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Abstract

This paper explores the theory of argument structure proposed in Hale and Keyser (1991) to account for the various properties of resultative verb compounds in Mandarin Chinese It is shown that neither a pure lexical approach (Li 1990a), nor a pure syntactic approach (Huang 1992) can account for all the properties of resultative verb compounds I argue that resultative compounds should be split into two types (lexical and syntactic) Further, I show that the distinct properties of lexical resultative verb compounds can be accounted for using Lexical Relational Structures (Hale and Keyser 1991)

1. Introduction

There are basically two different views of compounding. One derives all compounds in syntax (i.e. morpho-syntax) and the other in the lexicon (i.e. lexical-syntax). A representative of the former theory can be found in Huang (1992). In contrast, Li (1990a), proposes a theory of verb-verb compounding in the lexicon to account for the formation and interpretation of Mandarin verb-verb compounds. In this paper, I further examine resultative verb-verb (RVV) compounds in Mandarin Chinese. I will show that neither a pure lexical analysis nor a pure syntactic analysis

is sufficient in accounting for the data in Mandarin.

I first briefly review Li (1990a) and Huang (1992). I will discuss problems associated with these two analyses. It will be shown that RVV compounds need to be split into two types, lexical and syntactic compounds. Further, I will advocate a theory of lexical compounding based on the theory of argument structure proposed in Hale and Keyser (1991).

2. Previous Analyses

2.1. Li (1990a)

Li (1990a) proposes a lexical analysis of compounding by appealing to the Case theory as well as the assumptions listed in (1), which are related to theta-roles:

(1) a. A structured theta-grid, following Grimshaw (1992): the theta-roles of a verb are ordered according to their relative prominence.

    b. Theta-identification, following Higginbotham (1985): theta-roles from two different verbs can be identified and assigned to the same NP.

    c. Head-feature percolation, following Lieber (1983) among others: the theta-role prominence of a head of a compound needs to be maintained in the theta-grid of the compound.

Hence, given a compound consisting of two verbs, V1 and V2, the theta-roles of V1 are "identified" with those of V2 yielding a theta-structure with "merged theta-roles". For example, consider the compound *xia shu* 'play-lose' in (2)

(2) Both V1 and V2 have two theta-roles.

    baoyu xia-shu-le   qi

    Baoyu play-lose-ASP chess

    'Baoyu played (chess and as a result he) lost it.'

Both verbs have two theta-roles ⟨1,2⟩ and ⟨1',2'⟩ respectively. The only correct output of the theta-identification of the two theta-grids is ⟨1-1',2-2'⟩ (where the "-" notation indicates that the two theta-roles are identified). The other combinations are illegitimate because the prominence the theta-roles has to be maintained.

By using theta-identification and theta-role prominence, Li accounts for a wide range of compounds differing in the number of theta-roles of the verbs, as shown in (3)-(5).

(3)   V1 has two theta-roles and V2 has one.
      qi-ku ⟨1,2-1'⟩

      baoyu   qi-ku-le   daiyu
      Baoyu annoy-cry-ASP Daiyu
      'Baoyu made Daiyu so angry (that Daiyu) cried.'

(4)   V1 has one theta-role and V2 has two.
      wan-wang ⟨1-1',2'⟩

      ta   wan-wang-le   zijide zhize
      he play-forget-ASP own duty
      'He played (in such an absorbed way that he) forgot his duty.'

(5)   Both V1 and V2 have only one theta-role.
      xiao-feng ⟨1-1'⟩

      (a) fanjin xiao-feng-le
          Fanjin laugh-insane-ASP
          'Fanjin laughed to the extent of becoming mad.'

      ku-zou ⟨1,1'⟩

   (b) daiyu   ku-zou-le   henduo keren
          Daiyu cry-leave-ASP many   guest
          'Daiyu cried (so much that) many guests left.'

In (5), since both verbs have only one single theta-role, there is no relative prominence. Further, the identification of the theta-roles is optional in this case. This is due to Case theory, according to Li (1990a). Li maintains that since there are in general two structural Cases, there is no need to force theta-identification. Hence, for verbs with one theta-role, we will either get a transitive (i.e. without theta-identification) or an intransitive (i.e. with theta-identification) compound. In other words, Case theory determines in some cases whether or not there is theta-identification. Assuming that there are only two structural Cases available to each verb, there are only two possible arguments of a compound. Thus, a compound consisting of verbs with two theta-roles will not be able to take more than two arguments, even though there are more theta-roles available. It should be noted that in the case of verbs such as *xiao-feng* 'cry-insane', Li claims that there are independent pragmatic considerations which rule out a transitive counterpart.

Li considers all of the above kinds of compounds to have involved a causal relation, and for compounds that do not involve a causal relation, theta-identification takes place as well.[1]

Furthermore, Li argues that a syntactic approach to compounding in Mandarin Chinese a là Baker (1988) cannot be right. In Baker's account of causativization, incorporation takes place in a structure such as (6).

(6)

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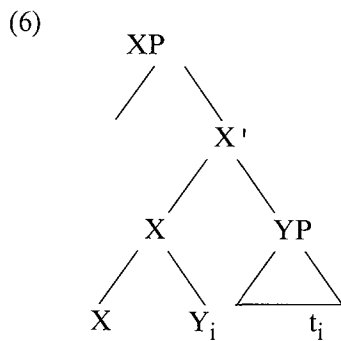
1. Li notes that even though both kinds of compounds (causal and "AND"-compounds) involve theta-identification, the "AND"-compounds have "obligatory" theta-identification when both members of the compounds have only one theta-role.

The incorporation of Y into X is possible (i.e. without crossing any barriers) because X is lexical and theta-marks YP. However, Li argues that it is quite unlikely that Mandarin compounds are results of such incorporation process because the first member of the compound does not "theta-mark" the second member of the compound. That is, in a compound such as *qi-ku* 'annoy-cry', Li considers it unlikely that *qi* 'annoy' theta-marks a clause headed by *ku* 'cry'. While Li's concern seems to be well-founded, it should be noted that if YP in (6) is an actual clause (i.e. IP or CP), it is certainly the case that no incorporation actually takes place (see also Baker (1988) and Li (1990b)). However, if YP is smaller than a clause (i.e. VP, PP, etc), and that not all XP's are barriers (which seems to have empirical support in recent works), then it is not clear that Li's objection to the syntactic approach can hold. Furthermore, Li's approach has other independent problems.

There are two basic problems with Li's analysis. First, Li claims that a compound of the kind in (3) can be ambiguous. In such a compound, the second verb has only one theta-role and thus there is no relative prominence with respect to this theta-role. Thus, there are two identification patterns allowed: ⟨1, 2-1'⟩ and ⟨1-1', 2⟩, as shown in (7). However, as Huang (p.c.) points out, even though Li claims that sentences such as (7) are ambiguous, when the object is specific or definite, the ambiguity disappears, as shown in (8).

(7)   from Li (1990a)

     Baoyu   qi-lei-le   ma

     Baoyu ride-tired-ASP horse

     a. Baoyu rode the horse (and as a result he got) tired.

     b. Baoyu rode the horse (and as a result the horse got) tired.

(8) Baoyu   qi-lei-le   nei-pi ma

     Baoyu ride-tired-ASP that-CL horse

     a. Baoyu rode that horse (and as a result that horse got) tired.

     b.*Baoyu rode that horse (and as a result he got) tired.

In other words, the proper translation for (7) should be "Baoyu went horseback-riding and as a result he/horse got tired". Note that Li's analysis predicts (8) to have the same readings as (7) since definite/specific NPs or referential NPs do not play a role in his analysis. As a result, his analysis overgenerates. Furthermore, it is a curious fact that the referentiality/definiteness of the object NP matters if we have in compounding simply a way of "calculating" and "combining" the theta-roles.

In addition, if *qi-lei* 'ride-tired' can have ambiguous readings in (7), the same ambiguity should arise in (9).[2]

(9) Baoyu qi-lei-le che
     Baoyu ride-tired-ASP bike
     a. Baoyu rode the bike (and as a result he got) tired.
     b.*Baoyu rode the bike (and as a result the bike got) tired.

In(9), there is only one reading available. The only one that can get tired in (9) is *Baoyu* since bikes cannot get tired. So we will need a pragmatic constraint to rule it out bearing in mind examples such as (8) which already render Li's account of the ambiguity questionable.

The second problem with Li's analysis lies in the heart of theta-identification. The mechanism of theta-identification is obligatory when the members of the compound verb have more theta-roles than the available structural Cases. This in fact rules out some possible compound verbs. Consider the following examples discussed in Huang C.R. (1991).

(10) ta (yingwei tiantian ti qiu) ti-puo-le ta-de qiu-xie
      s/he (because everyday kick ball) kick-break-ASP her/his sneaker
      '(lit.) S/he kicked-broke her/his sneaker (because s/he played soccer
      everyday).'

---

2. In this example, *che* is the short term for *jiao-ta che* 'foot-pedal car' and thus is glossed as 'bike'. Normally *che* is glossed as 'car'.

(11)   (from Tan 1991, cited in Huang C R 1991)

   lunwen xie-lao-le   ta

   thesis write-old-ASP s/he

   '(lit) Thesis (writing) aged him/her '

In (10), the object argument of the compound *ti-puo* 'kick-break' is *ta-de qiu-xie* 'his/her sneaker' However, the patient argument of the first member of the compound *ti* 'kick' is not the sneaker Instead, it is the optional argument *qiu* 'ball' Hence, the second argument of the first verb (i e the patient) cannot be identified with the argument of the second verb (the thing that gets broken) In other words, (10) presents a case in which the theta-roles of the verbs in a compound are not exhaustively assigned or identified [3] Furthermore, as shown in (11), if we have a strict theta-identification operation as well as theta-prominence maintenance, the theory undergenerates In (11), under Li's account, *xie* 'write' has a theta-grid $\langle 1, 2 \rangle$ while *lao* 'old' has the theta-grid $\langle 1' \rangle$ To allow the compound *xie-lao* 'write-old', an output theta-grid $\langle 2\text{-}1',1 \rangle$ is needed However, in such an output theta-grid, the theta-role prominence of the first verb is not preserved

2.2.   Huang's Syntactic Approach (1992)

   Huang (1992) examines resultative constructions and proposes to account for various properties of the constructions in Mandarin by a theory of Control Furthermore, he considers resultative compounds to be on a par with resultative predicates, with the former exhibiting similar relations as the latter Consider the sentences in (12) (from Huang 1992)

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3 *ti* 'kick' is not like verbs such as *eat* in that it has an optional argument, as we can see in (i)

(i) a ta xihuan ti   qiu

      he like   kick ball

      'He likes to kick ball '

                  b *ta xihuan ti

      he like   kick

Bearing in mind that Chinese allows object pro's, (ib) can have a reading "he likes to kick something" with the object dropped

(12) a. zhangsan ku-de shoupa   dou shi le
          Zhangsan cry-DE handkerchief all wet ASP
          'Zhangsan cried so much that the handkerchief got wet.'
      b. zhangsan ku-shi-le   shoupa
          Zhangsan cry-wet-ASP handkerchief
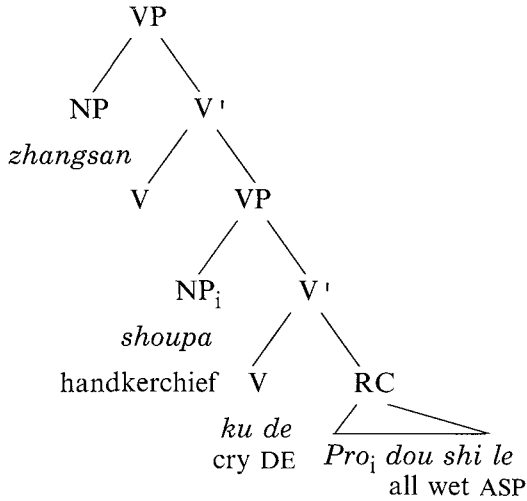   '(lit) Zhangsan cried-wet the handkerchief.'

Assuming the VP-internal subject hypothesis (Hale 1980, Fukui and
Speas 1985, Kitagawa 1986, Koopman and Sportiche 1986 among
others), the VP of (12a) has the structure in (13).[4] *ku-de* 'cry-DE' selects
and theta-marks the resultative clause [Pro dou shi le] 'all wet-ASP'.
The V' compositionally takes *shoupa* 'handkerchief' as an object. Since
this external object *shoupa* 'handkerchief' is the closest c-commanding
NP to Pro, it is the one which controls Pro in the resultative clause. The
verb *ku-de* 'cry-DE' subsequently moves to the higher empty verb (along
the lines of Larson (1988)). Similarly, (12b) has the structure in (14). The
difference between (12a) and (12b) is that the former has a phrasal result-
ative clause while the latter has a lexical resultative clause. The com-
pound verb is derived through a reanalysis process, or one can treat it as
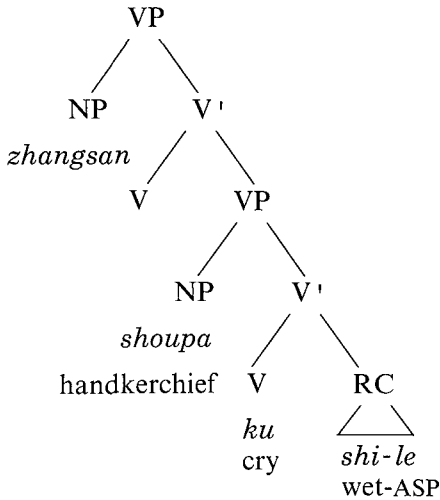an incorporation structure.[5]

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4. See Huang (1993) for arguments for adopting a VP-internal subject analysis in
   Mandarin Chinese.
5. In Huang (1992), no empty verb is explicitly used. However, it is clear that a ver-
   sion of Larson's VP-shell structure is assumed.

(13) adapted from Huang (1989), ex. (51)

```
                    VP
                  /    \
               NP        V'
          zhangsan      /  \
                      V      VP
                           /    \
                        NPᵢ       V'
                      shoupa     /  \
                   handkerchief V     RC
                               ku de  /⟍
                               cry DE  Proᵢ dou shi le
                                       all wet ASP
```

(14)

```
                    VP
                  /    \
               NP        V'
          zhangsan      /  \
                      V      VP
                           /    \
                        NP        V'
                      shoupa     /  \
                   handkerchief V     RC
                               ku    /\
                               cry  shi-le
                                    wet-ASP
```

Moreover, Huang treats transitive vs. intransitive compounds on a par with subject-control vs. object-control structures. For instance, given the transitive and intransitive *ku-xing* 'cry-awake', the intransitive version is simply a subject-control case while the transitive one is similar to *ku-shi* 'cry-wet' discussed above. (15a) and (15b) are examples of the transitive and intransitive *ku-xing* 'cry-awake'.
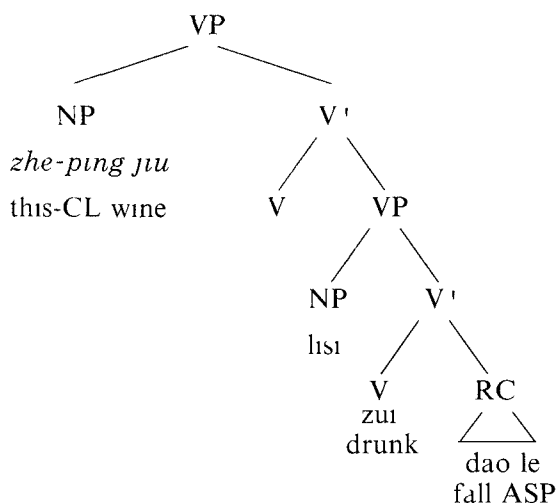
(15) from Huang (1989), (63)

    a. ta ku-xing-le

       he cry-awake-ASP

       'He cried and became awake.'

    b. ta ku-xing-le   lisi

       he cry-awake-ASP Lisi

       'He cried and awoke Lisi.'

Note that (15b) is not treated strictly as a causative verb. Huang also discusses cases of causative compounds, as shown in (16).
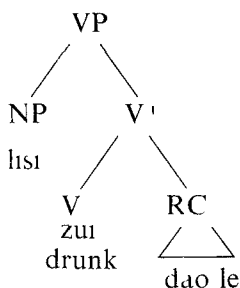
(16) a. zhe-ping jiu zui-dao-le   lisi

       this-cl wine drunk-fall-ASP Lisi

       'This bottle of wine got Lisi drunk.'

    b. lisi   zui-dao   le

       Lisi drunk-fall ASP

       'Lisi got drunk.'

Note that in (16a), *jiu* 'wine' is a causer. From (16b) it is clear that the causer is an "added" argument. In other words, in addition to the typical argument structure of the verb, causation can add an additional argument. Given a compound verb such as *zui-dao* 'dunk-fall' which is an unaccusative, we can derive (16b). If there is a causer, which can be the external argument of the compound, we can derive (16a). The structures corresponding to these two sentences are shown below:

(17)

```
                    VP
              /            \
          NP                V'
      zhe-ping jiu         /    \
      this-CL wine       V        VP
                                /    \
                              NP       V'
                              lisi    /   \
                                    V       RC
                                    zui    /   \
                                    drunk  dao le
                                          fall ASP
```

(18)

```
              VP
           /      \
        NP          V'
        lisi       /   \
                 V       RC
                 zui    /   \
                 drunk  dao le
```

The difference between (15b) and (16a) is that the subject NP of (15b) has a direct relationship to the action as well as the object (i e Lisi is awaken due to his crying) In contrast, in the case of (16a), the subject NP only contributes as an indirect causer, namely, Lisi got drunk because he drank too much wine but the bottle of wine itself does not contribute either to the act of drinking or to the result of getting drunk

The analysis given in Huang (1989) is quite attractive because it accounts for the unaccusative unergative and transitive/causative compounds However, it should be noted that the causer is treated as an additional argument added on by an empty causative verb If the addition of a causative argument always comes for free with an empty causative

verb, the question which arises is whether or not this is possible for all cases Compounds such as *zui-lei* 'chase-tired' show that we cannot freely add a causer argument, as shown in (19) [6]

(19) zhangsan zui-lei-le lisi
      Zhangsan chase-tired Lisi
      (i) 'Zhangsan chased Lisi and Lisi became tired '
      (ii) 'Lisi chased Zhangsan and Lisi became tired '
      (iii) * ' Zhangsan made Lisi tired by getting him involved in the act of chasing '

In (19) it is not possible to interpret Zhangsan as an indirect causer, in comparison with the wine which makes *Zhangsan* drunk in (16) In other words, *Zhangsan* in (19) has to be a direct causer rather than an indirect one However, if it is possible to always introduce an indirect causer, using the empty causative verb, why is it not possible in this case? Furthermore, it is not clear that Huang's analysis can account for the two possible readings in (19) If we derive such a compound syntactically, it is rather unlikely that both readings can be obtained [7]

We have seen that both a lexical account and a syntactic account run into problems with certain compounds and with certain readings of compounds In the following sections, I will propose an approach which uses both lexical and syntactic aspects of compounding In particular, I will argue that we need both lexical and syntactic compounding and they do have different properties Further, I will assume a lexical approach

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6 It should be noted that Li cannot account for the second reading in (19) since the prominence of the theta-roles of the first verb is not preserved Thus, this is comparable to compound *xie-lao* 'write-old '

7 A reviewer points out that native speakers don't seem to get the reading in (ii) Rather, they can have a reading "Zhangsan chased Lisi and as a result Zhangsan got tired ' My own judgement is that reading (ii) does exist, though it is certainly not the preferred reading However, the reading in which Zhangsan got tired seems quite unlikely to me Note that this will amount to the same problematic reading in *qi-lei ma* 'ride-tired horse' in (1) We will come back to the (ii) reading in section 3 2

based on Hale and Keyser's (1991) Lexical Relational Structure.

3. Lexical Relational Structure, an Overview

The proposal discussed here assumes the theory of argument structure proposed in Hale and Keyser (1991) (henceforth H&K). The conception of argument structure in H&K differs from the traditional conception of argument structure. In particular, there are no thematic roles "assigned" by verbs; instead, thematic roles are identified with points in lexical syntactic projections. In lexical syntax (l-syntax), the structure in which lexical relations are represented (i.e. thematic relations) is called "lexical relational structure" (henceforth LRS) (see also Hoffman (1991) for an overview of this theory). The output of LRS serves as the input to D-structure.

H&K notes that we only have a limited number of thematic roles because there are only a number of relations that can be represented structurally. I will briefly discuss the relations examined in H&K. First, a verb represents a dynamic event. In a structure such as (20), there are two events and the event represented by the first verb "implies" the second event, which is represented by the second verb. In other words, we have a causal relation represented in (20).[8]

(20) e1→e2

        VP
       / \
      V   VP
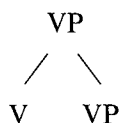
H&K assumes that the presence of a subject in l-syntax is forced by predication (or another way to put it is, the presence of a predicate needs a subject to satisfy full interpretation). In (20), the verb takes a VP as its

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8. Note that though we generally think of verbs to be denoting actions, it has been noted in the literature that verbs may have an event argument or they may have an event structure.

complement. In H&K, it is assumed that VP in l-syntax is not a predicate. Hence, in a structure such as (20), the upper VP does not have an NP in the specifier position.
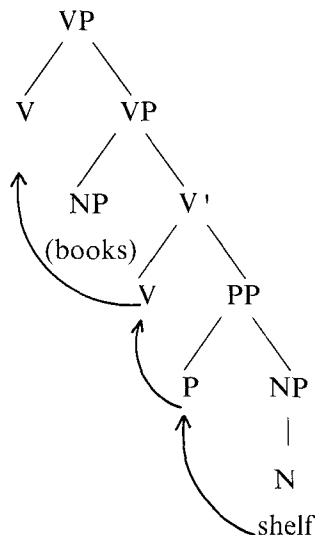
Besides VP, a verb can also take a PP, AP or NP as complements. Prepositions indicate "interrelation", for instance, spatial or locational relations. A structure such as (21) represents a change with a certain spatial or locational relation.

(21) e→r

```
            VP
           /  \
         NP    V'
              /  \
             V    PP
```
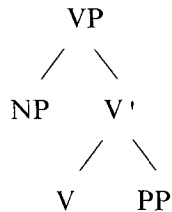
An example of such a relation is the verb *shelve* in English. It has the structure below.

(22)

```
            VP
           /  \
          V    VP
              /  \
            NP    V'
          (books) / \
                 V   PP
                    /  \
                   P    NP
                        |
                        N
                      shelf
```

The object noun of P incorporates into P and then the N+P combina-

tion further incorporates up the tree. The output is the verb *shelve*. The meaning of the verb *shelve* is thus accounted for (i.e. X causes Y to put Z on the shelf).
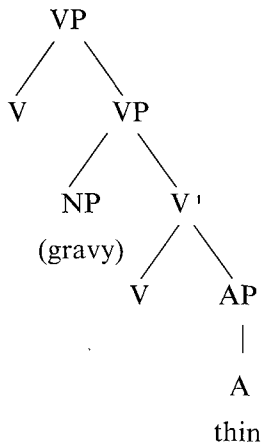
An adjective represents a "state". A structure such as (23) represents an entity undergoing change, or a change resulting in a state. In H&K's words, "a state is achieved as an integral, or defining part of a dynamic event."

(23) e→s

```
           VP
          /  \
        NP    V'
             /  \
            V    AP
```
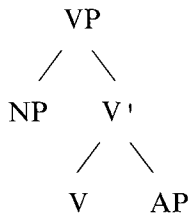
An example of (23) is the verb *thin*. It has the following structure:

(24)

```
        VP
       /  \
      V    VP
          /  \
        NP    V'
     (gravy) /  \
            V    AP
                 |
                 A
                thin
```
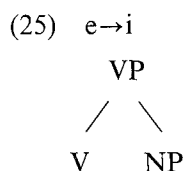
(24) represents the meaning of *thin,* which is [X causes Y to become thin]. Note that based on these relational structures, it is clear that NP in the specifier position of the inner VP is an affected element.

Furthermore, H&K notes that there are also verbs such as *laugh,*

which can be represented as in (25).

(25) e→i

    VP

  / \

V   NP

Thus, the verb *laugh* indicates that there is an event which produces an instance of *laugh*.
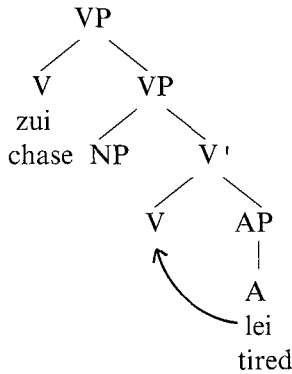
3.1. The Proposal

Now let's consider how we can account for the properties of compounding in Mandarin. To recapitulate, the lexical analysis along the lines of Li (1990a) runs into problems with overgenerating readings in cases where the object is referential. Further, it also runs into problems in undergenerating compounds which do not necessarily have argument sharing. On the other hand, the syntactic analysis proposed by Huang (1989) overgenerates causative compounds and it is not clear how it can deal with compounds with no apparent argument sharing as well.

I propose that there are indeed two ways of forming compounds, syntactic and lexical. I will discuss lexical compounding first. Then I will point out which kinds of compounds must have undergone a syntactic process. I propose that lexical compounding in Mandarin Chinese is similar to conflation in English, discussed in Hale and Keyser (1991). Consider first the compound *zui-lei* 'chase-tired'. (19) is repeated below as (26).

(26)   zhangsan zui-lei-le   lisi
       Zhangsan chase-tired-ASP Lisi
       (i) 'Zhangsan chased Lisi and Lisi became tired.'
       (ii) 'Lisi chased Zhangsan and Lisi became tired.'
       (iii)*'Zhangsan made Lisi tired by getting him involved in the act
   of chasing.'

Within the framework of H&K, the LRS of *zui-lei* 'chase-tired' can be represented as in (27).

(27)

```
        VP
       /  \
      V    VP
     zui   /  \
   chase  NP    V'
              /   \
             V     AP
              ↖     |
               \    A
                \  lei
                 tired
```

As represented in (27), the adjectival verb *lei* 'tired' is predicated of the NP in the inner VP in l-syntax. The LRS in (27) represents the reading of the compound "event of chasing leads to a state of being tired" or "event of chasing leads to a state of becoming tired". Since *lei* 'tired' is predicated of the inner NP, the object NP of the compound in s-syntax will be the element undergoing a change of state "being tired". In l-syntax, the adjectival verb *lei* 'tired' first incorporates into the empty verb, then the V+A complex further moves to the higher verb *zui* 'chase'. The output of the l-syntax incorporation is as shown in (28).

(28)

```
        VP
       /  \
      V    VP
   zui-lei  /  \
          NP    V'
               /  \
              V    AP
```
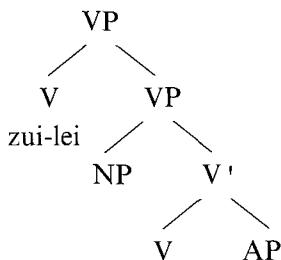
The representation in (28) shows clearly that the NP in the VP internal

position is the NP that undergoes a change of state. Thus, in this case, *Lisi* is the one who is getting tired. The question which arises here is how we can account for the reading indicated in (26ii), in which the inner NP is also the one that does the chasing.

Now consider again the LRS of *zui-lei* 'chase-tired'. It is clear that *lei* 'tired' is predicated of the inner NP in the LRS. However, the external argument is not specified in the l-syntax.[9] The relevant question here is: what is the relationship between the verb *zui* 'chase' and the inner NP in the LRS? In H & K, as discussed above, a structure of the type in (27) has the semantic relation $[e \to s]$ (i.e. an action or dynamic event implies a state). Another way of looking at the semantic relationship, as H&K notes, is "a state is achieved as an integral, or defining, part of a dynamic event". When the verb which takes the AP is an empty verb, as in English, it represents an elementary "change of state". On the other hand, when the verb is specified, as in the case of Mandarin Chinese, it indicates that a state is achieved as part of a dynamic event. In this case, the event is the event of chasing.

Based on the LRS of the compound, the inner subject will surface as a sentential object in s-syntax. The difference between the reading in (26i) and (26ii) is that in the former the inner subject is the chasee while in (26ii) the inner subject is the chaser. In an event of chasing, there are two participants. In the l-syntax, there is a variable which can represent one of the participants of the event and since the participant role is not stipulated in LRS, it can be either the one doing the chasing or the one being chased. If the inner NP in l-syntax in this case is "assigned" as the one being chased in the event (i.e. chasee), then the only possible participant left in the s-syntax is the chaser (and hence the reading in (26i)). It should be noted that in s-syntax, the whole VP, containing the inner NP is predicated of the subject NP. It is due to the syntactic predication that the event of chasing can be interpreted properly. On the other hand, if

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9. See Hale and Keyser (1991) for a detailed discussion of why there is no subject NP of which VP is predicated in l-syntax. In other words, the output of l-syntax does not have a VP-internal subject.

the inner NP is the chaser in the LRS, the only possible participant of the event of chasing left is the chasee, whcih is the subject of the "derived VP" at D-structure (and thus the reading in (26ii)).

Now let's turn to examples of the kind noted in Huang C.R., repeated below.

(29) (from Tan 1991, cited in Huang C.R. 1991)
      lunwen xie-lao-le   ta
      thesis write-old-asp s/he
      '(lit.) Thesis (writing) aged him/her.'

The LRS of *xie-lao* 'write-old' is similar to the LRS of *zui-lei* 'chase-tired'. And it is expected that *ta* 's/he' has to be the one being predicated by *lao* 'old' (because it is in the object NP position and thus the inner syntax position in l-syntax). As for the participants of the event of writing, it is clear that if *ta* 's/he' is in the slot in which the AP *lao* 'old' is predicated of, it cannot appear in the syntactic subject position. Assuming that it is "assigned" as the writer of the action of writing, then at S-structure, the subject NP can only be interpreted as the thing being written. On the other hand, if the inner NP in the LRS is "assigned" as the passive participant of the event of writing (i.e. the thing being written), then when the sentence needs to be interpreted, the reading will be contrary to our knowledge of the world (i.e. a thing such as a thesis can not write a person). In other words, it is not any grammatical mechanism which rules out *ta* 's/he' being the thing written by a thesis.[10]

Thus, we have here not a typical theta-role assignment phenome-

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10 A reviewer notes that the external subject *lunwen* 'thesis' seems to involve indirect causation Here we need to see how indirect causation differ from direct causation I think that direct causation requires the causer to be a participant of the event based on the argument structure In other words, in the example *xie-lao* 'write-old', *lunwen* 'thesis' is a participant of the event of writing. In contrast, for a compound such as *zui-dao* 'drunk-fall' in (3), the subject NP *zhe-pingjiu* 'this bottle of wine' is not a direct participant of *zui* 'drunk' (since there is only one participant in the state of being drunk) Hence, it is an indirect causer

non: instead, it is based on full interpretation (Chomsky 1986). Based on this approach, it is clear that we do not require "argument-sharing" to form a compound. In compounds such as *ti-puo* 'kick-broken' exemplified in (10), since *puo* 'broken' is predicated of *qiu-xie* 'sneaker', it is clear that the latter does not have to be an explicit participant of the event *ti* 'kick'. Thus, the whole compound *ti-puo* 'kick-broken' can indeed be predicated of a subject NP which is the agent participant of the event of kicking while "ignoring" the "patient" participant of the event. Note that while *qiu-xie* 'sneaker' is not the patient participant of the event, it is an indirect participant.

Consider now the difference between a referential NP and a non-referential NP with respect to compounds such as *qi-lei* 'ride-tired'. Li has indicated that given a compound such as *qi-lei* 'ride-tired', there are two possible interpretations. Examples (7) and (8) are repeated below.

(30)   from Li (1990a)

Baoyu qi-lei-le ma

Baoyu ride-tired-ASP horse

a. Baoyu rode the horse (and as a result he got) tired.

b. Baoyu rode the horse (and as a result the horse got) tired.

(31)   Baoyu qi-lei-le nei-pi ma

Baoyu ride-tired-ASP that-CL horse

a. Baoyu rode that horse (and as a result that horse got) tired.

b.*Baoyu rode that horse (and as a result he got) tired.

The question which arises here is why a referential NP will not induce ambiguity. First, we need to deal with the ambiguity in (30). Based on the analysis given so far, we do not expect the ambiguity because *ma* 'horse' is the one being predicated of by the adjectival verb *lei* 'tired'. In other words, the horse is the one which is tired according to this analysis. Before we proceed to discuss how this analysis accounts for the ambiguity, I would like to point out that not all speakers can get the read-

ing indicated in (30a) It appears that there is some dialectal variation with respect to the acceptability of the reading in (30a)

In the dialect which actually allows this reading, how does the reading come about? Intuitively speaking, when the reading in (30a) arises, the object NP *ma* 'horse' is not interpreted as a specific horse In other words, it is not treated as a referential NP This is comparable to the phrase *qi-ma* '(lit ride-horse) which is interpreted as 'horse-back riding', which does not use the 'horse' referentially Mandarin Chinese has plenty of phrasal verbs of this kind For instance, *tiao-wu* 'dance, (lit) jump-dance', *Wu* 'dance' in this case does not refer to a particular dance or a specific dance In short, the nouns in these cases are all used as part of the verb A comparable example in English is idiomatic expressions such as 'take advantage of' I propose that in (30a), *qi-lei-ma* 'ride-tired-horse' is in fact a complex verb, with the object NP incorporated to the verb After *lei* 'tired' has incorporated into the verb *qi* 'ride' and subsequent movement of *qi-lei* 'ride-tired' to the upper verb, the object NP then incorporates into the whole verbal complex, as shown in (32) [11]

(32)

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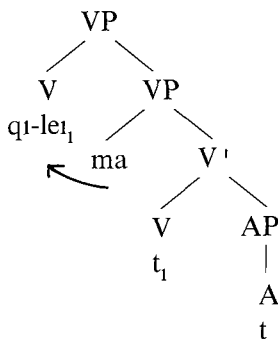
11 In Hale and Keyser (1993), examples such as (1) are ruled out by assuming that it is impossible to incorporate an internal subject NP (i e NP in Spec of VP) to the upper V

(1)*They wined into the bottles

   (c f He got wine into the bottles)

However, the example discussed in this paper can be distinguished from (1) In the example discussed here, the N is not incorporated into an empty V Instead, it is incorporated into a filled V Based on Hale and Keyser (1993), it appears that in English, V1 is always unfilled

The incorporated status of the object NP prevents it from being interpreted as the subject of *lei* 'tired' Thus, the syntactic subject NP, of which the whole veral complex [qi-lei-ma] is predicated, is interpreted as the subject of *qi* 'ride' as well as the subject of *lei* 'tired' In contrast, the specificity of the object NP is incompatible with an incorporated NP status Thus, the only compatible structure to (31) is a non-incorporated object NP analysis In this structure, the object NP is the only one which can be the logical subject of being tired since the adjectival verb *lei* 'tired' is predicated of this NP [12]

So far we have only talked about the non-problematic cases of this particular lexical analysis of compounding It is clear that using lexical relational structure, the problematic examples to Li's analysis can be accounted The question which arises then is whether or not this analysis can account for all the RVV compounds To answer this question, we need to consider the examples discussed in Huang (1989) (15)-(16) are repeated below

(33) from Huang (1989), (63)

    a ta ku-xing le

      he cry-awake ASP

      'He cried and became awake '

    b ta ku-xing-le   lisi

      he cry-awake-ASP Lisi

      'He cried and awoke Lisi '

---

12 A reviewer points out that the analysis here for *qi-lei* 'ride-tired' cannot be extended to account for compounds such as *chi-bao* 'eat-full', which only allows the external subject to be the affected argument Note that *chi-bao* 'eat-full' is basically an intransitive compound and there is only a case in which we see a transitive use, namely *chi-bao fan* 'eat rice and become full' Here, *rice* is used non-referentially This is clear from the fact that we cannot replace *rice* with for instance, *noodle* If the analysis presented in this paper is correct, then it is possible to ensure that *chi-bao* comes out as an intransitive verb the inner subject participates in the event of eating and this event, unless otherwise specified, has no object Thus, the compound will come out having an NP which will move to the sentential subject position, as in the case of intransitive *ku-xing* 'cry-awake' (see section 3 3)

(34) a. zhe-ping jiu zui-dao-le   lisi
         this-cl wine drunk-fall-ASP Lisi
         'This bottle of wine got Lisi drunk.'
    b. lisi zui-dao   le
         Lisi drunk-fall ASP
         'Lisi got drunk.'

As discussed above, Huang (1989) treated (34b) as a transitive use of *ku-xing* 'cry-awake' and (34a) as a causative. Though I will not adopt this particular implementation of the difference, I think that this way of expressing the distinction is quite appealing. Assuming the analysis given above, I will show below how the intransitive vs. transitive distinction in (33) can be acounted for. Further, I will show that the distinction between (33b) and (34b) is in fact a distinction between an "inherent causative verb" and a "surface causative verb", the fomer being derived lexically while the latter syntactically.
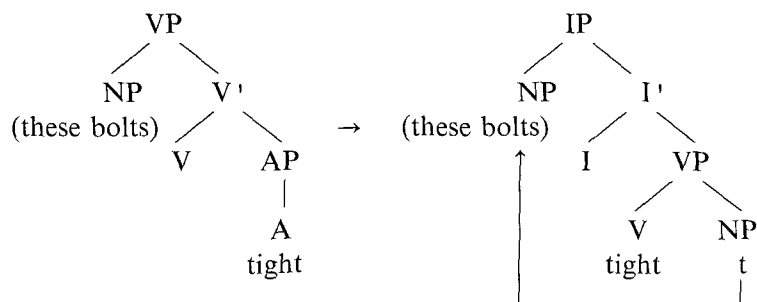
3.2. Lexical and Syntactic Causative

Huang (1989) considers compounds such as *ku-xing* 'cry-awake' to have a transitive counterpart. I argue here that they are similar to verbs such as *tighten* in English in that the latter can also project both transitive and intransitive (inchoative) syntactic verb phrases, as shown in (35).
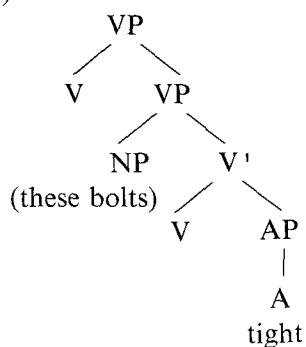
(35) a. Tom tightened these bolts.
    b. These bolts finally tightened.

H&K argues that the internal subject (the subject of the inner VP) in l-syntax is identified with the "affected argument". In (35b), it is clear that the s-syntactic subject is the affected argument. Thus, H&K posits (36) as the S-structure representation for (35b) and the corresponding LRS of *tighten* is (37).
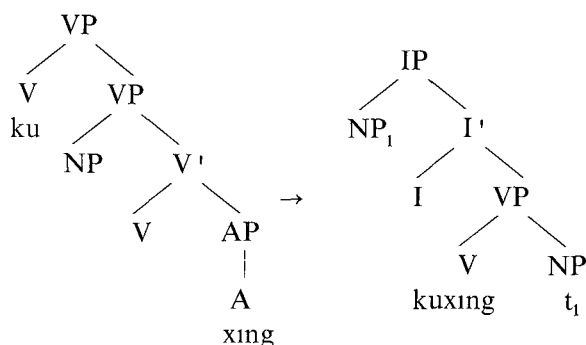
(36)

```
          VP                                    IP
        /    \                                 /   \
      NP      V'                             NP      I'
  (these bolts)  /  \        →         (these bolts)  /  \
              V      AP                              I      VP
                     |                                     /  \
                     A                                    V    NP
                   tight                               tight    t
```

(37)

```
           VP
         /    \
       V       VP
             /    \
           NP      V'
      (these bolts)  /  \
                   V     AP
                         |
                         A
                       tight
```
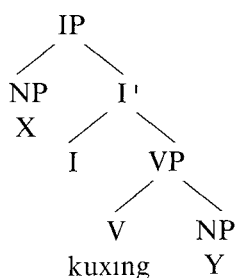
In (36), the s-syntactic subject is literally an internal subject. As we can see from (37), the transitive counterpart of *tighten* is in fact a causative verb while the intransitive/inchoative one is a non-causative.

I propose to account for the RVV compounds like *ku-xing* 'cry-awake' similarly. That is, the intransitive of *ku-xing* 'cry-awake' has an "internal subject" which is the affected element, which moves to the surface subject position at S-structure. On the other hand, the transitive *ku-xing* 'cry-awake' involves no movement. The whole VP is predicated of an external NP. (38) and (39) are representations of these two versions respectively.

(38)

```
        VP
       /  \
      V    VP                      IP
      ku  /  \                    /  \
         NP   V'               NP₁    I'
             /  \                    /  \
            V    AP    →           I    VP
                 |                     /  \
                 A                    V    NP
                xing              kuxing   t₁
```

(39)

```
        IP
       /  \
      NP   I'
      X   /  \
         I    VP
             /  \
            V    NP
          kuxing  Y
```

Consider now the difference between *ku-xing* 'cry-awake' and *zui-dao* 'drunk-fall' From (38), it is clear that *ku-xing* 'cry-awake' is an inherent causative The s-syntactic subject bears a direct causation relationship with the s-syntactic object (internal subject in l-syntax), which is the affected argument In contrast, in *zui-dao* 'drunk-fall', the relationship between the causer and the causee is indirect I suggest here that this type of causation is syntactic causation Here, I crucially rely on the difference between *xing* 'awake' and *dao* 'fall' In particular, the former is an adjective in l-syntax whereas the latter is a verb [13]

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13 One reviewer points out the difference between *ku-xing* 'cry-awake' and *cao-xing* 'disturb-awake' the latter cannot be used intransitively and it can take an inanimate subject The transitive nature of this compound, under this analysis, appears to be related to the impossibility of moving the object NP to the subject position in *s-syntax* I do not have an answer as to what prevents it from moving in this case However, the fact that the compound can take an inanimate subject is related to the fact that the first member of the compound *cao* 'disturb' can take an inanimate subject Thus, selectional properties remain in a compound

I propose that the LRS of *zui-dao* 'drunk-fall' is (40). As mentioned earlier, in H&K, VP's are not predicative in l-syntax. Due to the verbal status of *dao* 'fall', the resultative compound *zui-dao* 'drunk-fall' has the lexical structure shown in (40), which is an example of pure causatives, as shown earlier in (20). At S-Structure, the verb phrase headed by *zui-dao* 'drunk-fall' is predicated of an external NP. We thus have the "intransitive" *zui-dao* 'drunk-fall'. In addition, an extra causative projection can be added onto the representation at S-structure and a syntactic causative construction is derived, as shown in (41).

(40)
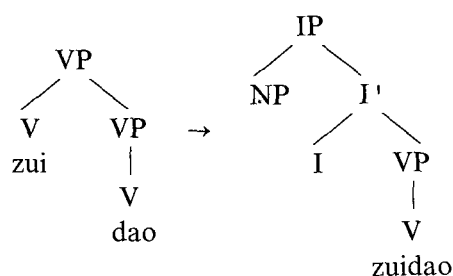
(41)
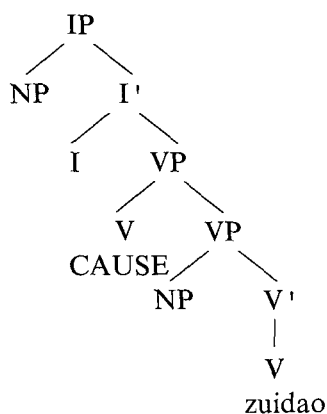
This syntactic causative is quite productive, as we can see in examples associated with verbs such as *xiao-si* 'laugh-die' and *qi-si* 'angry-die', as shown in (42)-(43).

(42) ta xiao-si   wo le

s/he laugh-die I   ASP

'S/he makes me laugh to the extent that I feel dead.'

(43) ta qi-xi   wo le

s/he anger-die I   ASP

'S/he makes me angry to the extent that I feel dead.'

We have noted earlier that Huang's analysis of syntactic causative makes the wrong prediction with respect to verbs such as *zui-lei* 'chase-tired' because this type of compound can never have an indirect causer. We have analyzed such compounds as inherent causative in which the second member of the compound is predicated of an inner subject and the whole compound is then predicated of a syntactic subject at s-syntax. The question which arises here is what prevents the syntactic causative from being added onto the output of the LRS of *zui-lei* 'chase-tired'. In other words, what differentiates *zui-dao* 'drunk-fall' from *zui-lei* 'chase -tired' in that the former can enter into a syntactic causative "frame" while the latter cannot. I think that the answer lies within the participants of events of each member of the compound. In the former case, the surface subject is both the affected argument of *dao* 'fall' and the participant of *zui* 'drunk'. Because of this, it can also enter the syntactic causative frame. On the other hand, in the case with verbs such as *zui-lei* 'chase-tired', if a syntactic causative projection is added onto the structure at S-structure, then the compound verb cannot be predicated of a normal subject, which will be interpreted as a participant of the event indicated in *zui-lei* 'chase-tired'. Due to the number of participants of events and syntactic predication, compound verbs such as *zui-lei* 'chase-tired' cannot have a syntactic causative counterpart.

Lastly, going back to the examples in (3) and (5), we can see that the analysis leads to desirable predictions. First, with respect to the compound *qi-ku* 'annoy-cry', it should be noted that this compound also has an intransitive use, such as *baoyu qi-ku-le* 'Baoyu is annoyed and
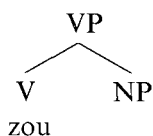
cried.' This is not surprising if we treat the intransitive one to have the LRS in (44), with *ku* 'cry' as a noun (as H&K notes, unergative verbs have the LRS as *laugh*):

(44)

```
        VP
       /\
      /  \
     V    VP
     qi   /\
         /  \
        V    NP
             |
             N
             ku
```
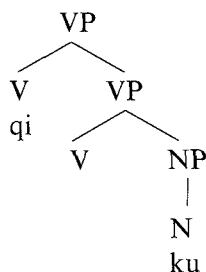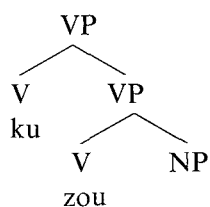
In s-syntax, the compound *qi-ku* can be predicated of an external NP and we have the intransitive version or it can come under the CAUSE verb, which will provide an extra argument and we then have the transitive counterpart. Furthermore, under this account, the compound *xiao-feng* 'cry-insane' in (5a) can be either transitive or intransitive, just like the compound *ku-xing* 'cry-awake'. My judgement coincides with this prediction, though it is the case that the transitive reading is a bit odd. Finally, the transitive nature of *ku-zou* 'cry-leave' will not be related to pragmatics. Instead, it is due to the LRS of the verb *zou* 'leave'. Based on H&K's proposal, it will be reasonable to suggest that *zou* 'leave', being an unaccusative verb, has the LRS in (45) and the LRS of *ku-zou* 'cry-leave' is shown in (46). Thus, *ku-zou* 'cry-leave' always has an object.

(45)

```
        VP
       /\
      /  \
     V    NP
     zou
```

(46)

```
        VP
       /  \
      V    VP
     ku    / \
          V   NP
         zou
```

In sum, I have presented an account of RVV compounds which incorporates a lexical approach based on Hale and Keyser's recent work and a syntactic approach. There are certainly many cases that I have not covered and I believe that if we look further into the LRS of each verb, we will gain a much better understanding of the nature of compounding in Mandarin Chinese.

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