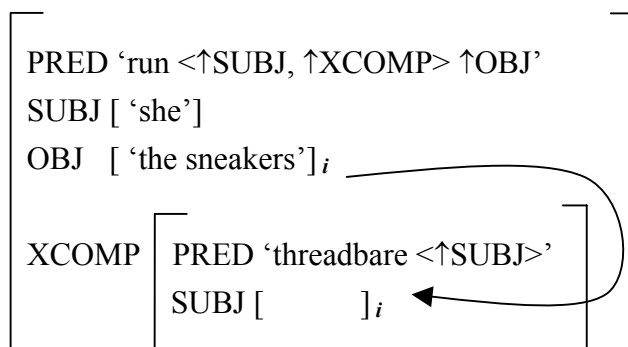
(36) Argument-function mapping in unergative intransitive resultatives

  a. *threadbare <w>* $(w = th[-r])$

  b. *run <x   z<w_i>>_i* $(x = ag, z = r\text{-}state)$

  c. She ran the sneakers threadbare.

$$ran< ag \quad r\text{-}state< th_i> > \qquad _i$$

IC:		$-r$	$-r$
DC:		$+r$	

	S/O/…	O_θ/OBL_θ<S/O>	S/O
UMP:	S	$OBL_\theta<S_i>$	O_i

Once again, strict one-to-one argument-function linking is upheld. The postverbal NP, due to its accusative case, is syntactically the object of the main verb, and yet linked to an athematic argument; it thus does not participate in the event structure of the main verb. This is precisely the LFG treatment of the so-called ECM verbs, such as *consider* in (23b) (cf., Bresnan 2001:285). Unergative intransitive resultatives thus belong to the same word class. The (partial) f-structure of (36c) is illustrated in (37), where the binding of the matrix athematic argument with the embedded *theme* is again syntactically expressed by the (object) control relation.

(37) The (partial) f-structure of an ergative intransitive resultative

PRED 'run <↑SUBJ, ↑XCOMP> ↑OBJ'
SUBJ ['she']
OBJ   ['the sneakers']_i

XCOMP   PRED 'threadbare <↑SUBJ>'
        SUBJ [   ]_i

Finally let's look at an example of the fake reflexive resultative, which is simply a case of the unergative resultative with a reflexive postverbal NP.

(38)   Argument-function mapping in fake reflexive resultatives

    a. *hoarse <w>*   (w = *th*[-*r*])

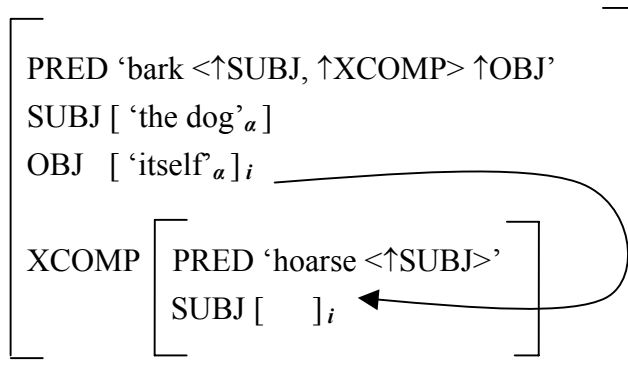   b. *bark <x z<w$_i$>>_$_i$*   (x = *ag*, z = *r-state*)

    c. The dog barked itself hoarse.

barked< *ag*   *r-state< th$_i$>* >   _$_i$

IC: *-r*   *-r*

DC: +*r*

               S/O/… O$_\theta$/OBL$_\theta$<S/O> S/O

UMP: S   OBL$_\theta$<S$_i$>   O$_i$

       The (partial) f-structure of (38c) is illustrated in (39), where the reflexive *itself* in OBJ must be bound by its antecedent in the minimal nucleus, or clause. This reflexive is thus genuine as far as the syntax is concerned; yet it is 'fake' in the sense that it is not a *thematic* argument of the verb.

(39)   The (partial) f-structure of an fake reflexive resultative

PRED 'bark <↑SUBJ, ↑XCOMP> ↑OBJ'
SUBJ ['the dog'$_\alpha$]
OBJ   ['itself'$_\alpha$]$_i$

XCOMP   PRED 'hoarse <↑SUBJ>'
          SUBJ [   ]$_i$

       In summary, English resultatives require a split in c-structures: unaccusative resultatives, which disallow a postverbal NP, must have the simplest binary VP, while all other resultatives have a ternary structure. A different split exists in the a-structures of resultatives: (un)accusative versus unergative resultatives. The unergative resultatives are exactly like ECM verbs in that the posverbal NP is syntactically the main verb's object, yet thematically not part of its event structure. This athematic matrix object functionally controls the subject of the embedded subject. (Un)accusative resultatives are also control verbs in that the subject of the embedded result XP is controlled by a function in the matrix clause. More specifically, the unaccusative resultatives are like subject control verbs, transitive resultatives are like object control verbs.

Thus, two overriding principles govern the LFG analysis of English resultatives: first, strict one-to-one argument-function linking is maintained, and second, all resultative constructions involve functional control at the syntactic level. Falk (2001:137) formulates control in the Functional Control Rule: 'If (↑XCOMP) is present in a lexical form, add the equation: (↑CF) = (↑XCOMP SUBJ)'.[17] Under the assumption that the controller is the least prominent core function available (SUBJ > OBJ > OBJ$_\theta$; cf., Keenen and Comrie 1977), English resultatives do indeed receive a unified analysis in LFG.

5. Resultative compounds in Mandarin Chinese

Mandarin resultative compounds present an interesting contrast to English resultatives. A Mandarin resultative compound is a complex verb formed by two composing verbs: the verb of the causing action and the verb of the result state (e.g., Lin 1990, Li 1990). Following Li (1995), they are referred to as V_{caus} and V_{res} respectively.[18] The former is either transitive, e.g., (40a), or intransitive, e.g., (40b-d), while the latter is typically intransitive, e.g., (40a-d).[19]

(40) a. Ta ti-kai-le   men.   (Chi: transitive V_{caus})
         he kick-open-ASP door
          'He kicked the door open.'   (Eng: transitive resultative)

      b. Ta dong-jiang-le.   (Chi: unaccusative V_{caus})
         he freeze-stiff-ASP
          'He froze stiff.'   (Eng: unaccusative resultative)

      c. Ta chang-ya-le   houlong. (Chi: unergative V_{caus})
         he sing-hoarse-ASP throat
          'He sang his throat hoarse.' (Eng: unergative resultative)

      d. Ta chang-ya-le.   (Chi: unergative V_{caus})
         he sing-hoarse-ASP
          'He sang himself hoarse.'   (Eng: fake reflexive resultative)

---

[17] CF stands for complement functions, which include all argument functions. A lexical form is a predicate's semantic form together with its arguments.
[18] Whether V_{caus} and V_{res} are separable and thus whether they form a lexical unit or a syntactic constituent have in fact been a point of contention. See Li (1990) for an example of the lexicalist view, and Huang (1982) and Wu (2004) for a syntactic approach. Chung (2004, chp V) lists a small number of strictly inseparable resultative compounds.
[19] Note that while these cover the major types of Mandarin resultative compounds, the paper does not intend to cover their entire range. For example, an anonymous reviewer mentioned a type of resultative compounds such as *chang-ya* 'sing-hoarse' and *zhui-lei* 'chase-tired' (V_{caus} <x y> + V_{res} <z>). The interesting fact that the two possible combinations, (<x-z y> and <x y-z>), produce not two but *three* readings are extensively discussed in Li (1995) and Her (2004) and only briefly later in this section.

The fake reflexive in English unergative resultatives is not allowed in Chinese, where the intransitive verbs (both unergatives and unaccusatives, as in (40b) and (40d) respectively), form resultative compounds that are simply intransitive.[20] Unergative verbs, like transitive verbs, may also form resultative compounds that are transitive, as in (40c) and (40a) respectively. Thus, the constituent structures of the VPs in (40) are thus straightforward. While in English, the cause-result event structure is more transparently represented in the syntactic construction, in Chinese it is lexically encoded. Thus, the central issue of Mandarin resultatives is regarding the linking of argument roles. The argument structures of the four resultative compounds are illustrated in (41).

(41)   a. *ti* 'kick' *<x y>* + *kai* 'open' *<z>*   (*x = ag, y = th*, z = *th*)
          → *tikai* 'kick-open' ***<x y-z>***

       b. *dong* 'freeze'*<y>* + *jiang* 'stiff'*<z>*
          → *dongjiang* 'freeze-stiff' ***<y-z>***

       c. *chang* 'sing'*<x>* + *ya* 'hoarse'*<z>*
          → *changya* 'sing-hoarse' ***<x z>***

       d. *chang* 'sing'*<x>* + *ya* 'hoarse'*<z>*
          → *changya* 'sing-hoarse' ***<x-z>***

The resultative compound inherits argument roles from both composing verbs (e.g., Her 2004, Li 1995, Huang and Lin 1992). Note that in (41a), (41b), and (41d) the role of V_{res} is bound with a role of V_{caus} into a 'composite' role, indicated as *y-z*, *y-z*, and *x-z* in the respective a-structure. A composite role is however always mapped to a single NP, despite its two composing roles. Take (40a) for example; the object NP *door* is both what got kicked and what ended up open, as in (42).

(42)   Ta ti-kai-le   men.
       he kick-open-ASP door
       'He kicked the door open.'
       <x   y-z>   (*x = ag, y = th*, z = *th*)
         ↓   ↓
         S   O
         He   door

---

[20] Lodrup (2000) reported that Norwegian resultatives do not distinguish between unaccusative and unergative verbs either; however, they must take 'fake' reflexives.

Thus, we come to the same crossroad once again regarding the one-to-one mapping principle, or the θ-Criterion. There seems to be no alternative but to accept CR's relaxed interpretation, which certainly explains the Mandarin data, where the two composing roles are indeed invariably from two different verbs. This is precisely the position implicitly assumed in the influential work on Chinese resultatives by Li (1995). However, in the account developed in Her (2004), the strict one-to-one correspondence required by the mapping principle or the θ-Criterion is successfully maintained. This alternative crucially hinges upon the notion of 'suppression'.

Her (2004) argued that the mapping principle or the θ-Criterion, in its truest interpretation, in fact entails that only one composing role in a composite role receives syntactic assignment. As a consequence, one of the composing roles must be suppressed. The suppression of a composing role in a composite role is therefore both motivated *and* constrained at the same time by the mapping principle or the θ-Criterion. Suppression does not complicate the grammar as it is independently motivated by lexical rules, e.g., passivization (43a-a'), detransitivization (43b-b'), and the middle formation (43c-c').

(43) a. The tulip was watered flat (by the girl).
  a' Shu   chuban le.
     book publish ASP
     'The book has been published.'
  b. She is always eating.
  b' Wo chi le.
      I   eat ASP
     'I ate.'
  c. This book sells extremely well.
  c' Ta hen hao-pian.
     he very easy-fool
     'He is easy to fool.'

Note also that a suppressed role may be *indirectly* linked to a syntactic function; the suppressed agent in passive, for example, can be semantically linked to the *by*-phrase (cf., Bresnan 1994:81). In (43a-a') even in the absence of a *by*-phrase, the suppressed agent role is still implicit and always an integral part of the event structure, just like the suppressed roles of detransitivized verbs in (43b-b') and middle verbs in (43c-c').[21] Likewise, a suppressed composing role in a resultative argument

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[21] An anonymous reviewer pointed out that the notion of suppression is also employed in the theory of Generative Lexicon (cf., Pustejovsky 1995).

structure 'piggy-backs' on its bound partner and always obtains indirect syntactic assignment. The argument selection principle for composite predicates proposed in Huang and Lin (1992) is close in spirit to this suppression account motivated by the strict one-to-one linking principle. While Her's suppression account can just as easily be adopted in the derivational framework, we continue to employ LFG and formulate this account in LMT. The linking in (42a) is shown in (44), where a role suppressed for linking is indicated by a single cross-out, as in *y̶*-z.

(44)   Ta ti-kai-le   men.
        he kick-open-ASP door
        'He kicked the door open.'

     i. $< x$ $y\text{-}z̶ > (x = ag, y = th)$
      IC   *-r*
      DC

              S/O/...   S/O
      UMP   S   O

     ii. $< x$ $y̶\text{-}z > (x = ag, z = th)$
      IC   *-r*
      DC

              S/O/...   S/O
      UMP   S   O

As shown in (44i) and (44ii), the mapping of the composite role *y-z*, despite the 'competition' between the two for syntactic assignment, produces a single result, due to the identical syntactic linking of *y* and *z*, both themelike roles with IC [*-r*]. The suppression account thus makes the correct prediction on argument-function linking. I will conclude this section by showing the linking of a-structure to functions in (40b-d) in (45-47) respectively.

(45)   Ta dong-jiang-le.
        he freeze-stiff-ASP
        'He froze stiff.'

    i   ⟨*y*-*z̶*⟩   (*y* = *th*)
      IC   *-r*

           S/O
      UMP   S

    ii.   ⟨*x̶*-*z*⟩   (*z* = *th*)
      IC   *-r*

             S/O
      UMP   S

(46)   Ta chang-ya-le   houlong.
        he sing-hoarse-ASP throat
        'He sang his throat hoarse.'

         ⟨*x*   *z*⟩   (*x* = *ag*, *z* = *th*)
    IC   *-r*

        S/O/...   S/O
    UMP   S   O

(47)   Ta chang-ya-le.
        he sing-hoarse-ASP
        'He sang himself hoarse.'

    i   ⟨*x*-*z̶*⟩   (*x* = *ag*)
      IC

           S/O/...
      UMP   S

    ii.   ⟨*x̶*-z ⟩   (*z* = *th*)
      IC   *-r*

             S/O
      UMP   S

The suppression account I have adopted fully accounts for the argument-function linking in Chinese resultative compounds. Thus, it should be preferred for maintaining the strict one-to-one argument-function linking over alternatives that violate it. Furthermore, it is demonstrated in Her (2004) that this suppression interpretation in fact affords a much simpler and more principled account of the potentially three-way ambiguous resultatives, such as *zhui-lei* 'chase-tired' in (48), compared with the account in Li (1995).

(48)　Zhangsan zhui-lei-le　　　Lisi.
　　　John　　chase-tired-ASP Lee
　　a. 'John chased Lee and made Lee tired.'　(causative)
　　　$< x\text{[caus]}$　$y\text{-}z\text{[af]} >(x = ag, y = th, z = th)$
　　　　S　　　O
　　　John　　Lee
　　b.*'Lee chased John and John got tired.'　(non-existent)
　　　$<x$　　　$y\text{-}z>$　　$(x = ag, y = th, z = th)$
　　　　O　　　S
　　　Lee　　John
　　c. 'John chased Lee and (John) got tired.'　(non-causative)
　　　$< x\text{-}z$　　　$y >$　$(x = ag, y = th, z = th)$
　　　　S　　　O
　　　John　　　Lee
　　d. 'Lee chased John and was made tired.'　(causative)
　　　$< x\text{-}z\text{[af]}$　　$y\text{[caus]}>$　　$(x = ag, y = th, z = th)$
　　　　O　　　S
　　　Lee　　　John

The account offered in Li (1995), which allows a composite role with two composing roles direct linking to a syntactic position, rules out (48b) for violating the thematic hierarchy, which requires the linking of the more prominent *agent* to the more prominent subject and the less prominent *theme* to the less prominent object. Li's account thus must concede a violation of the thematic hierarchy in (48d), where agent is linked to the object, and employ an additional theoretical construct, the causative hierarchy, to sanction this thematic violation. Due to the limitation of space, we will not go into the details of the full account in Her (2004); however, as the sketch in (49) adequately demonstrates, once suppression is taken into account, linking is straightforward and the results are correctly predicted.

(49)   Zhangsan zhui-lei-le   Lisi.
        John   chase-tired-ASP Lee

    a. 'John chased Lee and made Lee tired.'   (causative)

       $< x$ y-$z̶ >$ $(x = ag, y = th)$
        S   O
       John   Lee

       $< x$[caus] $y̶$-z[af]$>$ $(x = ag, z = th)$
         S   O
       John   Lee

    b.*'Lee chased John and John got tired.'   (non-existent)

       $< x$ y-$z̶ >$ $(x = ag, y = th)$
       $< x$[caus] $y̶$-z[af]$>$ $(x = ag, z = th)$
        *O   *S
       Lee   John

    c. 'John chased Lee and (John) got tired.'   (non-causative)

       $< x$-$z̶$ $y >$ $(x = ag, y = th)$
        S   O
       John   Lee

    d. 'Lee chased John and was made tired.'   (causative)

       $< x̶$-z[af] y[caus]$>$ $(z = th, z = th)$
         O   S
       Lee   John

      The linking pattern in (48b) is simply impossible and the linking in (48d) is also predictable as an affected theme is less prominent than a causer theme according to the Dowtyan proto-agent and proto-patient properties (cf., Dowty 1991). No violation of the thematic hierarchy is tolerated and there is no need for a causative hierarchy. This suppression account virtually 'falls out' under the strict one-to-one linking principle. Data from Mandarin Chinese resultative compounds thus clearly indicates that the one-to-one linking principle should and can be maintained.

6. Discussion

      In this section, I will discuss two further issues. The first deals with the computational nature of functional control in feature structures, as it relates to multiple associations of grammatical functions to a single constituent. I then examine the constituent structure of English unaccusative resulatives more closely and thus the issue whether they are lexically or syntactically derived.

6.1 More on control and feature structures

The LFG account I proposed relies crucially on the notion of functional control, which associates multiple functions with a single constituent.[22] CR's account, on the other hand, allows multiple associations of roles to an individual XP. Now, why is the former better?[23] The obvious answer is that the LFG analysis is able to preserve strict one-to-one linking in assigning theta roles to syntactic expressions, while CR's is not. However, one may still question why multiple association of functions to a single constituent is not as costly as CR's many-to-one linking.

First, note that control relations involve multiple associations of functions in an f-structure (a feature structure) with an identical value (cf., e.g., Stuart 1986: 20, Francez and Wintner 2003: sec. 3.2.2). This is accomplished by simple *reentrancy*, also known as feature sharing. In terms of *types* and *tokens*, in the multiple associations of different roles to an individual nominal, each role is a distinct *type*, which violates one-to-one correspondence. On the other hand, the multiple associations of more than one grammatical function to a single nominal involve only one identical set of features; thus each function in a control relation is merely a *token* of the one *type*. Reentrancy, as a computational device, is rather common place in feature structures and well-motivated independently by linguistic phenomena such as agreement and displacement (cf., e.g., Stuart 1986, Sells 1986, Falk 2001, Bresnan 2001, Dalrymple 2001, Francez and Wintner 2003, among others). Thus, control relations do not complicate the grammar, nor increase its computational complexity. In fact, under the view that each *copy* is a bundle of features, one might find Chomsky's (2000: 114) conception on *copy* fairly close to that of reentrancy.

> If α in the syntactic object SO is merged somewhere else (by the operation Move) to form SO'. Then the two occurrences of α form a chain, the original occurrence called the *trace* or *copy* of the new one. The terminology is misleading, for several reasons. First, each of the elements is a "copy" of the other. Second, copy theory is the simplest version of transformational grammar, making use of Merge, not Merge followed by an operation that deletes the original.

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[22] Incidentally, Kratzer's (2004) study within the derivational framework is in favor of a raising account of all adjective resultatives, which is similar to the control account I proposed above.

[23] Section 6.1 is due to this important question raised by an anonymous reviewer. For that I am grateful. To answer this question fully one should of course first justify LFG's conception of grammatical functions, which is beyond the scope of the paper. It relates to the fundamental debate between structure-oriented theories, such as TG and all its later incarnations, and relation-oriented theories, such as RG and LFG. In the former, notions such as subject and object are secondary and derived from structural configurations, while in the latter these are primary notions in syntax. See Bresnan (2001) for some arguments for the latter position.

In other words, each copy in a chain is and remains a *token* of the one *type*. As mentioned earlier, reentrancy is also employed in LFG in the treatment of various displacement phenomena. The recent shift from feature checking to feature matching (cf., Radford 2004: xi) may also indicate further convergence between the Minimalist syntactic approach and the unification-based frameworks.

6.2 English unaccusative resultatives and beyond

Next, let's take a closer look at the constituent structure of English unaccusative resultatives. Our LFG account adopts the same ternary VP for all English resultatives with a postverbal NP and thus inherits the advantages that CR argue for, some of which have been enumerated in section 1. However, unaccsative resultatives, which do not allow for an overt postverbal NP, must have a binary VP in LFG. In CR's unified ternary analysis, the unaccusative subject in S-Structure is derived by movement from its initial postverbal object position in D-structure, a derivational process analogous to that of the passivized subjects. Thus, there are two competing analyses for English unaccusatives: the lexical analysis, where unaccusatives are derived lexically, and the derivational analysis, where unaccusatives are derived syntactically. To further strengthen the LFG account, I shall demonstrate that the lexical analysis does afford certain empirical advantages.

Bresnan (2001:34-36) demonstrates conclusively that past participles of unaccusative and unergative intransitives can both undergo adjective formation, as in (50) and (51) respectively. The standard assumption is that adjectives require the linking of subject to a lexically derived external argument (e.g., CR 1992:179). Given that the external argument of unergatives is also derived lexically, adjective formation involves a simple category conversion. In order to maintain a unified adjective formation and thus to avoid a bifurcation, the argument role linked to the unaccusative subject should also be lexically derived.

(50)   Participle adjective formation of unaccusative verbs
    a. a wilted flower   a flower that has wilted
    b. an escaped convict a convict who has escaped
    c. a run-away slave   a slave who has run away
(51)   Participle adjective formation of unergative verbs
    a. a confessed killer   a killer who has confessed
    b. a practiced liar   a liar who has practiced
    c. a repented sinner   a sinner who has repented

This line of argument may also be extended to passive resultatives. Like the unaccusatives, the a-structure of passivized verbs consists of only an internal argument, or a [-*r*] role. Thus, as expected, passive and unaccusative resultatives behave the same in disallowing a postverbal NP, as in (52). Note that the passive verbs, like past participles of intransitive verbs, also undergo adjective formation, as shown in (53). Again, a uniform analysis of the input to adjective formation would suggest that passive verbs are also lexically derived.

(52)   a. The river was frozen (*itself) solid.
       b. The glass was smashed (*itself) to pieces.
       c. The house was burned (*itself) black.

(53)   Passive adjective formation
       a.   a frozen river   a river that was frozen
       b.   a smashed glass   a glass that was smashed
       c.   a burned house   a house that was burned

As expected, unergative resultatives can also be passivized, despite the fact that the object does not receive a theta role from the main verb, as in (54). Within CR's analysis, because the logical subject is lexically absorbed, the object in D-Structure is moved to the subject position. Passive unergative resultatives are thus syntactically derived; whereas in the LFG account, with the logical subject suppressed in a-structure, the athematic argument is linked to SUBJ; passive unergative resultatives are thus also lexically derived.

(54)   a. Her sneakers were run threadbare.
       b. We were barked awake.
       c. Her handkerchief was wept soggy.

The LFG account of English resultatives, by treating all verbs that undergo resultative formation as lexically derived, achieves a unified and simpler analysis of adjective formation. Furthermore, by analyzing all resultatives as control verbs (the unaccusative resultatives as subject control, transitive resultatives as object control, and the unergative resultatives as ECM-type object control), this unified account imposes no extra burden on the grammar. Given the further advantage it affords in maintaining the one-to-one linking principle, it should be preferred over analyses that weaken this well-motivated constraint.

7. Concluding remarks

This paper challenges the one prominent feature in Carrier and Randall's (1992) account of English resultative constructions, i.e., a weakening of the θ-Criterion by allowing more than one theta role to be assigned to an argument position. The derivational framework they assumed does not allow the preservation of both their structural analyses, which are basically sound, and the strict one-to-one linking. Such relaxed linking is likewise essential in Li's (1995) influential account of Chinese resultative compounds. However, this relaxation means a less constrained UG, and thus weakens its predictive power and increases the burden of language acquisition. I have demonstrated that such a relaxation is in fact unnecessary and the range of data on resultatives from both English and Chinese presented in the paper in fact support the strict one-to-one linking principle. The LFG analyses I put forth for English resultative constructions largely preserve Carrier and Randall's insight; furthermore, the simple analysis for Chinese resultative compounds hinges upon the notion of role suppression, a notion independently motivated by lexical processes such as passivization and detransitivization. The account for English also relies on the notion of functional control, again a notion independently motivated. Thus, the analyses I proposed only extend the generality of these existing notions and impose no extra burden on the grammar.

Within the tradition of the generative grammar, a more constrained theory is recognized as a better theory and a simpler analysis is a preferred analysis. The simplest one-to-one linking should be maintained meta-theoretically. The LFG analyses I have offered should thus be preferred on both theoretical and empirical grounds.

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結果式中的論旨角色與句法功能連結

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　　Carrier and Randall(1992)對英語結果句的分析與Li(1995)對漢語結果複合詞的分析有一個顯著的共通點，就是對於論旨準則(θ-Criterion)的從寬解釋，允許一個句法論元獲得一個以上的論旨角色。本文贊同以上兩篇論文所提出的詞組結構及論旨結構分析，但堅決認為不應且無須犧牲論旨角色與句法功能一對一的連結關係。本文所提出的分析以詞彙功能語法(LFG)中的彙照映理論(LMT)為理論基礎，以功能結構為句法訊息之核心，連結論旨結構與詞組結構。對漢語結果複合詞的分析利用了論旨角色吸收(absorb)或隱藏(suppress)的概念，英語的分析則利用了功能控管(control)的概念；兩者都是句法理論中既有、普遍且合理的概念。

關鍵詞：論旨準則、結果句、吸收(absorb)、隱藏(suppress)、詞彙功能語法、控管(control)