

In Matthew Chen and Ovid Tzeng
(eds.), *In Honor of William Wang:
Interdisciplinary Studies on
Language and Language Change*,
Pyramid Press, Taipei, pp. 187-221,
1995

On the Argument Structure of Resultative Compounds

Lisa Lai-Shen Cheng and C.-T. James Huang
University of California at Irvine

Resultative verb compounds (henceforth RVC) have enjoyed a special place in Chinese syntax, because their syntax and semantics have been shown to provide insights into the nature of compositional semantics and its relationship with syntax. In recent years, resultative compounds have been seen to contribute to the theory of argument structure as a theory of the syntax-semantics interface. Li (1990) was the first recent attempt to provide a systematic account of the argument structure of resultative compounds on the basis of the argument structure of their component verbs. There has been much revived interest in this construction, particularly as it pertains to the issues of transitivity, argument identification, and the head of a compound.

In this paper, we shall treat the argument structure of resultative compounds from the point of view of verb classes, and show that they can be treated on a par with simple (monomorphemic) verbs on the one hand, and with complex phrasal predicates on the other, as belonging to one of four basic predicate classes: unergative, transitive, ergative, and causative. We argue that the argument structure of a compound is essentially a composition of the event structure, rather than the transitivity properties, of its component parts, and that RVCs, like regular resultative phrasal constructions, are headed by the first predicate (V1). Once the resultatives are each properly classified as belonging to one of the four basic types of predicates, their major properties automatically follow from general principles governing operations on argument structure, the assignment of thematic structure, word order, and control. In addition to the four basic types, we also argue for the existence of a type of derived ergative (or middle) compounds. In motivating our analysis of various classes of RVCs we shall consider also the treatments of Li (1990), C.-R. Huang and Lin (1992), and Sybesma (1992), and note the superiority of our account both on conceptual and on empirical grounds.

1. Four types of resultative compounds

It is commonplace knowledge now that the argument structure of a predicate consists of a conceptual structure and a thematic structure, and that the latter may be derived from the former in some principled manner (see, for example, Jackendoff (1990), Hale and

Keyser (1994) among others). One way to understand the nature of predicates is to see how they group into different classes on the basis of their differences in argument structure, which may be characterized in terms of two dimensions, aspectuality and transitivity, the latter referring to the number of arguments occurring with a given predicate, and the former to the event-types that a given predicate denotes, in terms of the traditional action-state, telic-atelic, and Vendler's distinction of activity, accomplishment, achievement, and state. Thus, in the case of simple verbs, it is customary to distinguish not only between transitive and intransitive predicates, but also between accusative and unaccusative ones. These two dimensions define four basic predicate types: unergatives, transitives, ergatives and causatives, each illustrated in (1):

- (1) a. zhangsan chang-le hen jiu. 張三唱了很久。 (unergative)
 Zhangsan sing-asg verylong
 'Zhangsan sang for a long time.'
 b. zhangsan chang-le san-shou ge. 張三唱了三首歌。 (transitive)
 Zhangsan sing-asg three-cl song
 'Zhangsan sang three songs.'
 c. zhangsan xia-le yi tiao. 張三嚇了一跳。 (ergative)
 Zhangsan shock-asg one jump
 'Zhangsan was taken by surprise.'
 d. lisi xia-le zhangsan yi tiao. 李四嚇了張三一跳。 (causative)
 Lisi shock-asg Zhangsan one jump
 'Lisi surprised Zhangsan.'

(1a) and (1c) differ from their (b) and (d) counterparts in transitivity: the former are intransitive and the latter transitive. The (a) and (b) examples differ from (c) and (d) in aspectuality: the former denoting activities and the latter denoting states and/or changes of state. For the activity-denoting pair, the transitivity alternation manifests itself in the presence or absence of an internal argument (Theme or Patient). For the pair denoting a state or a change of state, the transitivity alternation lies in the presence or absence of a Causer which, if present, appears as an external argument.

The alternation illustrated here can be observed among RV compounds also:

- (2) a. zhangsan qi-lei-le. 張三騎累了。 (unergative)
 Zhangsan ride-tired-asg
 'Zhangsan rode himself tired.'
 b. zhangsan qi-lei-le liang-pi ma. 張三騎累了兩匹馬。 (transitive)
 Zhangsan ride-tired-asg two-cl horse
 'Zhangsan rode two horses tired.'

- c. zhangsan qi-si le. 張三氣死了。 (ergative)
 Zhangsan anger-dead-asg
 'Zhangsan got extremely angry.'
 '(Lit.) Zhangsan was angered to death.'
 d. zhe-jianshi zhen qi-si zhangsan le. 這件事真氣死張三了。 (causative)
 this-cl matterreally anger-dead Zhangsan asg
 'This matter really angered Zhangsan.'
 '(Lit.) This matter really angered Zhangsan to death.'

(2a) represents an unergative pattern in that it involves an activity-denoting V1 and alternates with the accusative pattern in (b). Other examples of the unergative pattern include *chi-bao* 吃飽 'eat and become full', *he-zui* 喝醉 'drink and become drunk', *han-ya* 喊啞 'shout and get a coarse voice', *zhui-lei* 追累 'chase and become tired', *tiao-fan* 跳煩 'jump to the point of being impatient', *pao-dao* 跑到 'run and arrive'. Most of these compounds may take an object, as in (2b) and *ta chi-bao le fan*, 'He ate rice and became full', *ta he-zui le jiu* 'he drank wine and got drunk'. In the transitive use, however, there is often a change of interpretation in what the subject of V2 is. For example, in (2a) the subject of V1 Zhangsan is understood to be the subject of V2 also, but in (2b) whereas the subject of V1 continues to be Zhangsan, it is now the object '2 horses' that is understood to be the subject of V2 'tired'. This shift of interpretation does not occur with the understood subject of V1, so the alternation between (2a) and (2b) is primarily an unergative/transitive alternation. Most transitive RVCs follow the pattern of (2b), with V2 understood to predicate on the object: *da-si* 打死 'hit-dead', *ku-shi* 哭溼 'cry and make wet', *ma-ku* 罵哭 'scold and make (someone) cry', *ti-kai* 踢開 'kick-open', *la-ping* 拉平 'pull-flat', *tui-dao* 推倒 'push-fall', etc.

The alternation exemplified in (2c) and (2d) is an ergative alternation in that the semantic object (Theme) is constant in both patterns, and the difference lies in the presence or absence of a Causer. In the absence of a Causer, the Theme occurs as the subject of the sentence (2c); when a Causer is present, it (the Causer) occupies the subject position, forcing the Theme to occur in object position. The following are a few more representative examples that exhibit the ergative alternation: *lei-si* 累死 'tired to death', *zui-dao* 醉倒 'drunk-fall', *xia-pao* 嚇跑 'scare-away', *le-huai* 樂壞 'joy-broken (overjoyed)', *mang-lei* 忙累 'busy-tired'.

In our examples so far, it is generally the case that in the unergative-transitive pair, V1 denotes an activity and hence its subject is an Agent, whereas in the ergative-causative pair, V1 denotes a state or a change of state and hence its subject is a Theme or an Experiencer. However, it is not uncommon to find examples of the ergative-causative pair in which the V1 apparently denotes an activity:

- (3) a. ta-de yanjing kan-hua le. 他的眼睛看花了。
 he-de eye look-blurred Asp
 'His eyes looked and became blurred.'
 b. nei-bu dianying kan-hua-le ta-de yanjing. 那部電影看花了他的眼睛。
 that-cl move look-blurred-asph he-de eye
 'That movie made his eyes blurred (from seeing it).'
- (4) a. ta xie-lei-le. 他寫累了。
 he write-tired-asph
 'He wrote himself tired.'
 b. nei-ben shu xie-lei-le lisi. 那本書寫累了李四。
 that-cl book write-tired-asph Lisi
 'That book got Lisi to write himself tired.'

Under appropriate circumstances most of the transitive compounds as the one in (2b) can also enter into the causative pattern. It is quite common to find that the same RVC with an activity-denoting V1 may have both a transitive and a causative use:

- (5) a. ta ku-xing-le xiaohai. 他哭醒了小孩。
 he cry-awake-asph child
 'He cried (and made) the child awake.'
 b. (meng-li de) nei-jian shi ku-xing-le ta. 夢裡的那件事哭醒了他。
 dream-in de that-cl matter cry-awake-asph he
 'The episode (in the dream) made him cry (himself) awake.'

Given examples like this, one might assume that both the transitive and the causative patterns may be derived directly from the same (unergative) intransitive *ta ku-xing le* 'He cried (himself) awake.' However, in the causative use, the subject of V1 is a Causee, and not a pure Agent, unlike the subject of V1 in the transitive pattern. The Causee relation is not unlike the Experiencer relation since it is not a true initiator of an action or event, any more than the subject of an experiencer verb is. Hence the alternation shown in (3) and (4) is not really an alternation between the unergative (with V1 assigning a pure Agent role) and the causative use, but the one between the ergative (with V1 assigning a Causee/Experiencer role) and the causative use.

This two-dimensional classification of simple verbs and compounds applies to larger units in the sentence as well. In Huang (1988, 1991) it is shown that resultative complement constructions with the 'complementizer' *de* are complex predicates projected as a V' (V-single-bar) which fall naturally into the four classes of predicates. Thus, parallel to the four compound categories, the phrasal constructions below are naturally characterized as unergative, transitive, ergative and causative, respectively:

- (6) a. zhangsan ku-de hen shangxin. 張三哭得很傷心。
 Zhangsan cry-de very sad
 'Zhangsan cried until he got very sad.'
 b. zhangsan ba lisi ku-de hen shangxin. 張三把李四哭得很傷心。
 Zhangsan ba Lisi cry-de very sad
 'Zhangsan cried (so much as to make) Lisi very sad.'
 c. zhangsan jidong-de liu-chu-le yanlei. 張三激動得流出了眼淚。
 Zhangsan excited-de drip-out-asph tear
 'Zhangsan got so excited as to come to tears.'
 d. nei-jianshi jidong-de zhangsan liu-chu-le yanlei. 那件事激動得張三流出了眼淚。
 that-cl matter excited-de Zhangsan drip-out-asph tear
 'That matter got Zhangsan so excited as to come to tears.'

The ergative alternation shown in (6c) and (6d) occurs with an experiencer V1. But causativization may occur with an activity-denoting V1 like *ku* 'cry' if its subject is a Causee/Experiencer. Thus alongside the transitive pattern, the following causative pattern is also possible with *ku-de hen shangxin* 'cry until one gets very sad':

- (7) zhe-jian shi ba zhangsan ku-de hen shangxin. 這件事把張三哭得很傷心。
 this-cl matter ba Zhangsan cry-de very sad
 'This matter caused Zhangsan to cry until he became very sad.'

Before we complete this section, we note that, strictly speaking, it is misleading to talk about unergative resultatives and other non-causative resultatives, because all resultatives are causatives by nature. In S. Huang (1974), two kinds of causatives are distinguished: "event causatives" and "factive causatives". These correspond respectively to our "transitives" and "causatives". We claim here that the difference between these two subtypes of resultative-causatives is on a par with the difference between transitivity and causativity on the part of V1. In the former case V1 is agentive and is able to take an internal argument, but in the latter case the V1 is causative, and takes Causer as its external argument.

2. The head of a resultative compound

In studies of RVCs, a question of considerable theoretical interest has to do with the headedness in these compounds. It is important to note that this is a question on the syntax of a compound, as the notion of a head is a structural and not a conceptual notion. For example, in semantic terms it is easy to observe that V1 often appears to serve an

adverbial function in the composition of a compound's meaning, whereas V2 seems to serve as the "center of predication". Thus, a compound like *ti-kai* 踢開 'kick-open' may be more aptly interpreted as 'to open by kicking', than as 'to kick with the result of opening (something)'. This is particularly true when *ti-kai* 'kick-open' is compared with *tui-kai* 推開 'push open', *la-kai* 拉開 'pull-open', *chui-kai* 吹開 'blow-open', *qie-kai* 切開 'cut-open', *niu-kai* 扭開 'twist-open', etc. For this reason it has been suggested by some that V2 rather than V1 should be regarded as the head of the compound. A view based on such considerations must be rejected, however, on the following grounds. First, if the headedness of these compounds is based upon a set of examples which may be interpreted as describing a set of "different ways of opening", treating V1 as an adverbial element, examples such as *ti-kai* 踢開 'kick-open' together with *ti-dao* 踢倒 'kick-fall', *ti-bian* 踢扁 'kick-flat', *ti-shang* 踢上 'kick-up', *ti-xia* 踢下 'kick-down', *ti-po* 踢破 'kick-broken', *ti-ping* 踢平 'kick-even', etc., would lead one to regard these as describing a set of "different results" arising from the action denoted by V1. Thus these considerations by themselves do not provide a correct basis for choosing between V1 and V2 as the head. These two sets of examples simply show that the semantics of the compounds are compositional, in that both components contribute to the total meaning of the compound. The semantic facts being illustrated by the above RVCs may be observed with verb-particle constructions in English as well: *push up*, *pull up*, *dig up*, *yank up*, in which different manners of obtaining an upward movement are highlighted; and *push up*, *push down*, *push in*, *push out*, *push through*, etc., in which different results obtained from an action of pushing are highlighted. In these examples, regardless of where the "center of predication" is, the issue of the head does not arise; the first predicative element (corresponding to V1 in RVCs) is uncontroversially regarded as occupying the structural head position. In brief, the notion of a head is a syntactic notion, and only syntactically relevant considerations may decide on the issue of whether V1 or V2 is the head.

Li (1990) develops an argument for the position that V1 is the head of an RVC based on syntactic considerations. Li's goal is to develop a theory that predicts the argument structure of an RVC from the argument structure of its component V1 and V2, especially as it concerns the transitivity of these elements. Since the total number of arguments selected by V1 and V2 may exceed 4, and an RVC typically occurs with at most two arguments (due to Case reasons), many possibilities arise as to which of V1's and V2's arguments may be unexpressed. (The unexpressed arguments may be truly unexpressed, or suppressed, or they may be "theta-identified" with an expressed argument.) Li puts forth the generalization that almost all logical possibilities are allowed, except that the external argument of V1 must be expressed as the external argument of the whole compound. By contrast, the same requirement does not hold of arguments of V2. These observations are then taken to indicate the headhood of V1, under the premise that certain relevant features of the head are obligatory, but not those of peripheral elements, just as it is standard to assume in X-bar theory that the head is obligatory, if not overtly

then in some covert form. Li implements this idea with the suggestion that the argument structure (treated as a feature) of the head V1 is obligatorily percolated to the whole compound. This then accounts for the fact that V1's external argument is realized as the RVC's external argument.

Li's treatment raises some theoretical and empirical problems, however, the most important one arising from the existence of the causative paradigm, both where the subject of V1 is a Theme or Experiencer (as in (2d)), and where the subject of V1 is a Causee (as in (3b) and (5b)). In (2d) and (5b), the external argument of the compound is neither an argument of V1 nor of V2, but is a Causer added from outside the basic argument structures of V1 and V2. In (3b) and (4b), the external argument of the compound is not the external argument of V1 (as would be required by Li's theory), but a Causer that is identified with the internal argument of V1. These cases indicate that the property of causativity may override the hierarchy that holds of non-causative accusative and unergative patterns (cf. Grimshaw (1991)), and some appropriate modification of Li's original theory is needed (a task that Li himself has undertaken; see Li (1993)).

Li's original treatment was focused on thematic structure and transitivity relations. However, it is apparent from Li's work that the transitivity of an RVC does not follow from the transitivity properties of either of its components. This generalization has also been made explicit in C.-R. Huang and Lin (1992, henceforth H&L). For example, the following sentences show that regardless of the transitivity of V1, an RVC may be transitive or intransitive. (8) illustrates the transitive pattern, and (9) the intransitive:

- (8) a. V1 is transitive:
 wo qi-lei-le liang-pima. 我騎累了兩匹馬。
 I ride-tired-asptwo-cl horse
 'I rode and make two horses tired.'
- b. V1 is intransitive:
 ta ku-shi-le shoupa. 他哭溼了手帕。
 he cry-wet-asptwo-cl handkerchief
 'He cried the handkerchief wet.'
- c. V1 is transitive but object is not realized in the compound:
 ta ti-po-le liang-shuang xie. 他踢破了兩雙鞋。
 he kick-broken-asptwo-cl shoe
 'He kicked and got two pairs of shoes broken.'

- d. V1 is ditransitive but neither object is expressed:
 ta song-suan-le tui le. 他(送禮)送酸了腿了。
 he give-sore-asp leg asp
 'He gave (gifts to other people until) his legs got sore.'
- (9) a. V1 is transitive but object is not realized:
 wo ting-fan le. 我聽煩了。
 I listen-annoyed asp
 'I listened to the point of becoming annoyed.'
- b. V1 is intransitive:
 ta xiao-feng le. 他笑瘋了。
 he laugh-sillyasp
 'He cried himself silly.'
- c. V1 is ditransitive but neither object is expressed:
 ta song-lei-le. 他送累了。
 he give-tired-asp
 'He gave (things away to others) and became tired.'

Note, on the other hand, that the aspectual and event types of V1 and V2 do play an essential role in determining the aspectual and event types of the compound as a whole. In a resultative compound, V2 is usually ergative (non-agentive, non-active), denoting a state or a becoming (change of state). Thus, as observed in Gu (1992), strings like *xia-tiao* 嚇跳 'frighten-jump' and *xia-han* 嚇喊 'frighten-scream' with inherently active V2's, cannot occur as resultative compounds, whereas *xia-pao* 嚇跑 'frighten-away', *xia-ku* 嚇哭 'frighten to tears', *xia-xing* 嚇醒 'frighten-awake' and the like are quite natural.¹ This requirement seems to hold of all four types of RVCs, so V2 does not contribute to a difference in the event types of the RVCs. Unlike V2, however, V1 plays an important role in determining an RVC's aspectual or event type. In an RVC, V1 may be active or stative. If V1 is active, the entire compound is used as an unergative or transitive, depending on whether it has an object or not. If V1 is stative or non-active, then the entire RVC is either ergative or causative, depending on whether an external Causer argument is present or not. Hence, the event type of the whole compound depends on the event type of V1 rather than that of V2 (which is invariably non-active). In this sense V1 is the head of the compound.

We thus agree with Li (1990) in postulating V1 as the head of an RVC. We also take this postulation to be based on syntactic, not purely semantic, considerations. We differ from him in our claim that it is the aspectual property of an argument structure that plays a crucial role in the making of a resultative compound. Our theory explains the obligatory occurrence of an Agent in the unergative and transitive paradigms, that of an Experiencer, Theme or Causee in the ergative paradigm, and the obligatory occurrence of a Causer in the environment of a causative paradigm. The thematic structure of a predicate is thus derived from its aspectual structure, which in turn reflects the left-headed nature of the

compound's internal structure. We also differ from Shen (1992), who considers V2 to be the head of the RVC (cf. also Gu 1992).

Our treatment also departs sharply from the treatment of H&L, who treat RVCs as *headless* composite predicates. Their claim that RVC's are headless is based solely the observation that the transitivity of a compound does not follow from that of its components. While it is not unnatural to conclude on the RVC's headlessness from one's inability to find evidence for its head, the reasoning based on transitivity considerations is quite strange. For one thing, it is worth noting that English resultative constructions exhibit similar transitivity properties:

- (10) a. John laughed himself silly.
 b. Tracy walked his feet sore.
 c. The tourists walked their shoes ragged.
 d. The joggers have run the pavement thin.
 e. John ate me out of house and home.
 f. Herman ate the cupboard bare.
 g. I drank him under the table.
 h. The tenors sang themselves hoarse.

These sentences indicate that the whole resultative construction can be transitive regardless of whether V1 is transitive or not ((b, f) are from Levin and Rapoport (1989) and (c, d, h) from Carrier and Randall (1993)). For example, *laughed*, *walked* and *run* are standard intransitives, but an NP appears as the object of the entire resultative construction in (a)–(d). Moreover, *ate*, *sing* and *drink* can be used transitively, but in (e)–(h) the object NP of the resultative expression is not an object of V1. In English too, then, the transitivity of the whole resultative construction does not depend on the transitivity of its components.² According to the reasoning applied by H&L, English resultatives would be headless constructions too. However, the issue of headedness does not even arise here. In all the examples in (10), V1 is clearly the head.

Our position that V1 is the head has been based on the fact that, although the transitivity of V1 does not determine the transitivity of an RVC, its aspectual properties do determine those of an RVC. Another consideration that leads to the same conclusion has to do with the structure of resultative phrases larger than the size of compounds. In examples like (6), repeated below, there is good reason to consider V1 to be the main verb of the sentence:

- (11) a. zhangsan ku-de hen shangxin. 張三哭得很傷心。
 Zhangsan cry-de very sad
 'Zhangsan cried until he got very sad.'

- b. zhangsan ba lisi ku-de hen shangxin. 張三把李四哭得很傷心。
 Zhangsan ba Lisi cry-de very sad
 'Zhangsan cried (so much as to make) Lisi very sad.'
- c. zhangsan jidong-de liu-chu-le yanlei. 張三激動得流出了眼淚。
 Zhangsan excited-de drip-out-asptear
 'Zhangsan got so excited as to come to tears.'
- d. nei-jianshi jidong-de zhangsan liu-chu-le yanlei.
 that-cl matter excited-de Zhangsan drip-out-asptear
 那件事激動得張三流出了眼淚。
 'That matter got Zhangsan so excited as to come to tears.'

It is a fundamental assumption of syntactic theory that phrases are headed. Thus, either V1 or V2 must be the main verb. C.-R. Huang and Mangione (1985) attempted to provide evidence for the headhood of V2, but it was shown in Huang (1988) that all their evidence failed to support their conclusion, and all available evidence points to the opposite conclusion. We shall not repeat here the arguments given in Huang (1988), but simply point to the fact that the V2-as-head hypothesis does not offer an account of even some of the most fundamental facts. Huang (1988) shows that, in order to make sense of causative sentences like (11d), it is necessary to assume that it derives from an underlying structure like (12) with a covert causative predicate taking (11c) as its complement:

- (12) nei-jianshi [CAUSE] zhangsan jidong-de liu-chu-le yanlei.
 That matter Zhangsan excited-de come-to-tears.

The surface structure is derived via movement of the lower verb *jidong-de* into the position of the causative predicate. Note that this movement crucially affects V1, but not V2. This is predicted under the V1-as-head hypothesis, since V-movement can only move a verb from the head of a complement into the position of the higher selecting verb, and never from an adjunct (the Verb Movement Constraint of Travis (1984), Baker (1987) among others).³

Now, it is well known that in Chinese, resultative compounds mirror resultative phrases in word order, and in the absence of evidence to the contrary (and we claim there isn't any), the most reasonable assumption to make is that the RVC's have essentially the same headed structure as phrasal resultative constructions do. To postulate a different structure headed by V2 would be groundless. And to assume that RVCs are headless is even worse.⁴

Our view of the matter also contrasts with that of Shen (1992), who argues that resultative compounds are headed by V2. Shen applies Li's (1990) reasoning for the identification of the head, but concludes on the headhood of V2 on the basis of the observation that, contrary to Li's earlier claim, it is V1's external argument, not V2's, that

may fail to be realized as an argument of the whole compound. This situation is illustrated by examples like (13a-c):

- (13) a. shoupa ku-shi-le. 手帕哭溼了。
 handkerchief cry-wet-asptear
 'The handkerchief was cried-wet.'
- b. zuichun shuo-gan-le. 嘴唇說乾了。
 lip talk-dry-asptear
 'The lips were talked-dried.'
- c. pen xi-lou-le. 盆洗漏了。
 sink wash-leak-asptear
 'The sink was washed-leaking.'

In each of these examples, the logical subject of V1 (Agent) is not realized; instead the logical subject of V2 appears as the subject of the entire compound. The reverse situation is not allowed, with the agent subject of V1 realized and the logical subject of V2 omitted: **ta ku-shi le* 他哭溼了 'He cried-wet'; **ta shuo-gan le* 他說乾了 'He talked-dry'; and **ta xi-lou le* 他洗漏了 'He washed-leaking'. The external argument of V1 need not be projected to the entire compound, then, though the external argument of V2 must. Assuming, following Li (1990), that the external argument of a head must always be projected, the relevant facts are then taken to show that V2 is the head of the resultative compound.

This view of the headhood is not tenable, however, for the following grounds. First, as we have seen, the transitivity of V1 and V2 has little bearing on the transitivity of the entire compound. Hence any attempt to define the head of an RVC on the basis of the transitivity properties of a compound in relation to the transitivity properties of its component parts seems to be on the wrong track. Secondly, although the logical subject of V1 is missing from (13a-c), there is good reason, as we will show below, to suppose that this is a result of Agent-suppression, akin to what happens in passives. That is, these sentences are to be treated as passive in some real sense, and the fact that the Agent of the compound is missing does not prevent its would-be theta-assigner from being the main verb, any more than the same process would affect the status of the main verb in a simple passive sentence.

3. The derivation of resultative compounds

We have seen that the event-type of a resultative compound depends on the event-type of V1. (The same generalization clearly also holds of larger resultative constructions, the 'V-de' constructions illustrated in (6).) To capture this generalization within a theory of argument structure, we propose that resultative compounds have an underlying complex

event structure in which the event denoted by V1 takes the event denoted by V2 as its complement. Thus the unergatives and transitives have the event structure (14).

- (14) $[_{RV} V1_{Active} [_{V2_{State/Change-of-State}}]]$

We shall refer to this as the structure of the Active RVCs. Given its semantics, especially the activity-denoting component, every active RVC obligatorily selects an Agent as its external argument. In addition, some such RVCs may, and some must, take a Theme as their internal argument, while other RVCs do not. If an internal Theme argument is selected, it is a transitive RVC; if no internal argument is selected, it is an unergative RVC.⁵ This event structure thus defines three possible argument structures: $\langle 1 \rangle$, $\langle 1, 2 \rangle$, and $\langle 1, (2) \rangle$, where arguments 1 and 2 are respectively linked to an Agent and a Theme. We assume that the thematic linking is governed by principles of Universal Grammar that follow from general considerations of compositional semantics:

- (15) $[_{RV} V1_{Active} [_{V2_{State/Change-of-State}}]]$:
- $\langle \text{Agent} \rangle$ (unergative RVC)
 - $\langle \text{Agent, Theme} \rangle$ (transitive RVC)
 - $\langle \text{Agent, (Theme)} \rangle$ (mixed)

Some more examples of these three categories of the active RVC are given below:

- (16) a. Unergative RVCs
xiao-lei 笑累 'laugh-tired', *pao-lei* 跑累 'run-tired', *tiao-fan* 跳煩 'jump-annoyed', *ku-lei* 哭累 'cry-tired', *shui-zhao* 睡著 'fall-asleep', *zou-diao* 走掉 'walk-away', *pao-kai* 跑開 'run-away'.
- b. Transitive RVCs
ku-shi 哭溼 'cry-wet', *ti-po* 踢破 'kick-broken', *tui-kai* 推開 'push-open', *la-ping* 拉平 'pull-even', *sha-si* 殺死 'stab-dead', *song-suan* 送酸 'send-sore', *si-po* 撕破 'tear-broken', *sao-ganjing* 掃乾淨 'sweep-clean'.
- c. Mixed RVCs
he-zui 喝醉 'drink-drunk', *chi-bao* 吃飽 'eat-full', *ku-xing* 哭醒 'cry-awake', *da-bai* 打敗 'hit-lose', *da-sheng* 打勝 'hit-win', *qi-lei* 騎累 'ride-tired', *ma-fan* 罵煩 'scold-annoyed', *han-ya* 喊啞 'shout-hoarse', *ku-fan* 哭煩 'cry-annoyed'.

The differences among these three sub-types of active RVCs are analogous to those among simplex active verbs: unergatives like *sneeze*, *cry*, *laugh*, transitives like *kick*, *know*, *hit*, and mixed members like *eat*, *read*, *write*, etc. In contrast to the active RVC's,

we assume that the ergatives and causatives are non-active RVCs which have the following event structure:

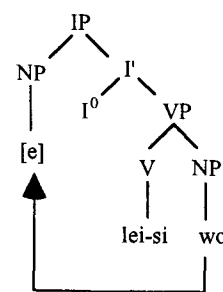
- (17) $[_{RV} V1_{Non-active} [_{V2_{State/Change-of-State}}]]$

Given its semantics, especially given that its head is non-active, denoting a state or a passive action (whose actor is a Causee), every non-active RVC obligatorily selects a Theme or Experience/Causer as an internal argument, and optionally a Causer as an external argument. We follow the Unaccusative Hypothesis (Perlmutter (1978), Burzio (1986)) and assume that the Non-Active RVCs have an argument structure of the form $\langle 2 \rangle$, or the form $\langle 1, 2 \rangle$, where 1 and 2 are respectively linked, by universal principles, to Causer and Theme/Experience/Causee.

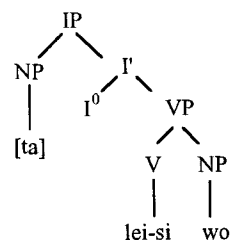
- (18) $[_{RV} V1_{Non-active} [_{V2_{State/Change-of-State}}]]$
- $\langle \text{Theme/Experiencer/Causee} \rangle$ (ergative)
 - $\langle \text{Causer, Theme/Experiencer/Causee} \rangle$ (causative)

Underlyingly, an ergative sentence has a syntactic structure with an object but no thematic subject. This object moves up to the surface subject position during the derivation (as in (19)), and hence the sentence takes on the appearance of an intransitive sentence. A causative sentence has an underlying structure in which both the subject and the object positions are filled (as in (20)).

(19)



(20)



Thus, whereas the unergative-transitive alternation is an alternation that results from the addition (or deletion) of an internal argument, the ergative-causative alternation is an alternation resulting from the addition (or deletion) of an external argument to (or from) the argument structure of a given verb having the same event structure. Some examples of the non-active RVCs include *lei-si* 累死 'tired to death', *zui-dao* 醉倒 'drunk-fall', *xia-pao* 嚇跑 'scare-away', *le-huai* 樂壞 'joy-broken (overjoyed)', *mang-lei* 忙累 'busy-tired', which alternate between the ergative and the causative use as illustrated below:

- (21) a. zhangsan mang-lei-le. 張三忙累了。
 Zhangsan busy-tired-asp
 'Zhangsan was busy working and got tired from it.'
 b. lisi mang-lei-le zhangsan. 李四忙累了張三。
 Lisi busy-tired-asp Zhangsan
 'Lisi caused Zhangsan to be busy such that Zhangsan got tired.'
 (22) a. zhangsan zui-dao-le. 張三醉倒了。
 Zhangsan drunk-fall-asp
 'Zhangsan got so drunk that he fell.'
 b. nei-bei jiu zui-dao-le zhangsan. 那杯酒醉倒了張三。
 that-cl wine drunk-fall-asp Zhangsan
 'That cup of wine caused Zhangsan to be so drunk that he fell.'

We note again that some RVCs exhibit both the unergative-transitive alternation and the ergative-causative alternation:

- (23) a. zhangsan he-zui-le 張三喝醉了。
 Zhangsan drink-drunk-asp
 'Zhangsan got drunk by drinking (wine).'

- b. zhangsan he-zui-le jiu. 張三喝醉了酒。
 Zhangsan drink-drunk-asp wine
 'Zhangsan drank wine and got drunk.'
 c. nei-bei jiu he-zui-le zhangsan. 那杯酒喝醉了張三。
 that-cl wine drink-drunk-asp Zhangsan
 'That class of wine got Zhangsan drunk (from drinking it).'
- (24) a. ta de yanjing kan-hua-le 他的眼睛看花了。
 he de eye read-blurred-asp
 'His eyes got blurred by reading.'
 b. ta kan-hua-le yanjing. 他看花了眼睛。
 he read-blurred-asp eye
 'He read and his eyes blurred.'
 c. baozhi kan-hua-le ta-de yanjing. 報紙看花了他的眼睛。
 newspaper read-blurred-asp he-de eye
 'The newspaper got his eyes blurred from reading it.'
- (25) a. xiaohai qi-lei-le 小孩騎累了。
 child ride-tired-asp
 'The child rode and got tired.'
 b. xiaohai qi-lei-le san-pi ma. 小孩騎累了三匹馬。
 child ride-tired-asp three-cl horse
 'The child rode three horses and made them tired.'
 c. nei-pi ma qi-lei-le san-ge xiaohai. 那匹馬騎累了三個小孩。
 that-cl horse ride-tired-asp three-cl child
 'That horse got three children tired (by the children riding them).'

We assume that a resultative whose V1 denotes an activity is used in the non-active sense when V1's logical subject is not the ultimate initiator of the event in question, i.e., when there is an external Causer of the event and the V1's subject is a Causee. Thematically, a Causee is not unlike an Experiencer of some mental condition, in that neither the Causee nor the Experiencer has control over the event. As such, a Causee is to be treated on a par with an Experiencer as an internal argument at the level of syntactic structure. Thus, the intransitive counterparts of the causative sentences in (22b)–(25b) are ergative sentences with Causee subjects. (This interpretation is possible only when it is understood, in discourse, that something else has caused the occurrence of the whole event.) In the absence of an (understood or overt) Causer, the subject of V1 is taken to be an Agent by default, and the RVC is an unergative that underlies the (a) sentences in (22)–(25). It seems that even in their intransitive use, RVCs like *ku-si* 哭死 'cry-dead', *xiao-feng* 笑瘋 'laugh-mad', *tiao-fan* 跳煩 'jump-annoyed', *pao-lei* 跑累 'run-tired', etc., can always have their subject interpreted as a Causee (if it is understood in discourse that there is an external Causer), or as an Agent (if no external cause is assumed to be

responsible for the event).⁶ On the other hand, for intransitive RVCs like *lei-si* 累死 'tired-dead', *le-feng* 樂瘋 'happy-mad', *qi-si* 氣死 'angry-dead', *xia-pao* 嚇跑 'scare-run', etc., where V1 denotes a mental state, the subject is invariably an Experiencer, never an agent. Hence these RVC's must be unambiguously ergative, and they exhibit only the ergative-causative alternation.

Summarizing, in this section we have seen that the differential properties of alternation exhibited by RVC's can be naturally understood by recognizing two paradigmatic event structures each headed by the event denoted by V1: the active paradigm and the non-active paradigm. The former exhibits the unergative-transitive alternation and the latter exhibits the ergative-causative alternation. Note that both the active and the non-active paradigms are defined purely in terms of the event-type(s) that a given V denotes, without regard to whether a given V is transitive or intransitive. The transitivity properties of a given RVC are derived entirely from the (composed) semantics of the entire RVC, and not from the transitivity properties of any component verb. Whether a given RVC is transitive or not depends on the meaning of the RVC: for one to cry until one dies is an event that does not affect another person than the subject, so *ku-si* 哭死 'cry-dead' is intransitive. But to cry until something becomes wet affects something other than the subject, so *ku-shi* 哭溼 'cry-wet' is transitive. And for the intransitive 'cry-tired', the crying could occur completely without a linguistically relevant external Cause, in which case the RVC would be used unergatively; or it could occur under some relevant external force, in which case it would be used ergatively (if the Cause is not part of a sentence) or causatively (if the Cause is a syntactic argument). In this way, we differ from Li (1990) and Shen (1992), whose major attempt is to compute the argument structure of RVCs by crucial reference to the transitivity properties of each component. As we saw earlier, this crucial reference to the transitivity properties fails to capture an important generalization concerning the nature of RVCs.

Our treatment (which originates in spirit from Huang (1988, 1991)) has some properties that are shared by C.-R. Huang and Lin (1992), who also do not base their analysis of RVC's on the transitivity properties of their component verbs. They postulate that resultative compounds represent composite event structures without clearly defined logical relations between them. Such structures are said to fit into either one of two "templates", the Accusative Template, which is linked to arguments that bear the roles of Proto-Agent and Proto-Patient (following Dowty (1990)); and the Unaccusative Template, which is linked to the argument that bears the role of Proto-Patient. However, H&L are not completely free from considerations of transitivity, since an important part of their account is the stipulation that either component of the RVC must contribute one argument to the compound and that the mapping between the selected base argument and the resultative argument is one-to-one. The slogan "one-argument-per-argument-structure" is felt to be logical given their equal ranking of the two verbs.

In addition to the problem that we have already pointed out regarding the theory of

headless structures, a serious problem also arises with H&L's postulation of the "one-argument-per-argument-structure" principle. In spite of their claim that this principle correctly predicts both the possible and impossible readings of RVCs, some of even the most commonly observed RVCs are over-looked and unaccounted for. The first kind of RVCs are pure causatives like the following:

- (26) zhangsan lei-si-le lisi. 張三累死了李四。
Zhangsan tired-dead-asplisi
'Zhangsan made Lisi tired to death.'
(27) nei-bei jiu zui-dao-le zhangsan. 那杯酒醉倒了張三。
that-cl wine drunk-fall-aspl Zhangsan
'That glass of wine got Zhangsan to be drunk and fall.'

The relevant crucial fact here is that the subject argument of each RVC is neither an argument of V1 nor of V2, but it is an argument of the entire RVC. The causative reading is available only as a function of the composed event structure, and the Causer argument is not projected from the argument structure of either V1 or V2.

A similar problem arises with causatives of the kind below:

- (28) baozhi kan-hua-le ta-de yanjing. 報紙看花了他的眼睛。
newspaper read-blurred-aspl he-de eye
'The newspaper got his eyes blurred from reading it.'
(29) nei-pi ma qi-lei-le san-ge xiaohai. 那匹馬騎累了三個小孩。
that-cl horse ride-tired-aspl three-cl child
'That horse got three kids tired from riding it.'

H&L assume that these are in fact allowed by the one-to-one principle. The subject argument of the RVC is contributed by V1, and the object argument by V2. For them, the only difference here is that V1 contributes its internal argument (object of 'read' and 'ride') to the RVC, rather than its external argument as seen in "canonical" resultatives like the following:

- (30) ta kan-hua-le ta-de yanjing. 他看花了他的眼睛。
he read-blurred-aspl he-de eye
'He read his eyes blurred.'
(31) xiaohai qi-lei-le san-pi ma. 小孩騎累了三匹馬。
child ride-tired-aspl three-cl horse
'The child rode 3 horses tired.'

They further surmise, without supporting evidence, that the availability of both

(28)–(29) and (30)–(31) — what we have dubbed the causatives and the transitives — is simply a result of underspecification of the contribution of V1 to the argument structure of the RVC. A crucial property of the causatives (28)–(29), however, is that the subject of the RVC is a Causer, and not (just) a Patient of V1, and this fact is not captured in H&L's account.

Still another problem has to do with RVC's like *chi-bao* 'eat-full', *he-zui* 'drink-drunk', etc.

- (32) ta chi-bao-le fan le. 他吃飽了飯了。
 he eat-full-asp rice asp
 'He ate rice and got full.'
- (33) ta qi-lei-le ma le. 他騎累了馬了。
 he ride-tired-asphorseasp
 'He went horse-back riding and got tired from it.'

In these sentences, both arguments are contributed by V1, and none by V2, directly violating the one-to-one principle. To explain away this problem, H&L claim (a) that examples like *chi-bao* 吃飽 'eat-full', *he-zui* 喝醉 'he-zui' (as in (32)) are idioms that must be listed in the lexicon as exceptions, and (b) that examples like *qi-lei* 騎累 'ride-tired', *xia-shu* 下輸 'play-lose', *zhui-lei* 追累 'chase-tired' (as in (33)), with interpretation according to which V2 predicates on the subject of V1, are in fact headed structures whose head is V2. However, neither claim is substantiated with any real evidence. Furthermore, the proposal that some RVC's are headed while others are headless reduces their original proposal to near vacuity. For one thing, there is nothing more "idiomatic" about *chi-bao* 吃飽 or *he-zui* 喝醉 than most of the RVC's we have considered: their meanings are highly compositional. A lot of similar examples can be found and coined: *he-bao-le tang* 喝飽了湯 'drank soup and got full', *chi-bao-le jiaozi* 吃飽了餃子 'eat dumplings and got full', *shui-bao-le jiao* 睡飽了覺 'have had enough sleep', *chi-ni le pingguo* 吃膩了蘋果, *da-ni-le lanqiu* 打膩了籃球 'play basket-ball and got bored'.⁷ In fact, there is no significant difference between expressions represented by (32) and those represented by (33). Both share the property that both V1 and V2 are understood to be predicated on the subject, and not the object, and that both the subject and the object arguments are contributed by V1, in violation of the one-to-one principle. It is clear that the postulation of V2-headed structures, backed by little more than their paraphrases in English, is motivated only because they are in conflict with the one-to-one principle. It is significant to note, in this connection, that examples like (33) are in fact ambiguous, depending on whether the object 'horse' is taken to be a true referential argument of an event structure or simply represent part of the activity denoted by V1. Thus (33) can mean either that he went horse-back riding and got tired from this activity (with *qi ma* referring to the activity of horse-backing riding), or that he rode the horse tired. If the object is preceded by a

determiner, thereby excluding the activity reading, then V2 must uniquely predicate on the object:

- (34) a. ta qi-lei-le wu-pi ma. 他騎累了五匹馬。
 he ride-tired-asp five-cl horse
 'He rode 5 horses tired.'
- b. ni qi-lei-le ji-pi ma? 你騎累了幾匹馬?
 you ride-tired-asphow many-cl horse
 'How many horses did you ride tired?'
- c. ni qi-lei-le shei-de ma? 你騎累了誰的馬?
 you ride-tired-asp who-dehorse
 'Whose horse did you ride tired?'

The same observation obtains with examples like *chi-bao* as well. Thus when the object is a true, referential argument, ungrammaticality results:

- (35) a. *zhangsan chi-bao-le ji-wan fan? *張三吃飽了幾碗飯?
 Zhangsan eat-full-asp how many-cl rice
 'Lit. Zhangsan got full from eating how many bowls of rice?'
- b. *zhangsan he-zui-le nei-ping jiu. *張三喝醉了那瓶酒。
 Zhangsan drink-drunk-asp that-cl wine
 'Lit. Zhangsan got drunk from drinking that bottle of wine.'

Note that the postverbal object may occur with a quantifier if it quantifies over events, because in this case the object NP can still be understood in the non-referential sense.⁸

- (36) a. zhangsan chi-bao-le san-dun fan. 張三吃飽了三頓飯。
 Zhangsan eat-full-asp three-cl rice
 'For three meals Zhangsan got full from eating rice.'
- b. zhangsan he-zui-le san-ci jiu. 張三喝醉了三次酒。
 Zhangsan drink-drunk-asp three-cl wine
 'For three times Zhangsan got drunk from drinking wine.'

With this, we can now see that the postulation that *chi-bao* 'eat-full' and the likes are V2-headed, raises more problems than it is intended to solve. This hypothesis exempts the compound from the one-to-one principle but it is not even clear how the V2-as-head idea is supposed to work out in structural terms. For example, if V1 is an adjunct with respect to the head V2, how does the object of V1 (*fan* 'rice' in *chi-bao-le fan*) end up following V2? Secondly, since examples like *qi-lei* 'ride-tired' allow two interpretations, with V2 referring to the subject or to the object, this means that the same RVC would

need to be analyzed as two different items: one a headed structure (when the one-to-one principle is violated), one a headless structure (when the one-to-one principle is obeyed). But this weak position is obviously necessitated only by the adoption of the one-to-one principle and the headless hypothesis. There is also a serious conceptual problem here. Recall that the headless hypothesis was proposed by H&L on the basis of the observation that the transitivity properties of an RVC do not rely on the transitivity properties of its component verbs. The adoption of the V2 hypothesis for certain compounds clearly shows that, even for H&L, the same observation about transitivity relations is no sufficient ground to jump to the headless hypothesis. In other words, the V2 hypothesis takes away the major motivation for the headless hypothesis, which is the bulk of H&L's theory.

Empirically, the most important problem of the V2 hypothesis is posed by the contrasts observed among (32)–(36). That is, for the RVCs under consideration, the V2 may predicate on the RVC's subject only when the object is non-referential, i.e., when it cannot serve as the target for V2 to predicate on. How can the V2 hypothesis possibly explain this restriction? Why should the referential nature of the object prevent the V2 from being the head of the compound? If V2 were the head of *qi-lei* 'ride-tired', then if one can get tired from the general activity of horse-back riding, why can't one get tired from riding a particular number of horses? Should those cases with referential objects be analyzed along the headless hypothesis, and if so, what does the referentiality of an object have to do with whether a given RVC is headed or not?

All these questions arise under H&L's theory. Within the theory we have advocated, according to which the V1 of an RVC is its head, there is a natural explanation for the relevant facts we have observed concerning sentences like (32)–(36). In Huang (1991), it was proposed that in a resultative V-de construction, the secondary predicate (V2) is subject to control (or predication) under the Minimal Distance Principle (Rosenbaum (1970), Chomsky (1980)). The relevant effect of the principle is that in a control or secondary predication structure, the PRO or the secondary predicate is interpreted as being controlled by the matrix object if there is an object, and by the matrix subject if no object is present. This is the situation we see with canonical resultatives. Exceptions happen with examples like (32) and (33), where the object of the RVC is used non-referentially. Since it has no reference, it cannot, and does not, enter into co-reference relations with other NPs. And it is in this situation that the V2 may be predicated on the matrix subject. If the object is referential, then it must be interpreted as coreferential with the subject of V2, as we just saw in (34)–(36). All this makes sense under the standard assumption that V1 heads the RVC, but not if V2 is taken to be the head.

4. On the pseudo-passive resultative

We have discussed four kinds of RVC's based on their associated event structures:

unergatives, transitives, ergatives, and causatives. The first two kinds involve active event structures which take agentive subjects, and the last two involve non-active event structures with non-agentive subjects. We now turn our attention to a special kind of resultatives which appear not to fit into any of these four types:

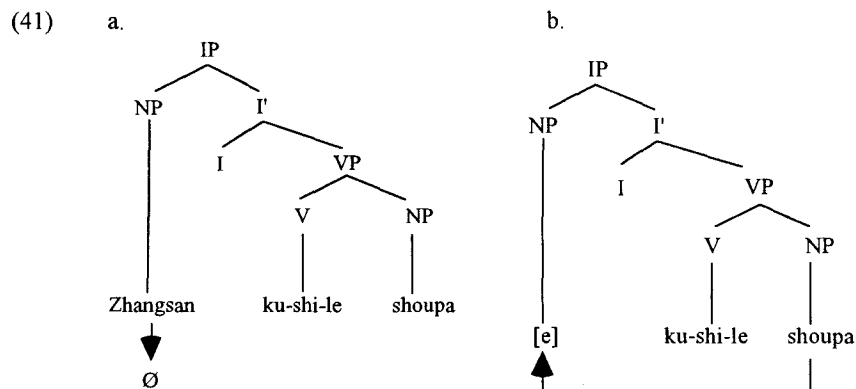
- (37) shoupa ku-shi-le. 手帕哭溼了。
handkerchief cry-wet-asp
'The handkerchief was wet from someone's crying.'
(38) qiqiu chui-po-le. 氣球吹破了。
balloon blow-broken-asp
'The balloon was popped (blown-broken).'

These sentences are interesting because they do not readily fit into any of the four categories we have discussed. In each compound the V1 denotes an activity, so the compound should be either unergative or transitive, and the subject should be an Agent. However, the subject is clearly a Theme/Patient. In fact, these sentences appear to exhibit the ergative-causative alternation when compared to the following:

- (39) ta ku-shi-le shoupa. 他哭溼了手帕。
he cry-wet-asp handkerchief
'He cried the handkerchief wet.'
(40) ta chui-po-le qiqiu. 他吹破了氣球。
he blow-broken-asp balloon
'He popped the balloon.'

We noted above that certain unergatives may be understood in the ergative sense, when their subjects play the role of a Causee. However, in the above examples, no Causee is involved, so the RVCs are transitive, not causative, by our earlier characterization. Thus, here we have compounds which exhibit neither an unergative-transitive nor an ergative-causative alternation, but an unexpected transitive-ergative alternation.

We propose that this pattern of alternation is a result of argument-suppression followed by NP-movement. In particular, for sentences like (37) and (38) the RVCs each have an underlying transitive argument structure, with an Agent as subject and Theme/Patient as object. But a rule of de-thematization suppresses the Agent role, so the derived structure is now ergative in form. To this structure NP-movement will apply and the Theme or Patient argument will surface as a subject:



We thus treat sentences like (37)–(38) as derived ergatives.⁹ These are on a par with passives like (42), except that they are not triggered by an overt passive marker as in standard passives:

- (42) shoupa bei (ta) ku-shi le. 手帕被(他)哭溼了。
 handkerchief bei s/he cry-wet asp
 'The handkerchief was cried wet (by him/her).'

We thus recognize the existence of a separate kind of surface intransitives that are different both from the unergatives, and from basic ergatives like *lei-si* 累死 'tired-dead', *zui-dao* 醉倒 'drunk-fall', etc. We claim that these derived ergatives are examples of the "Middle Construction", akin to the kind of middle constructions found in English and other languages:¹⁰

- (43) a. This book reads easily.
 b. Your theory won't sell.
 c. The door kicks open easily.

As is well known, alternations with middles show a pattern of ergativity, but they alternate with transitives but not causatives. We follow Keyser and Roeper (1984) and treat middles as surface ergatives, and distinguish them from deep ergatives which alternate with causatives.

In the rest of this paper, we defend our hypothesis that sentences like (37) and (38) are middle constructions. The two crucial aspects of this hypothesis that need to be defended are: (a) that the preverbal NPs are subjects, not topics, and (b) that these sentences are surface ergatives, to be distinguished from deep ergatives (i.e., those with *lei-si* 累死

'tired-dead', *zui-dao* 醉倒 'drunk-fall', etc).

One alternative analysis of (37)–(38) that comes to mind and that has sometimes been suggested treats them as topicalized sentences, each with a topicalized object and a Pro subject. According to this alternative, (37) would be formally represented as (44a) on a par with (44b) with a lexical subject:

- (44) a. shoupa_i Pro ku-shi-le t_i 手帕_i , Pro 哭溼了 t_i。
 handkerchief_i Pro cry-wet-asp t_i
 b. shoupa_i ta ku-shi-le t_i 手帕_i , 他哭溼了。
 handkerchief_i s/he cry-wet-asp t_i

If *shoupa* 'handkerchief' is a topic and not a subject, then (37) is a transitive sentence. There is no transitive-ergative alternation here, and the problem that concerns us does not arise. There is strong evidence, however, that (37)–(38) are not cases of topicalization and that *shoupa* 'handkerchief' and *qiqiu* 'balloon' are subjects in (37) and (38), not topics. There are at least three pieces of evidence for this position.

First, as argued in Cheng (1989), if (37) were a topicalized sentence with an empty subject, then it is not clear why sentences like the following are ungrammatical under the same analysis:

- (45) *guojing hen xihuan. *郭靖很喜歡。
 Guojing very like
 'Lit.: Guojing, [someone] likes him very much.'

That is, it is a mystery why (45) cannot be analyzed with a topicalized object and a Pro subject as in (46a), on a par with (46b) with a lexical subject:

- (46) a. guojing_i Pro hen xihuan t_i 郭靖_i , Pro 很喜歡 t_i。
 Guojing very like
 'Guojing, (someone) likes (him) very much.'
 b. guojing_i lisi hen xihuan t_i 郭靖_i , 李四很喜歡 t_i。
 Guojing Lisi very like
 'Guojing, Lisi likes (him) very much.'

On the other hand, if *Guojing* and *shoupa* are analyzed as subjects, there is a good explanation for the contrast between (37)–(38) and (45). It has been observed that Middle Formation is lexically restricted. In particular, only predicates that express certain results or involve affected themes may be used in the middle construction (see Hale and Keyser (1987), Dowty (1979), among others). Purely state- and activity-denoting

predicates cannot undergo Middle Formation. This point is most clearly seen in contrasts like the following:

- (47) a. *This kind of meat pounds easily.
 b. This kind of meat pounds thin easily.
 (48) a. *These dishes wipe easily.
 b. These dishes wipe dry easily.
 (49) a. *This door kicks easily.
 b. This door kicks open easily.

The (a) sentences are ill-formed because their predicates are purely activity-denoting. The following sentences show that state-denoting predicates do not have middle counterparts either:

- (50) a. A lot of people like John.
 b. *John likes easily.
 (51) a. Many people resemble Peter.
 b. *Peter resembles easily.

Now, it is easy to see how the contrast between (37)–(38) and (45) can be explained if these are results of Middle Formation. The ungrammaticality of (45) directly follows from the fact that it involves a stative predicate which is ruled out in the middle form.

Additional evidence for the subjecthood of *shoupa* 手帕 'handkerchief' in (37) is noted by Sybesma (1992), who points out that (37) and (38) are completely natural without the pause that often accompanies topicalized sentences. He also notes that the string in (45) is in fact acceptable if uttered with the proper comma intonation associated with topicalization. This shows that a sentence containing a topicalized object followed by a null subject is acceptable only if uttered with a clear pause. This in turn shows that the analysis (44a) is not correct for (37). Another piece of evidence for our position comes from a contrast between topicalization and relativization observed in Huang (1991) and Ning (1993), illustrated below:

- (52) a. zhangsan, chehuo fasheng le. 張三，車禍發生了。
 Zhangsan accident happen-asp
 '(As for) Zhangsan, an accident happened (to him).'
 b. *chehuo fashengde ren lai-le. *車禍發生的人來了。
 accident happen de person come-asp
 'Lit. The person such that an accident happened came.'
 (53) a. zhangsan fasheng-le chehuo. 張三發生了車禍。
 Zhangsan happen-asp accident
 'An accident happened to Zhangsan.'

- b. fasheng chehuo de nei-ge ren lai-le. 發生車禍的那個人來了。
 happen accident de that-cl person come-asp
 'The person to whom an accident happened came.'

It is proposed in Ning (1993) that relativization differs from topicalization in that whereas a topic structure may be licensed by a rather loose "aboutness" requirement that does not necessarily manifest itself in syntactic terms, a relativized structure requires that the relative operative bind into a syntactic position in the relative clause. This requirement on relativization, and the lack of it on topicalization, explains the contrast shown in (52). In (52a), the comment clause is an ergative sentence, with no argument coindexed with the topic. But the sentence is acceptable on the "aboutness" interpretation of the topic. (52b) is bad, however, because nothing in the ergative relative clause is coindexed with its head or the null operator associated with the head. (53b) shows that if the relative clause contains an additional argument position (for an Experiencer, as shown in (53a)), that argument can be relativized, satisfying the null operator's binding requirement as in (53b)). Now, note that the contrast between (52b) and (53b) also shows up with *ku-shi*, etc.

- (54) a. *shoupa ku-shi-le de ren lai-le. *手帕哭溼的人來了。
 handkerchief cry-wet-asp de person come-asp
 'The person such that the handkerchief was cried-wet.'
 b. ku-shi-le shoupa de ren lai-le. 哭溼了手帕的人來了。
 cry-wet-asp handkerchief de person come-asp
 'The person who cried and made the handkerchief wet came.'
 (55) a. *qiqiu chui-po-le de ren lai-le. *氣球吹破的人來了。
 balloon blow-broken-asp de person come-asp
 'The person such that the balloon was popped came.'
 b. chui-po qiqiu de ren lai-le. 吹破氣球的人來了。
 blow-broken balloon de person come-asp
 'The person who popped the balloon came.'

The grammatical cases are those where the RVCs are used transitively, with the subject bound by the relative operator. With the relative clauses in their middle form in the (a) sentences, relativization is impossible since nothing is syntactically bound by the operator. Note that this explanation goes through only under the assumption that these relative clauses are middle constructions, but not if they are topicalized constructions. If the relative clauses could be analyzed as topic structures, then an Agent position would still be open to be relativized, and the ungrammaticality of the (a) sentences would be unexplained.

We have established that (37)–(38) are ergative but not topicalized sentences. It still remains to show that these sentences are surface ergatives (i.e., middles), which need to

be distinguished from deep ergatives. This step of our argumentation is necessary because other writers (including Sybesma (1992) and Shen (1992)) have treated the ergatives without making the deep-surface distinction. We now show that these two types of ergatives exhibit different properties that motivate this distinction.

First, an important difference between middles and pure ergatives is that whereas the former entail the existence of some implicit agent or other, the latter never do. In this respect, middles are like passives, but pure ergatives are not. In fact, the middle resultatives can be paraphrased with their passive counterparts, but not the pure ergatives. Thus (37) and (38) are synonymous with the passives in (56)–(57), but the pure ergatives in (58a) and (59a) are not paraphrasable by their (b) counterparts:

- (56) shoupa bei ku-shi-le. 手帕被哭溼了。
handkerchief bei cry-wet-asp
'The handkerchief was cried-wet.'
- (57) qiqiu bei chui-po-le. 氣球被吹破了。
balloon bei blow-broken-asp
'The balloon was popped.'
- (58) a. zhangsan lei-si-le. 張三累死了。
Zhangsan tired-dead-asp
'Zhangsan was tired to death.'
- b. zhangsan bei lei-si-le. 張三被累死了。
Zhangsan bei tired-dead-asp
'Zhangsan was made tired to death.'
- (59) a. zhangsan zui-dao-le. 張三醉倒了。
Zhangsan drunk-fall-asp
'Zhangsan was so drunk that he fell.'
- b. zhangsan bei zui-dao-le. 張三被醉倒了。
Zhangsan bei drunk-fall-asp
'Zhangsan was made so drunk as to fall.'

That the surface ergatives involve some degree of agentivity but the deep ergatives do not is also evidenced by the contrast below (as pointed out to us by T.-C. Tang):

- (60) a. *men zidong tui-kai-le. *門自動推開了。
door automatically push-open-asp
'Lit. The door was automatically pushed open.'
- b. men zidong da-kai-le. 門自動打開了。
door automatically hit-open-asp
'The door opened automatically.'

As argued in Keyser and Roeper (1984), this difference between middles and true ergatives follows naturally from the assumption that middles are surface ergatives resulting from the suppression of their agents, whereas deep ergatives are ergative both underlyingly and on the surface. It has been observed (Roeper (1984)) that when an agent is suppressed, it may nevertheless continue to function as an implicit argument, a well known property of passives (when their agent phrases are unexpressed). That middles also exhibit this property follows automatically if they are assumed to involve Agent suppression. On the other hand, since pure ergatives are underlyingly subjectless, no subject will be suppressed, and there is no source for an implicit argument in the sentence.

The distinction between deep and surface ergativity that we are making has not been made in the literature on Chinese resultatives. For example, Sybesma (1992) and Shen (1992) both treat (37)–(38) as ergatives without distinguishing them from those true ergatives which alternate with pure causatives. Sybesma even went further to claim that even the unergatives are in fact ergatives as well. The most important argument Sybesma adduced in support of his position is derived from "Simpson's Law" (Simpson (1983)), which states that in a resultative construction, the result predicate (V2) must be predicated on the object of the whole construction — either the deep or the surface object. The crucial facts from English that support Simpson's Law are the following:

- (61) a. John kicked the door open.
b. The door fell open.
c. The door was kicked open.
d. The door kicks open easily.
e. John cried himself silly.
f. *John cried silly.

In (61a) the resultative predicate is predicated on the lexical object *the door*. In the ergative, passive, and middle constructions (b)–(d), the secondary predicate is controlled by the trace of the subject. With an unergative resultative like *cry silly*, however, there is no logical object for the resultative attribute *silly* to be predicated on, and the sentence is out as in (f). The otherwise peculiar obligatory insertion of a reflexive into the object position is then satisfactorily explained by Simpson's Law.

In Chinese, Simpson's Law apparently is also observed in standard transitive and causative resultatives:

- (62) xiao mao yao-si-le laoshu. 小貓咬死了老鼠。
little cat bit-dead-asp mouse
'The kitten bit the mouse to death.'
- (63) nei-bei jiu zui-dao-le lisi. 那杯酒醉倒了李四。
that-cl wine drunk-fall-asp Lisi
'That glass of wine got Lisi to be so drunk as to fall.'

With our middles and the deep ergatives, the requirement also holds generally, where the resultative clause is predicated on the object trace:

- (64) zhangsan zui-dao-le. 張三醉倒了。
 Zhangsan drunk-fall-asp
 'Zhangsan got drunk and fell.'
- (65) shoupa ku-shi-le. 手帕哭溼了。
 handkerchief cry-wet-asp
 'The handkerchief was cried wet.'

However, in contrast to (61e–f), an unergative RVC is possible, with the resultative clause predicated directly on the main clause subject, without a reflexive in the object position:

- (66) zhangsan ku-lei-le. 張三哭累了。
 Zhangsan cry-wet-asp
 'Zhangsan cried [himself] tired.'

If the unergatives are analyzed as unergatives as we have, then they constitute an exception to Simpson's Law. However, if they are treated as ergatives as suggested by Sybesma, then even in (66) the subject binds an object trace which serves as the subject of V2. Under this analysis, Simpson's Law is saved. And at the same time, it is claimed that in Chinese, all unergative resultatives are ergatives, contrary to what we have assumed all along.

This argument based on Simpson's Law is not complete, however. Even if the Law applies without exception, it remains that in Chinese, an unergative verb like *ku* 'cry' can be used to make an ergative resultative, while in English a similar verb cannot.¹¹ It is not clear how this parametric difference should be stated, and it is possible that Simpson's Law is in fact violable in some languages. Furthermore, as we have already seen, there are cases where V2 is not controlled by the object: *chi-bao* 吃飽 'eat-full', *he-zui* 喝醉 'drink-drunk', etc. Finally, it is useful to note that Simpson's Law partially duplicates the Minimal Distance Principle (MDP) of Rosenbaum (1970). As long as an RVC has an object, the MDP will ensure that V2 is predicated on the object. So Simpson's Law may be reduced to the claim that resultatives must have objects. It is conceivable that such a requirement may hold of one language but not another.

At any rate, even if all unergative resultatives were to be analyzed as ergatives, it is still necessary to distinguish between deep and surface ergativity. In Sybesma's theory, no such distinction is made, and (37)–(38) are treated on a par with (58a) and (59a), repeated below:

- (37) shoupa ku-shi-le. 手帕哭溼了。
 handkerchief cry-wet-asp
 'The handkerchief was wet from someone crying.'
- (38) qiqiu chui-po-le. 氣球吹破了。
 balloon blow-broken-asp
 'The balloon was popped.'
- (58) a. zhangsan lei-si-le. 張三累死了。
 Zhangsan tired-dead-asp
 'Zhangsan was tired to death.'
- (59) a. zhangsan zui-dao-le. 張三醉倒了。
 Zhangsan drunk-fall-asp
 'Zhangsan was so drunk that he fell.'

This unitary treatment, however, fails to capture another important distinction between these sentences: only the deep ergatives, but not the surface ergatives, may undergo pure causativization, i.e., the addition of a Causer argument. In particular, since Sybesma does not distinguish between deep and surface ergatives, his theory leads one to expect that both kinds of ergatives exhibit the same range of alternations. For example, given that a deep ergative like *lei-si* 'tired-dead' can be causativized with the addition of a Causer argument, one would expect, in his theory, that a surface ergative like *ku-shi* 'cry-wet' can be causativized in the same way. That is, it is predicted that the following sentences can be interpreted in the sense of pure causatives:

- (67) %zhangsan ku-shi-le shoupa. %張三哭溼了手帕。
 Zhangsan cry-wet-asp handkerchief
 Intended reading: 'Zhangsan caused the handkerchief to be cried-wet.'
- (68) *zhe-jian shi ku-shi-le shoupa. *這件事哭溼了手帕。
 this-cl matter cry-wet-asp handkerchief
 Intended reading: 'This matter caused the handkerchief to be cried-wet.'

However, as shown above, this is impossible. For (67) to be grammatical, the subject must be interpreted as the person who actually cried. Semantically, there is nothing implausible or far-fetched about the intended meanings, so the unavailability of these meanings must be derived from a proper theory of argument structure. Under our approach, a natural explanation is available once we assume that once an argument has been dethematized, it cannot be thematized again. Hence when *ku-shi* 'cry-wet' occurs in a transitive sentence, it must be interpreted in its underived sense, as an agentive transitive sentence, and not as a (doubly derived) causative sentence.

Finally, the distinction between deep and surface ergativity is motivated by a contrast

between the transitive and the causative under topicalization. The object of transitive is topicalizable, but not that of a pure causative:

- (69) a. wo ku-shi-le shoupa. 我哭溼了手帕。
 I cry-wet-asp handkerchief
 'I cried the handkerchief wet.'
 b. shoupa, wo ku-shi-le. 手帕, 我哭溼了。
 handkerchief, I cry-wet-asp
 'The handkerchief, I cried wet.'
 (70) a. lisi mang-huai-le zhangsan. 李四忙壞了張三。
 Lisi busy-sick-asp Zhangsan
 'Lisi got Zhangsan to be sick from being too busy.'
 b. *zhangsan, lisi mang-huai le. *張三, 李四忙壞了。
 Zhangsan Lisi busy-sick-asp
 'Lit. Zhangsan, Lisi got sick from being too busy.'

The same contrast can be observed in the following examples too:

- (71) a. xiaohai ba lisi zhui-lei-le. 小孩把李四追累了。
 child ba Lisi chase-tired-asp
 (a) 'The child chased Lisi tired.'
 (b) 'The child caused Lisi to chase himself tired.'
 b. lisi, xiaohai zhui-lei-le. 李四, 小孩追累了。
 Lisi child chase-tired-asp
 'Lisi, the child chased [him] tired.'
 (Not: 'Lisi, the child caused him to chase himself tired.')

(71a) is ambiguous between a transitive reading and a pure causative reading, but (71b) only has the transitive reading but not the causative reading. The contrasts shown in (69)–(71) can be explained under a minimal parsing principle that favors processing the nuclear clause in its basic or minimally derived form. In (69b) the basic form of the nuclear clause is transitive, so a null object is readily available to be coindexed with the topic. In (70b) the basic form of the nuclear clause is ergative, so no null object is available to be coindexed with the topic. The lack of ambiguity in (71b) follows in the same way. The nuclear clause must be interpreted as a transitive (with a null object coindexed with the topic) or as an ergative (with no null object), but not as a causative with a null object, which is derivative of the ergative. Hence the causative reading is lacking from (71b).

All this explanation is available only if the transitive and the ergative are taken to be basic forms from which the middles and causatives are respectively derived, i.e., only if

two kinds of ergative compounds, deep and surface ergatives, are recognized.

5. Summary

In this paper we have made the following points concerning the syntax and semantics of resultative compounds in Chinese. First, like simplex predicates, resultative compounds show an array of alternations that can be usefully captured from two dimensions: transitivity and aspectuality. Secondly, the transitivity of an RVC does not depend on the transitivity properties of its component verbs, but the aspectuality of an RVC does depend on the aspectuality properties of its components, in particular those of V1. Thirdly, this generalization can be insightfully captured by deriving RVCs from underlying left-headed event structures whose semantics determines their linking with appropriate thematic and argument structures. Finally, a special ergative form derived from transitive RVCs by the suppression of the Agent argument is recognized, and is seen to exhibit properties of middle constructions. It is also shown that systematic differences between middles and pure ergatives follow if the former are derived from the transitives while the latter are taken to be underived forms.

Notes

1. Resultative phrases larger than compounds allow an active verb in the result clause, however. In contrast to the non-existing *xia-tiao* 'frighten-jump', *xia-han* 'frighten-scream', the following resultative complement constructions are well formed:

- (i) zhangsan xia-de [tiao-le qi-lai]. 張三嚇得跳了起來。
 Zhangsan frightened-de jump-aspup-come
 'Zhangsan was so frightened that he jumped up.'
 (ii) zhangsan xia-de [lianmang han jiuming]. 張三嚇得連忙喊救命。
 Zhangsan frightened-de instantly scream save-life
 'Zhangsan was so frightened that he instantly screamed for help.'

This difference can be explained by the fact that the result is expressed by a phrase or clause that contains aspectual features, and hence the phrase or clause containing an activity verb can denote a state.

2. One difference between Chinese and English is that English resultatives must be transitive (cf. Simpson (1983)): compare (10h) with **The tenors sang hoarse* and the grammatical Chinese counterpart *ta chang-ya le* 他唱啞了 'He sang [his voice] hoarse'.

3. There are of course sentences with resultative complements (and descriptive complements) for which a V2-as-head analysis does make sense as a possibility for those sentences. Such a view has only been suggested but never demonstrated to be better than the V1-as-head hypothesis for the same sentences however, so by Occam's Razor one can simply eliminate the V2 hypothesis.

4. In fact, H&L are not entirely consistent in assuming that RVCs are headless composite predicates.

In order to allow for compounds like *chi-bao* 'eat full', *he-zui* 'drink-drunk', and *ta qi-lei-le ma* with the interpretation 'He went horse-back riding and got tired', H&L propose that these are RVCs headed by V2. This means that a compound like *qi-lei* 'ride-tired' in a sentence like *ta qi-lei le ma* is headless if the horse got tired, but headed (by V2) if he got tired. Given all available facts, this seems the weakest theory imaginable.

5. There is no grammatical principle which governs whether or not an internal argument should be selected. Instead, if an internal argument is selected, it is necessarily interpreted as a theme. Pragmatic principles rule out illegitimate sentences. For example, if *pao-kai* 'run-away' were to select an internal argument, that argument will be interpreted as a theme, the thing that is 'away'. However, if the external argument is interpreted as the agent of 'run-away', then it is quite absurd that something other than the agent is 'away'. Thus, such cases are ruled out by pragmatic principles.

6. This treatment thus highlights the independent use of the thematic role of a Causee aside from that of an Agent. But it should be noted that the role Causee is not being proposed as a primitive of grammar, so there is no cost in talking about it as a role independent of Agent. As is widely accepted now, theta-role labels like Agent, Experiencer, etc., are just convenient labels that are used to facilitate discussion. The real origin of the difference among different thematic roles lies in the difference among different event-types and event structures. To the extent that we can talk about a fully active event (where no external Causer is involved) and a caused event, the difference between Agent and Causee follows quite automatically. (An alternative is to treat a Causee as being derived from an underlying Agent, which gets internalized as a result of the addition of a Causer argument.)

7. H&L cite the example *ta chi-bao-le mian* 他吃飽了麵 'he ate noodles and got full' as being ill-formed, apparently indicating that *chi-bao-le fan* 吃飽了飯 is a frozen expression, but the above examples with *bao* clearly falsify this claim. In fact, even *ta chi-bao-le mian* 他吃飽了麵 'he ate noodles and got full' is not unacceptable for many speakers. Furthermore, in their analysis, it is possible to treat the RVC in (33) as a right-headed compound, nothing prevents *chi-bao* from being treated this way. Then it remains a mystery why *chi-bao* 'eat-full' is idiomatic, while *chi-ni* 'eat-bored', *ting-fan* 'listen-bored', *xia-shu* 'play-lose', etc. are not.

8. See Huang (1992) for treatment of cases of "event quantification" involving apparently noun-modifying QPs. For the object to be interpreted in the part-of-an-activity reading, it can be a bare NP, or a proper noun, but not a quantificational NP:

- | | | |
|-------|---|-------------|
| (i) | zhangsan zhui-lei-le xiaotou le.
Zhangsan chase-tired-asp thief asp
'Zhangsan got tired from chasing thief.' | 張三追累了小偷了。 |
| (ii) | zhangsan zhui-lei-le hufei le.
Zhangsan chase-tired-asp Hufei asp
(a) 'Zhangsan got tired from chasing Hufei.'
(b) 'Zhangsan chased Hufei tired.' | 張三追累了胡斐了。 |
| (iii) | zhangsan zhui-lei-le san-ge xiaotou le.
Zhangsan chase-tired-asp three-cl thief asp
'Zhangsan chased three thieves tired.' | 張三追累了三個小偷了。 |
| (iv) | zhangsan zhui-lei-le ji-ge xiaotou?
Zhangsan chase-tired-asp how many-cl thieves
'How many thieves did Zhangsan chase tired?' | 張三追累了幾個小偷？ |

It is instructive to note that the same restriction applies to cases involving event quantification:

- | | | |
|-----|--|----------|
| (v) | zhangsan kan-le san-ci shu.
Zhangsan read-asp three-cl book
'Zhangsan read three times.' | 張三看了三次書。 |
|-----|--|----------|

- | | | |
|--------|--|-------------|
| (vi) | zhangsan kan-le san-ci Laoren yu Hai.
Zhangsan read-asp three-cl old-man and sea
'Zhangsan read <i>The Old Man and the Sea</i> three times.' | 張三看了三次老人與海。 |
| (vii) | *zhangsan kan-le san-ci ji-ben shu?
Zhangsan read-asp three-cl how many-cl book
'Lit. Zhangsan read that book for three times.' | *張三看了三次幾本書？ |
| (viii) | *zhangsan kan-le san-ci san-ben shu.
Zhangsan read-asp three-cl three-cl book
'Lit. Zhangsan read three books for three times.' | *張三看了三次三本書。 |

We assume that this pattern follows from the assumption that quantificational NPs are represented as variables in Logical Form. Bound variables must be represented as true arguments since they necessarily are connected to elements outside of the VP. Lexical elements like proper names and non-referential NPs may be treated as within a self-contained description of an activity, and need not be treated as a true argument of a sentence.

9. For the purpose of exposition we assume argument-suppression to be a syntactic operation, but this assumption is not necessary. A desirable alternative is to assume this to be a lexical operation on argument structures. The result of the operation is a derived argument structure. The D-Structure of this derived ergative argument structure will have the same form as the D-Structure for basic ergative sentences. In this alternative approach, the difference between deep ergativity and derived ergativity is captured in the lexicon.

10. English middles typically occur in generic sentences and often accompanied by adverbs like *easily*. We shall assume that this is a property peculiar to English, since our "pseudo-passives", while exhibiting properties of middles, are clearly not subject to this restriction.

11. In Sybesma's treatment, the question is why *ku* 'cry' in Chinese may be used as a raising verb whereas it cannot in English. Sybesma adopts a small-clause analysis of the resultatives. There has been considerable debate over whether resultatives involve a small-clause structure or complex predicates with Larsonian structures. We assume the complex predicate analysis, on the basis of arguments produced in Huang (1988, 1991), and Larson (1988). Carrier and Randall (1993) is the most recent attempt to support the small-clause analysis for resultatives over the traditional ternary-branching analysis. The arguments advanced against this ternary-branching analysis, however, are largely inapplicable to the complex-predicate analysis. For more arguments in favor of a complex-predicate analysis of resultatives see Neeleman and Weerman (1993). Contreras (1993) argues that even the canonical small-clause constructions are to be analysed as complex predicate constructions.

References

- Baker, Mark. 1987. *Incorporation*. University of Chicago Press, Chicago.
- Burzio, Luigi. 1986. *Italian syntax*. Kluwer Academic Publishers, Dordrecht.
- Carrier, Jill and Janet Randall. 1993. The argument structure and syntactic structure of resultatives. *Linguistic inquiry* 23, 173–234.
- Cheng, Lisa Lai-Shen. 1989. Transitivity alternations in Mandarin Chinese, in Majorie Chan and Thomas Ernst (eds.), *Proceedings of the third Ohio state university conference on Chinese linguistics*, Indiana University Linguistics Club.
- Chomsky, Noam. 1975. *The logical structure of linguistic theory*. Plenum, New York.
- _____. 1980. On Binding, *Linguistic inquiry* 11, 1–46.
- _____. 1981. *Lectures on government and binding*. Foris Publications, Dordrecht.

- Contreras, Heles. 1993. A Larsonian analysis of small clauses, ms., University of Washington.
- Dowty, David. 1991. Thematic proto-roles and argument selection, *Language* 67, 547–619.
- Grimshaw, Jane. 1990. *Argument structure*. MIT Press, Cambridge, Massachusetts.
- Gu, Yang. 1992. *The syntax of resultative and causative compounds in Chinese*. Doctoral Dissertation, Cornell University.
- Hale, Kenneth and S. Jay Keyser. 1987. A view from the middle (*Lexicon project working papers* 10), Center for Cognitive Science, MIT, Cambridge, Massachusetts.
- _____. On argument structure and the lexical expression of syntactic relations, in Kenneth Hale and S. Jay Keyser (eds.), *The View from Building 20*, pp. 53–110. MIT Press, Cambridge, Massachusetts.
- Huang, C.-T. James. 1982. *Logical relations in Chinese and the theory of grammar*. Doctoral Dissertation, MIT.
- _____. 1988. *Wo pao de kuai* and Chinese phrase structure, *Language* 64, 274–311.
- _____. 1991. Complex predicates in control, in U. Lahiri, S. Iatridou, R. Larson and J. Higginbotham (eds.), *Control and grammar*, 109–147. Kluwer Academic Publishers, Dordrecht.
- _____. 1991. On verb movement and some syntax-semantics mismatches in Chinese, to appear in *Proceedings of the 2nd international symposium of Chinese languages and linguistics*, Academia Sinica, Taipei.
- _____. 1992. On lexical structure and syntactic projection, to appear in *Proceedings of the 3rd international symposium of Chinese languages and linguistics*, Academia Sinica, Taipei.
- Huang, Chu-Ren and Fu-Wen Lin. 1992. Composite event structures and complex predicates: a template-based approach to argument selection, to appear in *Proceedings of the third annual meetings of the formal linguistic society of Mid-America*.
- _____, and Louis Mangione. 1985. A reanalysis of *de*: adjuncts and subordinate clauses, *Proceedings of the 4th west coast conference of formal linguistics*, 80–91. Graduate Linguistics Student Association, Stanford University.
- Huang, Shuanfan. 1974. Mandarin causatives, *Journal of Chinese linguistics* 2, reprinted in S. Huang (1982) *Papers in Chinese syntax*, pp. 123–144, Crane, Taipei.
- Jackendoff, Ray. 1990. *Semantic structures*. MIT Press, Cambridge, Massachusetts.
- Keyser, S. Jay and Thomas Roeper. 1984. On the middle and ergative constructions in English, *Linguistic inquiry* 15, 381–416.
- Larson, Richard. 1988. On the double object construction, *Linguistic inquiry* 19, 335–391.
- Levin, Beth and Tova Rapoport. 1989. Lexical subordination, *Proceedings of the 24th regional meeting of the Chicago linguistic society*, 275–289.
- _____, and Malka Rappaport-Hovav. 1991. Wiping the slate clean: a lexical semantic exploration, *Cognition* 41, 123–151.
- Li, Yafei. 1990. On V-V compounds in Chinese, *Natural language and linguistic theory* 8, 177–207.
- _____. 1993. Structural heads and aspectuality, *Language* 69, 480–504.
- Neeleman, Ad and Fred Weerman. 1993. The balance between syntax and morphology: Dutch particles and resultatives, *Natural language and linguistic theory* 11, 443–476.
- Ning, Chunyan. 1993. *The overt syntax of relativization and topicalization*. Doctoral Dissertation, University of California, Irvine.
- Perlmutter, David M. 1978. Impersonal passives and the unaccusative hypothesis, *Proceedings of the 4th annual meeting of the Berkeley linguistic society*, 157–189.
- Roeper, Thomas. 1984. Implicit arguments in the syntax and the lexicon, ms., University of Massachusetts, Amherst.
- Rosenbaum, Peter S. 1970. A principle governing complement subject deletion, in R. Jacobs and P. S. Rosenbaum, eds., Ginn and Company, Waltham, Massachusetts.
- Shen, Li. 1992. *Guanyu hanyu jieguo fuhe dongci zhong canxiang jieguo de wenti* [On the argument structure of resultative compounds in Chinese], ms., Kyoto University.
- Simpson, Jane. 1983. Resultatives, in L. Levin, M. Rappaport, and A. Zaenan (eds.), *Papers in lexical-*

- functional grammar*, Indiana University Linguistics Club, Bloomington.
- Sybesma, Rint. 1992. *Causatives and accomplishments: the case of Chinese BA*. Doctoral Dissertation, Leiden University.
- Travis, Lisa. 1984. *Parameters and effects of word order variation*. Doctoral Dissertation, MIT.
- Williams, Edwin. 1983. Against small clauses, *Linguistic inquiry* 14, 287–308.
- Winkler, Susanne. 1993. Focus projection and argument structure of resultatives, *Proceedings of workshop on the semantic and syntactic analysis of focus*, 59–73. Research Institute for Language and Speech, Utrecht University.