Argument-Function Mismatches in Mandarin Resultatives: A Lexical Mapping Account*

ABSTRACT. This paper seeks to account for the argument-function mismatches observed in Mandarin resultative compound verbs. The account is formulated within a revised Lexical Mapping Theory which incorporates a unified mapping principle. Under the simplest and also the strictest interpretation of this mapping principle (or the θ-criterion), a composite role, formed by two composing roles, receives syntactic assignment via one composing role only; the second composing role is thus suppressed. Argument-function mismatches are due to the competition between composing roles for syntactic assignment. This LMT account also facilitates a natural explanation of markedness among the competing syntactic structures.

Keywords argument-function mismatch, LMT, lexical mapping, linking, resultative compound, competition of structures

1. INTRODUCTION

Inversion constructions pose interesting problems for generative syntactic theories. A locative inversion verb, for example, in many languages has a locative phrase preposed to the subject position and the logical subject postposed to the object position (Bresnan 1989, Huang and Her 1998). An example from Mandarin Chinese and English is given in (1).

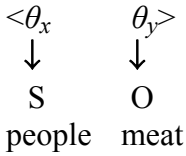
(1) a. Lisi zuo zai tai-shang.
Lee sit at stage-top
'Lee is sitting on the stage.'

b. Tai-shang zuo-zhe Lisi.[1]
stage-top sit-ASP Lee
'On the stage is sitting Lee.'

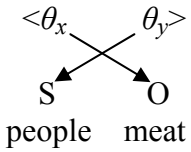
The argument structure of both the Mandarin *zuo* and the English *sit* in the canonical (1a), <*theme locative*>, is identical to that in the inverted (1b). A more dramatic example is found in Mandarin consumption verbs. Take *chi* 'eat' for example. The canonical linking of the agentlike role to subject and the patientlike role to object is shown in (2a). In Mandarin Chinese, as in English, the preverbal DP and the post-verbal DP canonically encode the grammatical subject and object respectively (Her 1990, Tan 1991). Thus, the linking of *liang ge ren* 'two people' to object and *yi bang rou* 'one pound of meat' to subject in

(2b) creates an apparent subject-object inversion, compared with (2a) (Huang 1993, Her 1997).[2]

(2) a. Liang ge ren chi yi bang rou.[3]
two CL person eat one pound meat
'Two people eat one pound of meat.'



b. Yi bang rou chi liang ge ren.
one pound meat eat two CL person
'One pound of meat feeds two people.'



A syntactic theory should nonetheless be able to predict the linking of the argument roles to grammatical functions or configurational argument positions such as the specifier of VP and the complement of V, in such constructions. It would be a great compromise for any syntactic theory aiming at characterizing UG to leave the syntactic assignment of argument roles to the realm of lexical idiosyncrasies (Pesetsky 1995: 11-13).

This paper explores the particular argument-function linking problem in resultative compound verbs. A resultative compound may potentially exhibit an even more intriguing pattern of argument-function mismatches. The compound verb *zui-lei* 'chase-tired' in (3) allows up to three readings, which were first comprehensively documented by Li (1995).

(3) Zhangsan zhui-lei-le Lisi.[4]
John chase-tired-ASP Lee
a. 'John chased Lee to the extent as making him (Lee) tired.'
b.*'Lee chased John and he (John) got tired.'
c. 'John chased Lee and (John) got tired.'
d. 'Lee chased John and was made tired (by John).'

Movement-based analyses for such mismatches between argument roles and syntactic functions have been critically challenged by alternative lexicalist views (Li 1995, Bresnan 1994, and Bresnan and Kanerva 1989). This paper adopts the specific lexicalist framework of Lexical-Functional Grammar (LFG) and further develops the initial analysis offered in Her (1997). The remainder of the paper is organized into six sections. Section 2 presents the argument structures of resultative compound verbs and the linking problem. Section 3 reviews a non-derivational lexicalist analysis, albeit within the derivational

Government and Binding (GB) framework, put forth by Li (1995). Section 4 presents the general LMT framework and a revised version, followed by an analysis of argument-function assignments and causativity assignment in Mandarin resultative compounding. Section 5 offers an account for the varying degrees of markedness among different argument-function linkings. Section 6 contains some concluding remarks.

2. RESULTATIVE ARGUMENT-FUNCTION MISMATCHES

Resultative compounding is a productive word-formation process in Chinese morphology, where two verbs merge, the first denoting the causing action or event and the second indicating the resulting state or event (Lin 1990, Y. Li 1990). Following Li (1995), the two composing verbs are referred to as V_{caus} and V_{res} respectively. V_{caus} is either transitive, such as *zhui* 'chase' and *sha* 'kill', or intransitive, e.g., *pao* 'run' and *ku* 'cry'. V_{res}, however, is typically an intransitive verb like *lei* 'to be tired', *si* 'to be dead', and *shi* 'to be wet'.[5] The resultative compound verb inherits argument roles from both composing verbs (Li 1995, Huang and Lin 1992). Focusing on a transitive V_{caus} and an intransitive V_{res}, the merging of the two argument structures produces two outcomes:

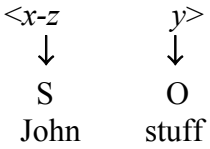
(4) $V_{caus}<\theta_x\ \theta_y> + V_{res}<\theta_z> \rightarrow$ (i) V_{caus}-V_{res} $<\theta_x\ \ \theta_y$-$\theta_z>$
(ii) V_{caus}-V_{res} $<\theta_x$-$\theta_z\ \ \theta_y>$

Since the single role of V_{res} merges with either of the two roles of V_{caus} and forms a composite role, one might expect to find two types of compounds. However, three types of argument-function linking may obtain, though normally only a specific linking is available with a compound, as shown in (5-7).

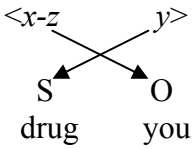
(5) Lisi niu-gan-le maojin. (causative)
Lee wring-dry-ASP towel
'Lee wrung the towel dry.'

$<x$	y-$z>$
↓	↓
S	O
Lee	towel

(6) Zhangsan chi-yan-le zhe zhong dongxi. (noncausative)
John eat-tired-of-asp this kind stuff
'John's gotten tired of eating this kind of stuff.'



(7) Zhe zhong yao hui chi-si ni. (causative)
this kind drug will eat-dead you
'Eating this kind of drug will make you dead.'



In addition, it is important to note that a resultative verb may or may not have the semantic feature of being causative. As Li (1995: 265) pointed out, while in (5) and (7) there is a strong sense that the subject, i.e., Lee and the drug respectively, is responsible for the state that the object is in. It is because of this remarkable difference that Chinese grammarians, e.g., Wang (1958), Huang (1988), Gu (1992), Cheng and Huang (1994), Cheng *et al* (1997), called examples like (5) and (7) causatives and those like (6) non-causatives. Li (1995, 1999) also argued that the emergence of this causativity can only be attributed to the resultative compounding, as in (4), because neither the V_{caus} nor the V_{res} is causative by itself. Causativity is one of the best-known features of the Mandarin *ba*-construction (Zou 1993, Li 1995: 271**,** Sybesma 1992, 1999**,** Bender 2000: 127, Ziegeler 2000) and *bei*-construction (Li and Thompson 1981, Huang 1992, Li 1995: 277). Hence, both (5) and (7) have *ba* and *bei* counterparts, as in (8) and (10) respectively, while (6) does not, as shown in (9). Li (1995) also made the same argument based on these two constructions.

(8) a. Lisi ba maojin niu-gan-le.
Lee BA towel wring-dry-ASP
'Lee wrung the towel dry.'

b. Maojin bei lisi niu-gan-le.
towel BEI LEE wring-dry-ASP
'The towel has been wrung dry by Lee.'

(9) a. *Zhangsan ba zhe zhong dongxi chi-yan-le.
John BA this kind stuff eat-tired-of-asp

b. *Zhe zhong dongxi bei Zhangsan chi-yan-le.
this kind stuff BEI John eat-tired-of-asp

(10) a. Zhe zhong yao hui ba ni chi-si.
this kind drug will BA you eat-dead
'Eating this kind of drug will make you dead.'

b. Ni hui bei zhe zhong yao chi-si.
you will BEI this kind drug eat-dead
'You will be made dead by eating this kind of drug.'

All of the three argument-function linking patterns illustrated in (5-7) may potentially be observed within a single resultative verb form; *zhui-lei* 'chase-tired' is such an example, cited in Li (1995). The single expression of (11) produces three different well-formed readings in (12). Note that while the inversion in (12b) is ill-formed, (12d) is well-formed. Furthermore, of the three well-formed readings, (12a) and (12d), similar to (5) and (7) respectively, are causatives, but (12c), like (6), is a non-causative. The feature [caus] refers to the 'cause', and [af] to the 'affectee', again following Li's (1995); they are equivalent to 'causer' and 'causee' respectively, in Huang's (1988) terms.

(11) *zhui* 'chase <*x y*>' + *lei* 'tired <*z*>' → (i) <*x y-z*>
(ii) <*x-z y*>

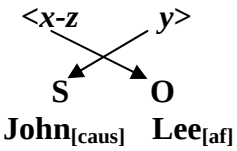
(12) Zhangsan zhui-lei-le Lisi.[6]
John chase-tired-ASP Lee
↓ ↓
SUBJ OBJ

a. 'John chased Lee and made Lee tired.' (causative)
<*x* *y-z*>
↓ ↓
S O
John$_{[caus]}$ Lee$_{[af]}$

b.*****'Lee chased John and he (John) got tired.' (non-existent)
<*x* *y-z>*
***S *O**
John Lee

c. 'John chased Lee and (John) got tired.' (non-causative)
<*x-z* *y*>
↓ ↓
S O
John Lee

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



In the next two sections I discuss two approaches to the argument-function mappings and causativity assignment in these resultative compounds.

3. THE CAUSATIVE HIERARCHY ACCOUNT

This section reviews the causative hierarchy account offered in Li (1995), where he convincingly refutes movement-based analyses of the linking in (12) and provides a lexicalist account within a derivational framework. His account assumes that the linking between a theta role and a syntactic argument position is constrained by the thematic hierarchy. The thematic hierarchy predicts that a hierarchically more prominent theta role, such as the agent role, must correspond to a structurally more prominent argument position, the subject position (e.g., Belletti & Rizzi 1988; Baker 1988, 1997; Carrier-Duncan 1985; Grimshaw 1990; Higginbotham 1985; Larson 1988; Marantz 1993; Speas 1990). Thus, the ungrammatical (12b), where the most prominent agent role, *x*, is assigned to the less prominent object position, is ruled out due to the violation of the thematic hierarchy. Likewise in (12d), the less prominent patientlike role, *y*, is linked to the subject position while the most prominent agentlike role, *x*, is assigned to the object position. Yet, in spite of the violation of thematic hierarchy, (12d) is well-formed. The challenge is thus to explain why.

The account Li offers for the grammaticality in (12d) crucially hinges upon causativity assignment in resultative compounding. To this end, an additional theoretical construct, the causative hierarchy, is proposed. Causative roles, or c-roles, are assigned directly to syntactic positions according to the causative hierarchy, i.e., the more prominent Cause to the more prominent subject, and the less prominent Affectee to the less prominent object.[7] Resultative compounding imposes further conditions on c-role assignment, as follows:

(13) C-role Assignment Conditions (Li 1995, 1999):
   a. The argument in the subject position receives the c-role Cause from a resultative compound if it receives a theta role only from V_{caus}. (Li 1999:453)
   b. The argument in the object position receives Affectee from a resultative compound if it receives a theta role at least from V_{res}. (Li 1995:268, 1999:453)

Also crucial to Li's (1995) analysis is the assumption that the causative hierarchy is more prominent than, and thus overrides, the thematic hierarchy. This principle can be viewed as an overriding well-formedness condition:

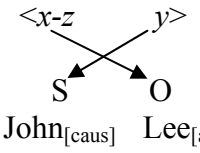
(14) Well-formedness Condition on Mapping Argument Structure to Syntax
Theta roles can be assigned contrary to the thematic hierarchy if the arguments receiving them are assigned c-roles in ways compatible with the causative hierarchy. (Li 1995:269)

According to Li (1999:453), the mapping of theta roles to syntactic positions within the account of Li (1995) contains the following three steps:

(15) Mapping steps from the argument structure to syntax in Li (1995)
Step 1: randomly assign theta roles to argument positions.
Step 2: assign causative roles to these positions according to (13).
Step 3: check well-formedness according to (14).

As an example, consider the inverse mapping in (12d), repeated below. The more prominent role *x-z* is assigned to the less prominent object *Lisi*, and conversely the less prominent role *y* to the more prominent subject *Zhangsan*. Despite this apparent violation of thematic hierarchy, (12d) is well-formed because its c-role assignment is well-formed according to (13a-b): Cause is assigned to the subject position because the latter receives a theta role *y* only from the V_{caus} *zhui* 'chase', and Affectee is assigned to the object because it receives the single role *z* of V_{res} *lei* 'tired'.

(12d) Zhangsan zhui-lei-le Lisi.
John chase-tired-ASP Lee
'Lee chased John and was made tired.'



$John_{[caus]}$ $Lee_{[af]}$

Li's (1995) account is observationally adequate in that it does account for the issue of grammaticality and that of causativity in all three readings of (12). Furthermore, given that neither V_{caus} nor V_{res} is causative, this account also captures the insight that causativity assignment is an integral part of the lexical formation of the resultative compound. Still, a better alternative should be pursued for several reasons. First, Li's account must assume a more relaxed interpretation of the θ-Criterion in order to allow linking of both of the two composing roles in a composite role. (We will discuss this point further in 4.2.) Secondly, Li's c-role assignment conditions are specific to the resultative compounding and do not follow from independently-motivated principles within the derivational framework adopted. Thirdly, given that causativity is one of the

most important properties distinguishing the proto-agent from the proto-patient (Dowty 1991) and thus affecting argument-function linking, it should ideally be integrated into the argument structures of resultative compounds. Li's account crucially depends upon the causative hierarchy, which must override the thematic hierarchy. An account that follows straightforwardly from well-established existing principles and can do without this additional machinery and the consequent interaction is simpler and thus should be preferred.

4. A LEXICAL MAPPING ACCOUNT

Lexical Mapping Theory (LMT) is the module in LFG that poses an argument structure, or a-structure, which interfaces between the lexical semantic structure and the syntactic structure of a predicator (Bresnan and Kanerva 1989 and Bresnan and Zaenen 1990, among others).[8] The conception of the a-structure assumed here is based on Baker (1983) and Bresnan (1996, 2001: chp. 14).

(16)

lexical semantics	(e.g., sink <*sinker sunk*>)
↓	
a-structure	(e.g., sink <*ag th*>)
↓	
syntactic structure	(e.g., [PRED 'sink <(↑SUBJ) (↑OBJ)>])

The argument structure of a predicator contains the minimal information necessary for the encoding of its syntactic arguments. This information includes the number of arguments, the thematic roles of the arguments, and their hierarchical organization. For example, the argument structure '*sink <ag th>*' specifies that the predicator *sink* requires two arguments, i.e., AGENT and THEME, and that AGENT is hierarchically higher than THEME. This information is all necessary in order to be able to map the a-structure to the syntactic structure, i.e., to respectively map AGENT and THEME to SUBJ and OBJ.

4.1 Mapping Argument Roles to Grammatical Functions

The hierarchical organization of a-structure arguments is determined by the THEMATIC HIERARCHY, which is assumed to be universal. The thematic hierarchy assumes an order of prominence among thematic roles in the a-structure, descending from the most prominent AGENT role. The LMT adopted in this paper assumes the particular thematic hierarchy proposed in Bresnan and Kanerva 1989, l992), shown in (17).[9] In the a-structure, argument roles are represented in a left-to-right order reflecting this prominence scale. Thus, the theory assumes that no two roles in the a-structure are equal in prominence.

(17) Thematic Hierarchy:
ag > *ben* > *go*/*exp* > *inst* > *pt*/*th* > *loc*

Grammatical functions, which correspond to a-structure roles, are likewise assumed to have a universal hierarchical organization. These include SUBJ, OBJ, OBL_θ, and OBJ_θ. SUBJ is the highest-ranked grammatical function, thus the most prominent and the least marked, while OBJ_θ is at the other extreme. This hierarchy is based on a classification in terms of two binary features: [±*r*] (thematically restricted) and [±*o*] (objective).

(18) Markedness Hierarchy of Argument Functions:
SUBJ**(-*r* –*o*)** > OBJ**(-*r* +*o*)**/OBL_θ**(+*r* –*o*)** > OBJ_θ**(+*r* +*o*)**

The LMT adopted in this paper assumes the theoretical constructs stated above but proposes the following universal classification of roles in the a-structure.[10]

(19) Intrinsic Classification of Argument Roles for Functions (IC):
pt/th → [-*r*]

The classification in (19) can be seen as an LFG implementation of the unaccusative hypothesis, initially proposed by Permulter (1978), that cross-linguistically *pt/th* is encoded as an unrestricted function, i.e., SUBJ or OBJ (Bresnan and Kanerva 1989, Bresnan and Zaenen 1990).[11] Note that the thematic hierarchy assumed here provides no clue to the prominence scale between two co-occurring *pt/th* roles in an a-structure. It is therefore further assumed in the LMT adopted here that proto-properties, in the sense of Dowty (1991), are utilized for such cases, i.e., the one with more proto-agent properties is more prominent.[12] This issue will be further explored in 4.3 and 4.4,

The version of LMT proposed here replaces the multiple mapping principles and well-formedness conditions in other formulations of the theory with a single UNIFIED MAPPING PRINCIPLE (UMP) in (20). The UMP applies to all syntactic assignments, SUBJ and non-SUBJ roles alike, and consistently links each and every argument role to the most prominent compatible function available. (Her 2003, 2004).[13]

(20) The Unified Mapping Principle (UMP):
Map each argument role, from the most prominent to the least, onto the highest compatible function available.
(*A function is *available* iff it is not linked to a role.)[14]

We will now look at the lexical mapping of three different verbs in their canonical active construction as examples: the unaccusative verb *melt*, the unergative verb *bark*, and the transitive verb *kiss*.

(21) The ice melted.

	melt < *x* >	(*x* = *pt/th*)
IC:	[-*r*]	

CF:	S/O	(CF = compatible functions)
UMP:	S	

(22) The dog barked.

	bark < *x* >	(*x* = *ag*)
IC:		

CF:	S/O/…	
UMP:	S	

(23) The girl kissed the dog.

	kiss < *x*	*y* >	(*x* = *ag*, *y* = *pt/th*)
IC:		[-*r*]	

CF:	S/O/…	S/O	
UMP:	S	O	

Lexical rules, which may be language-specific, may alter the 'lexical stock' of the a-structure by adding, suppressing, or binding argument roles (Bresnan and Kanerva 1989, Bresnan 2001: 310). For example, the lexical operation of passive suppresses the highest role in a thematic structure.

(24) Passivization: <*θ*… >
↓
∅

(25) The dog was kissed.

	kiss < *x*	*y* >	(*x* = *ag*, *y* = *pt/th*)
IC:		[-*r*]	
Passive:	∅		

CF:		S/O	
UMP:		S	

4.2 Strict One-to-One Linking and Suppression

As seen earlier, the lexical operation of resultative compounding merges two verbs and their a-structures. The a-structure of derived compound verb, by inheriting argument roles from both V_{caus} and V_{res}, contain composite roles, as in (26i-ii). This subsection addresses the specific problem of linking a composite role to a grammatical function.

(26) Resultative Compounding (1st formulation):
$V_{caus}\langle x\ y\rangle + V_{res}\langle z\rangle \rightarrow$
$V_{caus}V_{res}\langle \alpha\ \beta\rangle$, where $\langle \alpha\ \beta\rangle$ = (i) $\langle x\ y\text{-}z\rangle$
(ii) $\langle x\text{-}z\ y\rangle$

In essence, the lexical operation of resultative compounding binds the single role from V_{res} with either of the roles of V_{caus}. We will use the term 'composite role' to refer to a role formed by two composing roles bound as one. The resultative compound is therefore transitive, *not* ditransitive. Thus, a composite role must link to one, and only one, argument function (Li 1995, Her 1997, Huang and Lin 1992). However, an explanation is needed as to why the linking of composite roles does not violate the one-to-one correspondence between argument roles and syntactic argument functions required by the unified mapping principle. Such strict one-to-one linking is likewise required by the previous Argument-Function Biuniqueness Condition in LFG and the *θ*-Criterion in the derivational framework.

In their analysis of English resultatives, Carrier and Randall (1992:180) thus find it necessary to propose a relativized interpretation of the *θ*-Criterion, which essentially states that an argument XP must bear one and only one *θ*-role *assigned by the same head*.

(27) a. *water* $\langle x\ y\rangle$
b. *flat* $\langle z\rangle$
c. [The girl] watered [the nice tulip] flat.
θ_x θ_y θ_z

Thus, in this structure-based analysis, the object position in (27), filled by the DP *the nice tulip*, indeed receives two argument roles, but each from a different head: θ_y from the matrix verb *water*, θ_z from the embedded predicate *flat*; hence the *θ*-Criterion is not violated. This relaxation offers a technical solution and can be easily adopted within the version of LMT adopted here. As pointed out earlier, in Li's (1995, 1999) account, where the two composing roles in a composite role both receive linking, such a relaxation of the *θ*-Criterion must be assumed. However, the original interpretation of a strict one-to-one argument-function correspondence is much simpler and should be preferred, especially if a principled account is available under it (Her 2004).

Note that the strict one-to-one interpretation entails that only one composing role in a composite role receives syntactic assignment. It thus also entails that the second composing role must not receive syntactic assignment. An argument role that receives no mapping is known as SUPPRESSION in the LFG literature, similar to ABSORPTION in the derivational framework. The suppression of a composing role, as a logical consequence of one-to-one linking, can thus be considered *universally motivated and constrained* by the mapping principle.

As mentioned in 4.1 above, role suppression, together with addition and binding, can be part of lexical operations and the suppression of the highest role, or logical subject, in passivization was given as an example in (24). Suppression

is also required in the MIDDLE and TOUGH constructions. Thus, as a notion that is independently and universally motivated, its employment in mapping composite roles does not complicate the grammar in any way.

Also, it is crucial to note that suppression does not eliminate an argument semantically; it merely blocks the role from surfacing as a syntactic *argument*. Whether the suppressed role may still surface as a syntactic *adjunct* seems to vary from construction to construction. In a passive sentence like (28a), for example, the suppressed external role may still be identified with, and thus semantically linked to, a *by*-adjunct phrase (Bresnan 1994:81). A so-called 'subject-oriented' adverb, which likewise refers to the suppressed AGENT, may also be allowed, as in (28b). A middle construction, however, does not allow such options, as shown in (29a-b), where the suppressed role must remain implicit.

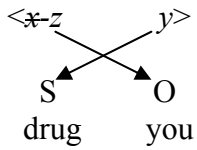
(28) a. The nice tulip was watered flat (by the girl).
b. The nice tulip was watered flat (intentionally).

(29) a. This new car sells very well (*by the dealers).
b. This new car sells very well (*intentionally).

The fact that two composing roles are bound as a single composite role would lead to the prediction that a composing role suppressed for syntactic assignment cannot surface as a separate syntactic adjunct. Indeed no well-formed examples can be found in Mandarin. The resultative compound verb is thus like the middle verb in (29a). Furthermore, the suppressed composing role also does not allow indirect syntactic expressions such as the 'subject-oriented' adverbs in (29b). The inversion example in (7) is repeated as (30a) as an illustration; note (30b) is ill-formed with the subject-oriented adverb. The suppression of a compositing role in a composite role is thus well-motivated and well-constrained.

(30) *chi* 'eat' <*x y*> + *si* 'dead' <*z*> →
chi-si 'eat-dead' <~~*x*~~-*z y*>

a. Zhe zhong yao hui chi-si ni.
this kind drug will eat-dead you
'Eating this kind of drug will make you dead.'



b. *Zhe zhong yao hui <u>youyide</u> chi-si ni.
this kind drug will intentionally eat-dead you

With θ_x suppressed in θ_x-θ_z (indicated by cross-out), the syntactic assignment of the composite role to OBJ is determined solely on the basis of θ_z. (The exact account for the mapping of θ_y-SUBJ and θ_z-OBJ will be given in the next two subsections.) However, since a suppressed composing role always receives implicit linking to the grammatical function directly assigned to its partner, the suppressed θ_x is implicitly linked to OBJ, never anything else. The object *ni* 'you' thus receives the semantic interpretation of θ_z, the THEME of *si* 'dead' as well as the interpretation of θ_x, the AGENT of *chi* 'eat'.

4.3 Argument-Function Linking in Resultative Compounds

The theory of strict one-to-one linking and suppression therefore predicts that resultative compounding should generate four potential a-structures, as shown in (31). Again, suppression is indicated by a single cross-out.

(31) Resultative Compounding (2nd formulation):

$V_{caus}\langle x\ y\rangle + V_{res}\langle z\rangle \rightarrow$

$V_{caus}V_{res}\langle \alpha\ \beta\rangle$, where $\langle \alpha\ \beta\rangle =$ (i) $\langle x\ y\text{-}\cancel{z}\rangle$

(ii) $\langle x\ \cancel{y}\text{-}z\rangle$

(iii) $\langle x\text{-}\cancel{z}\ y\rangle$

(iv) $\langle \cancel{x}\text{-}z\ y\rangle$

The application of the LMT to cases (33i-ii) is shown in (34):

(32) Zhangsan zhui-lei-le Lisi.
John chase-tired-ASP Lee
a. 'John chased Lee to the extent as making him (Lee) tired.'

$\langle x\ \ y\text{-}\cancel{z}\rangle$ (33i) (x = *ag*, y = *pt/th*)

IC [-*r*]

CF S/O/... S/O

UMP S O

John Lee

$\langle x\ \ \cancel{y}\text{-}z\rangle$ (33ii) (x = *ag*, z = *pt/th*)

IC [-*r*]

CF S/O/... S/O

UMP S O

John Lee

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

$\langle x\ \ y\text{-}\cancel{z}\rangle$ (33i)

. $\langle x\ \ \cancel{y}\text{-}z\rangle$ (33ii)

*O *S

Lee John

As shown in (32a), the competition between θ_z-θ_y produces two a-structures (31i-ii) but only one reading, due to the identical syntactic linking of θ_z and θ_y, both [-*r*] roles. The ungrammatical reading in (32b) (the earlier (12b)) is also accounted for, as its linking is ill-formed. In the next two a-structures (31iii-iv), however, the competition for syntactic assignment between the two composing roles does produces two distinct argument-function linkings and thus two well-formed readings. With θ_z suppressed, the linking in (12c), shown below as (32c), is straightforward: the agentlike θ_x links to SUBJ, and the patientlike θ_y to OBJ.

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

c. 'John chased Lee and (John) got tired.'
< *x*-~~*z*~~ *y* > (33iii) (*x* = *ag*, *y* = *pt/th*)

SC	[-*r*]	

CF	S/O/...	S/O
UMP	S	O
	John	Lee

d. 'Lee chased John and was made tired (by John).'
< ~~*x*~~-*z* *y* > (33iv) (*y* = *pt/th*, *z* = *pt/th*)

SC	[-*r*]	[-*r*]	

CF	S/O	S/O	
UMP	S	O	incorrect mapping
UMP	O	S	desried mapping not yet accounted for
	Lee	John	

However, the linking for (12d), shown in (32d), presents a complication. Recall that the thematic hierarchy assumed in (17) has *pt/th* roles equal in prominence. With the agentlike θ_x suppressed, the two remaining roles, θ_y and θ_z, both *pt/th* roles, receive the same [-*r*] classification. The mapping in (32d) thus must remain unresolved for now. If θ_y is less prominent than θ_z here, the mapping is incorrect. Thus, for the required [θ_y–SUBJ θ_z-OBJ] mapping to obtain, θ_y must be demonstrated to be more prominent than, and thus positioned to the left of, θ_z. As stated earlier, Dowtyian proto-properties are employed in such cases. We will demonstrate in 4.4 that causativity provides an unequivocal indication that θ_y is indeed more prominent than θ_z in (32d).

4.4 Causativity in Resultative Compounds

As argued in Li (1995, 1999), given that neither V_{caus} nor V_{res} is causative on its own, causativity in a resultative compound must be attributed to the lexical formation. Li (1999:480) in fact proposes a universal default hypothesis that

causative roles are assigned when a resultative construction is formed. Within a causative resultative compound the most natural place for [af], or Affectee, to be associated with is θ_z, the only role required by V_{res}. Extending Her's (1997:153) that an argument structure where the role from V_{res} is suppressed cannot be causative, the following generalization on causativity distribution among Mandarin resultative compounds is reached:

(33) Causativity Assignment in Resultative Compounding:
An unsuppressed role from V_{res} receives [af] iff an unsuppressed role from V_{caus} exists to receive [caus].

Thus, resultative compounding can now be further expanded to include causativity distribution:

(34) Resultative Compounding (3rd formulation):
$V_{caus}<x\ y> + V_{res}<z> \rightarrow$
$V_{caus}V_{res}$ $<\alpha\ \beta>$, where $<\alpha\ \beta>$ = (i) $<x\ y\text{-}\cancel{z}>$
(ii) $<x$[caus] $\cancel{y}\text{-}z$[af]$>$
(iii) $<x\text{-}\cancel{z}\ y>$
(iv) $<\cancel{x}\text{-}z$[af] y[caus]$>$

The application of (34) to the three well-formed readings in (12) is shown in (35) below:

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

a. 'John chased Lee to the extent as making him (Lee) tired.'
$< x$ $y\text{-}\cancel{z} >$ (34i) (non-causative)
S O
John Lee

$< x$[caus] $\cancel{y}\text{-}z$[af]$>$ (34ii) (causative)
S O
John Lee

b.*'Lee chased John and he (John) got tired.' (non-existent)
$<x$ $y\text{-}z>$
*O *S
Lee John

c. 'John chased Lee and (John) got tired.'
$< x\text{-}\cancel{z}$ $y >$ (34iii) (non-causative)
S O
John Lee

d. ‘Lee chased John and was made tired (by John).’
< ~~*x*~~-*z*[af] *y*[caus]> (34iv) (causative)
O S
Lee John

As demonstrated in (36a), the two a-structures of (34i) and (34ii), <*x y*-~~*z*~~> and <*x* ~~*y*~~-*z*> respectively, share an identical argument-function linking and thus relate to the same reading of (36a). Note that in (34i), θ_z from V_{res} is suppressed and thus the a-structure receives no causativity; yet, (34ii) is causative with θ_x[caus] and θ_z[af]. Our account thus correctly predicts that the reading of (36a) is still causative. On the other hand, the reading of (36c), which corresponds to (34iii), is not causative because θ_z from V_{res} is suppressed. Finally, consider (35d), or (35iv): θ_z is not suppressed in its a-structure <~~*x*~~-*z y*> and thus receives [af], while an unsuppressed role θ_y from V_{caus} exists to receive [caus].

The prominence issue between two unsuppressed *pt/th* roles in (32d) can now be resolved. It has been well-established since Dowty (1991) that [caus] is a prototypical property associated with the AGENT role and [af] is associated with the prototypical PATIENT and that the former is more prominent than the latter.[15] Between θ_y[caus] and θ_z[af] in (35d), the former is thus more prominent. With causativity accounted for, in (32d) the more prominent θ_y is mapped to SUBJ by the UMP first, prior to θ_z, which can then be mapped to OBJ only. We illustrate this analysis on another example.

(36) Zhexie xiangzi ban-lei-le ta. (causative)
these box move-tired-ASP she
‘Moving these boxes tired her out.’

	< ~~*x*~~-*z*[af]	*y*[caus]>
SC	[-*r*]	[-*r*]
	---	---
CF	S/O	S/O
UMP	O	S
	she	boxes

In (36), θ_y *xiangzi* ‘box’, which undergoes a change of location due to the verb *ban* ‘move’, is a *pt/th* role, while θ_z *ta* ‘she’, which undergoes a change of state and ends up being tired, is also a *pt/th*. The two roles are thus equal in prominence, according to the thematic hierarchy in (17). However, the stalemate is broken when causativity is taken into account. Being the causer, θ_y has more proto-agent properties, and is thus more prominent, than θ_z, the affectee. Thus, following the convention that in the a-structure a more prominent role is listed to the left of a less prominent one, (36) should in fact be represented as (37). This convention will be strictly followed hereafter.

(37) Zhexie xiangzi ban-lei-le ta.

	< *y*[caus]	~~*x*~~-*z*[af]>
SC	[-*r*]	[-*r*]
	---	---
CF	S/O	S/O
UMP	S	O
	boxes	she

Causativity is thus indeed an important factor in the syntactic assignment of argument roles. The insight of Li's (1995) causative hierarchy, i.e., Cause > Affectee, is captured more naturally as a semantic property of argument roles in our account, which, however, consistently maintains the thematic hierarchy as well as the strict one-to-one linking (as a consequence entailed by the UMP in the LMT assumed in the paper or as a condition imposed by the θ-Criterion in the framework assumed by Li (1995)). No additional machinery is necessary as the notion of suppression that the current account hinges upon is universally and independently motivated.

4.5 Further Resultative Compound Data

In this subsection we will examine the lexical mapping in passivized resultative compounds and resultative compounds with an intransitive V_{caus}. As shown in (38), with an intransitive V_{caus}, resultative compounding produces three possible a-structures. Here again the competition between two composing roles produces two a-structures.

(38) *ku* 'cry <*x*>' + *xia* 'blind <*z*>' → (i) <*x*-~~*z*~~>
(ii) <~~*x*~~-*z*>
(iii) <*x z*>[16]

(39) Ta ku-xia-le. (non-causative)
she cry-blind-ASP.
'She cried and went blind as a result.'

	<*x*-~~*z*~~>	(38i)	(*x* = *ag*)
IC			

CF	S/O/...		
UMP	S		

	<~~*x*~~-z >	(38ii)	(*z* = *pt/th*)
IC	[-*r*]		

CF	S/O		
UMP	S		

The distinction between the two mappings in (39) is due to the strict one-to-one argument-function correspondence. However, since the suppressed role still receives syntactic expression indirectly from the role that it is bound with, the two a-structures share identical syntactic assignment and the same reading. No causativity is assigned to either a-structure because in (38i) θ_z from V_{res} is suppressed, while in (38ii) there is no unsuppressed role from V_{caus} to receive [caus]. The linking of the a-structure of (38iii) is demonstrated in (40).

(40) Ta ku-xia-le liang ge yanjing. (causative)
she cry-blind-ASP two CL eye
'She cried (her) two eyes blind.'

<*x*[caus] z[af]> (38iii) (*x* = *ag*, *z* = *pt/th*)
IC [-*r*]

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

The causativity assignment formulated earlier in resultative compounding also predicts correctly that (40), where θ_x and θ_z do not form a composite role and θ_z is not suppressed, is indeed causative. Thus, we only need to include the intransitive V_{caus} to cover the entire range of resultative compounding.

(41) Resultative Compounding (final formulation):
V_{caus}<*x y*> + V_{res}<*z*> →
$V_{caus}V_{res}$ <*α β*>, where <*α β*> = (i) <*x y-z*>
(ii) <*x*[caus] ~~*y*~~-*z*[af]>
(iii) <*x-z y*>
(iv) <*y*[caus] ~~*x*~~-*z*[af] >
V_{caus}<*x*> + V_{res}<*z*> →
$V_{caus}V_{res}$ <*α (β)*>, where <*α (β)*> = (i) <*x-z*>
(ii) <~~*x*~~-*z*>
(iii) <*x*[caus] *z*[af]>

Next we will apply the LMT analysis to passivized resultative compounds. First, we will look at the passive form of *ku-xia* 'cry-blind' in (42). Again, the passive operation in LFG simply suppresses the most prominent role. Note also that causativity in this passive sentence is the same as in its active counterpart (40), correctly predicted by the causativity assignment in Resultative Compounding.

(42) Liang ge yanjing dou bei ku-xia-le.
two CL eye all BEI cry-blind-ASP
'Both eyes went blind, caused by crying.'

	<*x*[caus] z[af]> (causative) (*z* = *pt/th*)
Passive	∅
IC	[-*r*]

CF	S/O
UMP	S

Finally, we return to *zhui-lei* 'chase-tired' and examine its passive counterparts closely. According to Li (1995) as well as Her (1997), only a single reading is obtainable in the *bei* construction of *zhui-lei* 'chase-tired', as in (43).

(43) Lisi bei zhui-lei-le.
Lee BEI chase-tired-asp
'Lee was chased and made tired.'

However, the LMT analysis proposed above in fact predicts that there should be two well-formed readings associated with the passive (43). In (44), the four possible a-structures with causativity assignment are shown, each with its external role suppressed by passivization.

(44) Lisi bei zhui-lei-le.
Lee BEI chase-tired-asp

i. < *x* *y-~~z~~* >
∅ S
Lisi
'Lee was chased and got tired.'

ii. < *x*[caus] *~~y~~-z*[af]> (causative)
∅ S
Lisi
'Lee was chased and made tired.'

iii. < *x-~~z~~* *y* > (non-causative)
∅ S
Lisi
*'Lee got tired.'

iv. < *y*[caus] *~~x~~-z*[af] > (causative)
∅ S
Lisi
'Lee was made tired by chasing (someone).'

As noted by Li (1995:277) and others, the *bei* causative construction requires an affected internal argument, which is linked to the passivized subject. The a-structures of (44i) and (44iii), with no [af] feature at all, are thus ruled out.

Only (44ii) and (44iv) remain, both with an [af] internal role. The linking of the a-structure in (44ii) is straightforward and leads to the easily accessible reading in (43). A closer examination is needed for (44iv). Again, recall that causativity properties dictate that θ_y, a *pt/th* role, is more prominent than θ_z, also a *pt/th* role. Thus, in the passivized (44iv), it is θ_y, the more prominent role, that is suppressed, not the less prominent θ_z. Our analysis thus predicts that both (44ii) and (44iv) are well-formed and that there should indeed be two readings to (43), shown in (45a) and (45b) respectively.

(45) Lisi bei zhui-lei-le.
Lee BEI chase-tired-asp

a. 'Lee was chased and made tired.' (44ii)

	<*x*[caus] ~~*y*~~-*z*[af]>	(*z* = *pt/th*)
Passive	∅	
IC	[-*r*]	
CF	S/O	
UMP	S	

b. 'Lee was made tired by chasing (someone).' (41iv)

	< *y*[caus] ~~*x*~~-*z*[af]>	(*z* = *pt/th*)
Passive	∅	
IC	[-*r*]	
CF	S/O	
UMP	S	

Each of the two passive causative readings, (45a) and (45b), find its logical correspondence in the two active causative counterparts in (36a) and (36d) respectively, repeated below as (46a) and (46b) respectively.

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

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

<*x*	~~*y*~~-*z*>
S	O
John$_{[caus]}$	Lee$_{[af]}$

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

<*y*	~~*x*~~-*z* >
S	O
John$_{[caus]}$	Lee$_{[af]}$

The reading in (45b), the passive counterpart of (46b), however, is admittedly not easily accessible for some native speakers. Among the three active readings of *zhui-lei* 'chase-tired' in (36), the one in (36d) (=46b), which is associated with subject-object inversion, is the most difficult one to obtain.[17] Thus, given the even more marked nature of passive, the difficulty of (45b), the passive counterpart of (46b), can be appreciated. Most native speakers consulted, however, have little difficulty accepting (48) below, which has the exact identical a-structure and the same mapping as (46b) (=36d). The active counterpart of (48) is shown in (47).

(47) Zhe zhong xiao zi hui kan-huai ni-de yanjing.
this kind small print will read-bad your eye
'Reading such fine print will make your eyes go bad'.
<*y*[caus] ~~*x*~~-*z*[af] >
S O
fine print eyes

(48) Ta-de yanjing bei kan-huai-le.
her eye BEI read-bad-ASP
'Her eyes went bad, caused by reading (this).'
<*y*[caus] ~~*x*~~-*z*[af] >
∅ S
eyes

Furthermore, once the passive (47) is adopted in the *shi..de* focus construction, as in (49), all of the dozen or so native speakers consulted find its reading even more easily accessible. The *shi..de* construction places the post-*shi* constituent into focus (Cheng 1983).

(49) Ta-de yanjing jiu shi zheyang bei kan-huai de.[18]
her eye exactly SHI this-way BEI see-bad DE
'Her eyes went bad, precisely caused by reading this way.'

In spite of the difficulty that many native speakers might have in obtaining the reading in (45b), the grammaticality of (48-49) supports the LMT account. In the next section we will attempt an explanation as to why the linking in (45b), though equally well-formed, produces a reading that is less accessible than that of (45a).

5. A MARKEDNESS THEROY OF LINKING

We will demonstrate in this section that within the LMT proposed above, a notion of markedness can be derived for argument-function linking. An unmarked linking produces a more transparent match between the lexical

semantic structure and the syntactic structure of a predicator and thus a more accessible reading, while a more marked linking involves a higher degree of opacity and thus a more obscure reading.

5.1 The Basic Data of Active Resultative Compound Verbs

Consider again the three readings in the active expression of *zhui-lei* 'chase-tired', repeated in (50).

(50) Zhangsan zhui-lei-le Lisi.
John chase-tired-asp Lee

a. 'John chased Lee to the extent as making him (Lee) tired.'
< *x* *y-~~z~~* >
< *x*[caus] ~~*y*~~*-z*[af] >
S O
John Lee

b.*'Lee chased John and he (John) got tired.'
< *x* *y-~~z~~* >
. < *x* ~~*y*~~*-z* >
*O *S
Lee John

c. 'John chased Lee and he (John) got tired.'
< *x-~~z~~* *y* >
S O
John Lee

d. 'Lee chased John and was made tired (by John).'
<*y*[caus] ~~*x*~~*-z*[af] >
S O
John Lee

The linkings in (50a), (50c), and (50d) are equally well-formed within the theory; however, the reading in (50a) is no doubt the most accessible while (50d) is without question the most opaque. Thus, our discussion here is not in relation to grammaticality or marginality. Rather, it is in regard to the relative accessibility or transparency of the (well-formed) readings available. As Li (1995:256fn) puts it, (50a) has the 'basic' meaning. The reading of (50d), on the other hand, is so subtle that it in fact escaped notice in Y. Li (1990) and was a surprise to him when he was made aware of its possibility later (Li 1995:257). An explanatory analysis should be able to shed some light on the varying degree of transparency or markedness among the different readings.

According to Hsieh (1989, 2005) and Her (1997), variation is invariably due to competition between two or more grammatical processes. Competition can be more precisely defined as follows: Given two grammatical processes, P1

and P2, if the same source yields two or more results, then P1 and P2 are in competition. A simple example is the variation of past tense forms of certain English verbs, e.g., *lit* vs. *lighted* and *throve* vs. *thrived*, due to two competing morphological processes. For a resultative compound, the variant linkings can be attributed to the competition for syntactic assignment among the participating argument roles. Recall first that the resultative compounding binds the THEME role of V_{res} with either of the two roles of V_{caus}, as shown in (51).

(51) *zhui* 'chase <*x y*>' + *lei* 'tired <*z*>' → a. <*x y-z*>
b. <*x-z y*>

While a composing role in a composite role may be suppressed, an independent role guarantees syntactic assignment. Thus, it can be assumed that an independent role is less marked than a composite role. The first instance of competition arises when the two roles of V_{caus}, θ_x and θ_y, compete for independence in the a-structure of the compound verb. Assuming that the more prominent role is also less marked, the unmarked choice would be for the more prominent *ag* role θ_x to remain independent and the less prominent *pt/th* role θ_y, to be bound with θ_z from V_{res}. Thus, a-structures derived from (51b) are more marked than those derived from (51a); this is summarized in (52).

(52) *zhui* 'chase <*x y*>' + *lei* 'tired <*z*>' → a. <*x y-z*> *less marked*
b. <*x-z y*> *more marked*

Recall also that one composing role must be suppressed to allow syntactic assignment of the composite role. A second instance of competition for syntactic assignment is thus found between composing roles within a composite role, as shown in (52).

(53) *zhui* 'chase <*x y*>' + *lei* 'tired <*z*>' → i. <*x y-~~z~~*>
ii. <*x ~~y~~-z*>
iii. <*x-~~z~~ y*>
iv. <*y ~~x~~-z* >

Let's examine (53i) and (53ii) first, both of which correspond to the less marked (52a). Recall that the two a-structures produce the single most accessible reading of (50a). The competition between the two composing roles, θ_y-θ_z, both *pt/th* roles, is therefore neutralized, as whichever is unsuppressed it would receive the same [-*r*] classification and thus an identical syntactic assignment.[19] The mutually compatible linkings in (53i) and (53ii) are thus equally unmarked, and the reading associated with them, i.e., (50a), the most transparent.

Assuming again the more prominent role is less marked, the unmarked choice of syntactic assignment between two competing roles is thus the more prominent role. Based on this notion of markedness, a clear distinction can be made between (53iii) and (53iv), both corresponding to the more marked (52b). Between the two composing roles, θ_x-θ_z, *ag* and *pt/th*, the suppression of the

more prominent *ag*, or θ_x, in (53iv) thus is more marked than the suppression of the less prominent *pt/th* in (53iii).

Metaphorically speaking, the suppression of a more prominent role in a composite role to allow the linking of a less prominent role is an upset. Likewise, an upset obtains when a more prominent role in the a-structure is bound in a composite role allowing a less prominent role independent syntactic assignment. Assuming that an unmarked linking aligns the lexical semantic structure and the syntactic structure, an upset is more marked and skews this semantics-syntax alignment. A summary is given is (54) below. Again, (54i) and (54ii) relate to the most accessible reading of (50a), (54iii) to that of (50c), and (54iv) to the relatively obscure reading of (50d). Following the terminology put forth in Hsieh (2005), (54i) and (54ii) are 'transparent', (54iii) 'semi-opaque', and (54iv) 'opaque'.

(54) *zhui* 'chase <*x y*>' + *lei* 'tired <*z*>' →

i. <*x y*-~~*z*~~> (*no upset, transparent*)
ii. <*x*[caus] ~~*y*~~-*z*[af]> (*no upset, transparent*)
iii. <*x*-~~*z*~~ *y*> (*1 upset, semi-opaque*)
iv. <*y*[caus] ~~*x*~~-*z*[af]> (*2 upsets, opaque*)

Incidentally, the ill-formed (50b) may also receive an interpretation within such as a view of markedness and opacity: the markedness of its linking is to the degree intolerable by the grammar. The reading associated with the ungrammatical (50b) is thus beyond opacity and inaccessible.

5.2 Reexamining the Passive Readings

We will now re-examine suppression in passivization. Between the active and the passive construction, the latter is universally more marked and less transparent. Aissen (1999, sec. 4.2) discusses how the choice of voice can be conceived as the result of a competition between AGENT and THEME for THEMATIC PROMINENCE, a cover term for topicality, empathy, and discourse coherence. An upset thus arises when THEME is more prominent than AGENT in discourse, often creating an inversion effect.[20] Within the LMT, we can simply conceive the choice of voice as a competition between AGENT and THEME for the syntactic assignment to SUBJ, the least marked grammatical function. Upset thus occurs at two levels in the passive construction: discourse over syntax and THEME over AGENT. Syntactically, an upset results in the suppression of AGENT in grammatical function assignment. The winning THEME in this upset is, to borrow a term from Relational Grammar, 'promoted' to subjecthood.

In light of this discussion on markedness and opacity, we now re-examine the two well-formed a-structures, and thus also the two readings, associated with passivized *zhui-lei* in (45), repeated in (55).

(55) Lisi bei zhui-lei-le.
Lee BEI chase-tired-asp

a. ‘Lee was chased and made tired.’

<*x*[caus]	~~*y*~~-*z*[af]>	(*2 upsets*)
∅	S	
(John)	Lee	

b. ‘Lee was made tired by chasing (someone).’

<*y*[caus]	~~*x*~~-*z*[af] >	(*3 upsets!*)
∅	S	
	Lee	

As noted earlier, most native speakers consulted find (55b) difficult to obtain without the coercion of an appropriate context. In our earlier discussion, additional examples, i.e., (48) and (49), with the same structure but with a more favorable discourse context, had to be brought in to demonstrate that the LMT analysis is indeed correct. We are now in a better position to explain the opacity of (55b). Notice first that here Resultative Compounding merges the THEME role θ_z from V_{res} with the more prominent AGENT θ_x of V_{caus}, thus creating the first upset. The second upset occurs in the syntactic assignment of the composite role ~~*x*~~-*z*, where the more prominent AGENT θ_x is suppressed. These two instances of upset result in the most opaque reading among the three active readings. With an additional upset from the suppression of the more prominent causer θ_y over the less prominent affectee θ_z in passivization, linking of the a-structure in (55b) is thus even further obscured.

6. CONCLUSION

In conclusion, argument-function mismatches in resultative compound verbs are due to the competition for syntactic assignment between the two composing roles in a composite role. In cases where the suppression of a more prominent role in the syntactic function assignment of an argument structure, an upset occurs, which induces an apparent inversion of argument-function linking. The simplified LMT framework proposed in the paper facilitates a straightforward formalization of this analysis and also generates further predictions, which all have been shown to be correct. This account also preserves the thematic hierarchy by assigning causativity to argument roles, rather than to syntactic positions. Furthermore, this account also afford a theory of markedness in linking and thus provides an explanation for the varying degrees of markedness among different argument-function assignments.

NOTES

* (Acknowledgments to be added.)

[1] 'ASP' stands for 'aspect' and *zhe* is an imperfective aspect marker.

[2] Examples of the subject raising construction are given in (i) and (ii) below to demonstrate that the preverbal DP in (1b) and (2b) respectively is indeed the (raised) subject. In (i), both *you* (有) and *shi* (是) are raising verbs, and so are *yinggai* 'should' and *keneng* 'is likely' in (ii).

i. Tai-shang you/shi zuo-zhe yi ge ren.
stage-top YOU/SHI sit-ASP one CL person
'On the stage indeed was sitting a person.'

ii. Yi bang rou yinggai/keneng chi liang ge ren.
one pound meat should/could eat two CL person
'One pound of meat should/could feed two people.'

More discussion on the syntactic encoding of SUBJ in Mandarin can be found in Her (1990) and Tan (1991). Furthermore, as convincingly argued for in Sybesma (1999), postverbal bare nominals, including frequentatives and durations, in Mandarin are all complements, not adjuncts. Thus, the unmarked postverbal NPs in (i-ii) must be non-oblique objects.

[3] 'CL' stands for 'classifier'. Chinese is a classifier language, where nouns need to be syntactically marked by a classifier when numerated.

[4] The aspect marker 'le' marks the perfective aspect.

[5] These adjectival verbs are real verbs in Chinese, in spite of their translation as adjectives. See McCawley (1992) for arguments against the category ADJECTIVE in Chinese.

[6] The choice of *zhui-lei* 'chase-tired' as the example here is deliberate because it is the most prominent example used in Li (1995) to demonstrate the three-way ambiguity in one single verb. Note that linking in (9a), (9c), and (9d) corresponds to (5), (6), and (7) respectively, where the readings are more straightforward.

[7] Even though Li does not give a list of c-roles, it seems clear that Cause and Affectee are the two only c-roles, and thus the hierarchy is simply: Cause > Affectee.

[8] The first comprehensive formulation of LMT is offered in Bresnan and Kanerva (1989). For the most widely circulated formulation of LMT, see

Chapter 14 of Bresnan (2001), which is based largely upon Bresnan and Zaenen (1990). Falk (2001) also gives a lucid and concise introduction to LMT, with a more precise theory of argument roles. An introduction with more elaborated examples can be found in Chapter 8 of Dalrymple (2001). Though its essential assumptions have remained fairly stable for the last fifteen years, the issue of argument-function linking in LMT, especially its precise formulation, has yet to have been resolved (Butt and King 2000:9). There are a number of alternative formulations of LMT, including Zaenen (1993), Butt et al (1997), Butt (1998), Ackerman and Moore (2001b), and Alsina (1996), among others.

[9] Such a prominence scale of argument roles might also be derived from Dowtyian proto-agent and proto-patient properties (Dowty 1991).

[10] This scheme further simplifies the LMT proposed in Her (1999, 2003). However, this revised LMT likewise allows morphosyntactic operations that add syntactic classification features and affect mapping. See Her (1999, 2003) for further details.

[11] Perlmutter's (1978: 160) Unaccusative Hypothesis is stated within the specific framework of Relational Grammar: "Certain intransitive clauses have an initial 2 (object) but no initial 1 (subject)." [Insertions into parentheses added].

[12] A common approach within LFG is to further distinguish primary *pt/th* roles from secondary *pt/th* roles, the latter receiving IC [+*o*], not [-*r*], in the so-called 'asymmetrical' languages, English included (Bresnan and Moshi 1990, Alsina and Mchombo 1993). For symmetrical languages, e.g., the African language Chichaga, this does not apply; thus, *pt/th* roles are all linked to unrestricted functions. For asymmetrical languages, exactly which patient/theme role is secondary is parameterized between patient and theme. For instance, in English it is the non-patient theme, while in Romance languages it is the non-theme patient (Falk 2001:115). In this paper, we will not resort to such a language-specific distinction.

[13] Note that the UMP does not state explicitly that every clause must have a SUBJ, even though most syntactic frameworks posit universal principles stating otherwise, e.g., the Subject Condition in LFG, the Extended Projection Principle in GB/P&P, and the Final-1 Law in Relational Grammar. It has been suggested that clauses may truly be without a subject (e.g., Babby 1989, Simpson 1991, and McCloskey 1999). The UMP reflects the insight that SUBJ is the most favored grammatical function in the linking of each and every role. Thus, subjectless clauses may be allowed, but only as a marked and construction-specific morphosyntactic option.

[14] As roles are listed in a left-to-right order according to prominence, this formulation may give the perception that mapping is procedural, or from left to

right. This is not intended. In fact, UMP is meant to be a constraint that applies declaratively (Her 2003).

[15] One can also achieve the same result by adopting a Dowtyian approach (e.g., Zaenen 1993, Ackerman and Moore 2001a) and base subject selection on proto-roles. We can thus modify the Unified Mapping Principle (UMP) accordingly:

> Map each argument role, from the most prominent to the least, onto the highest compatible function available; resolve equal prominence with proto-role properties.

[16] This option exists because a resultative compound in Chinese is restricted to having at most two roles. Thus, the merging of the only two roles is optional.

[17] Section 6 discusses the nature of markedness of the argument-function linking associated with this reading, and at that point its obscurity will be accounted for.

[18] *Shi* is a verb in Chinese similar to English *be*; *de* is a relativizer.

[19] Thus, a conspiracy, as defined in note 18, obtains in the competition between the two a-structures (53a) and (53a'). While conflicts give rise to more opaque forms, a conspiracy produces a more transparent form (Hsieh 2005).

[20] Birner (1994) offers an excellent discussion on the information packaging function of inversion constructions.

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