On *de/bu* and the Syntactic Nature of Resultative Verbal Compounding[*]

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By presenting a detailed syntactic analysis of two peculiar elements, "potential modality items" *de* and *bu*, intervening between the two components, V(erb) and R(esult), of Resultative Verbal Compounds (RVCs) from Mandarin Chinese, this paper argues that there is an inner modal projection De^0 generated between V and R licensed by $Modal^0$ and the familiar quantificational intervention/ blocking effects observed in *dou*-quantifications and *A-not-A* questions have an analogue in *de/bu* constructions of RVCs. It is proposed in this paper that the inner modal De^0 and $Modal^0$ share the same potential modality feature [M], either [$M_{possibility}$] or [$M_{ability}$], and the correlation between De^0 and $Modal^0$ is derived by an LF X^0/head-movement from De^0 to $Modal^0$. The dependency between De^0 and $Modal^0$ must obey locality constraints (Relativized Minimality) and analogous quantificational intervention effects found in *de/bu* constructions are given as evidence for the LF X^0/head-movement approach.

Key words: Mandarin Chinese, modal, potentiality, blocking effects, resultative compound

1. Introduction

The term Resultative Verbal Compound (RVC) in Mandarin Chinese refers descriptively to a combination usually composed of two components, namely V (Verb) and R (Result), on the surface. A sentence that contains an RVC as exemplified in (1) is

a type of Resultative Construction (RC) that conveys a TELIC event consisting of two sub-events, an ACTION denoted by V and a RESULT denoted by R, respectively:

(1) Lisi **kan-dao**(-le) zhe-ke shu.
     Lisi chop-fall-PERF this-CL tree
     "Lisi chopped the tree down."

Generally, no element can intervene between the compound V and R of RVCs.[1] However, two particular elements, *de* and *bu*, the so-called "potential modality items", can exceptionally appear between V and R, as shown in (2):

(2) Lisi *kan-**DE/BU**-dao* zhe-ke shu.
     Lisi chop-DE/BU-fall this-CL tree
     "Lisi can/cannot chop the tree down."

Semantically, *de/bu* sentences are usually taken to be comparable to sentences that are constructed by the modal *neng/bu-neng* 'can/cannot', as shown in (3).

(3) Lisi **neng/bu-neng** *kan-dao* zhe-ke shu.
     Lisi can/not-can chop-fall this-CL tree
     "Lisi can/cannot chop the tree down."

Both (2) and (3) convey some modality meanings: both (2) and (3) can be interpreted as either an epistemic modality meaning {It is possible/impossible for Lisi to chop the tree down.} or a deontic modality meaning {Lisi is able/unable to chop the tree down.}[2] (cf. Tsai 2001). I shall argue in this paper that semantically *de/bu* sentences like (2) can be interpreted the same as sentences that contain the modal *neng/bu-neng* like (3).

If (2) and (3) convey the same semantics, several questions might be raised: (i) Why would *de/bu* occur between V and R as [V-*de/bu*-R] on the surface instead of appearing at the preverbal position similar to [*neng/bu-neng* V-R]? (ii) Do *de/bu* sentences syntactically show any distributional differences from that of *neng/bu-neng* sentences? (iii) What would the syntax and semantics of *de/bu* constructions tell us?

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[1] Another type of RVC is categorized as "real lexical compound". RVCs like *gai-shan* 'change-good (improve)', *tui-guang* 'promote-broad (popularize)', *jia-chang* 'extend-long (lengthen)', etc., should be treated as lexically derived **words** instead of **phrases**, since nothing can intervene between the two components, not even *de/bu* (**gai-de/bu-shan*, **tui-de/bu-guang*, **jia-de/bu-chang*). I would like to separate this kind of **real lexical compound** from the RVC that allows the intervention of *de/bu* in the discussion.

[2] Besides the epistemic <u>possibility</u> and the deontic <u>ability</u> meanings indicated above, *neng/bu-neng* also conveys a meaning of 'permission'. I shall discuss the differences in §2.1.

The goal of this research is to investigate these puzzles and develop an appropriate explanation for the intervening elements *de* and *bu*.

I propose that *de/bu* are an indication of an inner modal head *De* structurally generated between V and R, that is, *De* is not generated at the same structural position as *Modal* but lower. The proposed argument is supported by the fact that *de* and *neng* can coöccur in a single sentence. Based on the semantic parallelism between *de*-sentences and *neng*-sentences, I further argue that *De* is licensed by *Modal* and they share the same potential modality feature [M], either [$M_{possibility}$] or [$M_{ability}$]. I argue that *De* and *Modal* must be syntactically related in order to check their relevant features. The correlation between *De* and *Modal* is a derivation via a syntactic LF movement which has to obey locality constraints (Relativized Minimality). Evidence supporting this proposal comes from familiar quantificational intervention effects discussed by Lee (1986), Cheng (1995), Beck (1996a), Beck & Kim (1997), Soh (1998, 2001), and others. I shall show that *de/bu* constructions have analogous intervention effects when interacting with four constructions: passive constructions, *ba*-constructions, focus elements, and manner adverbs. There are two possibilities to categorize the LF movement: either an X^0/head-movement or an XP/A-bar movement. By providing syntactic evidence, I shall argue that the semantic dependency between *De* and *Modal* is derived by an X^0/head-movement from De^0 to $Modal^0$ at LF.

This paper is organized as follows. In §2, I discuss the modality status of *de/bu* and *neng/bu-neng* and argue that *de/bu* sentences and *neng/bu-neng* sentences are semantically interpreted the same. Based on the *neng-de* coöccurrence, I suggest in §3 that *de* projects as a different projection from the modal *neng*. I also show that *de-* and *neng*-sentences syntactically behave differently when interacting with passives, *ba*-sentences, focus elements, and manner adverbs which significantly trigger intervention effects in *de*-sentences but not in *neng*-sentences. Remarkably, *dou*-quantifications and *A-not-A* questions, which are well known as being derived by undergoing LF movement, are also affected by the same intervention/blocking effects as those in *de*-constructions when interacting with these four constructions. The status of *de/bu* is discussed in §4 where I provide a short history of *de/bu* and argue that *de/bu* are an X^0 level category projecting as De^0. I further suggest that the dependency between *De* and *Modal* is built up by LF movement, that is, *De* must check its relevant feature [M] with *Modal*. There are two possibilities for the LF movement, X^0 and XP movements. Section 5 examines in detail the four constructions that trigger intervention effects in *de*-constructions and suggests that the LF movement in *de*-constructions should be an X^0/head movement, rather than an XP/A-bar movement. In §6, I discuss the fact of *neng-de* coöccurrence in a single sentence and its single/double modality interpretation. Finally, §7 summarizes the account and provides a brief discussion and importance of the research.

2. Semantics of *de/bu* and *neng/bu-neng*

Semantically both *de/bu* sentences and *neng/bu-neng* sentences express either a possibility or an ability reading[3] (cf. Tsai 2001). Accordingly, both (2) and (3) can be interpreted as an epistemic modality meaning {It is possible/impossible for Lisi to chop the tree down.}, or a deontic modality meaning {Lisi is able/unable to chop the tree down.}.

In addition to the possibility and ability, *neng/bu-neng*, like English *can/cannot*, also express a permission reading. Thus, (3) can be interpreted as a reading on the question of whether or not the external argument[4] is allowed to chop down the tree by an

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[3] As indicated in Tsai (2001), with appropriate contexts and predicates, it is possible to tease apart the possibility and ability readings. (Tsai (2001) focuses on the specificity of the subject.) In (i), I use ordinary subjects and the *neng-de* coöccurrence not shown in Tsai (2001). I take only the contexts and predicates from Tsai (2001: 34):

    (i) a. Lisi (***bu-)neng*** qu-***de*-liao** Taiwan.
          Lisi not-can go-DE-finish Taiwan
          "It is possible/impossible for Lisi to go to Taiwan."

      b. Lisi (***bu-)neng*** pa-***de*-shang** Yu Shan.
          Lisi not-can climb-DE-UP Yu Shan
          "Lisi is not able/unable to climb Yu Mountain."

[4] The type of Vs forming RVCs is not restricted to verbs of ACTION, such as 'read', 'chop', etc. given in this paper. Verbs of psychological activities, such as *wang* 'forget', *xia* 'scare', etc., can also form RVCs and take *de/bu*. In (i), the external argument *Zhangsan* is an EXPERIENCER (in (ia)) or an CAUSER (in (ib)), rather than an AGENT.

    (i) a. Zhangsan ***wang-de/bu*-liao** qi-nian-qian-de shi.
          Zhangsan forget-DE/BU-finish seven-year-ago-'s matter
          "Zhangsan can/cannot forget the matter that happened seven years ago."

      b. Zhangsan ***xia-de/bu*-dao** Lisi
          Zhangsan scare-DE/BU-fall Lisi
          "Zhangsan can/cannot scare Lisi."

Moreover, *de/bu* can also appear in examples like (ii) where the external argument is not an AGENT but an inanimate object undergoing the ACTION of arriving and the V is an unaccusative verb.

    (ii) huoche ***dao-de/bu-liao*** zhan
        train arrive-DE/BU-finish station
        "The train has/does not have the potentiality/possibility to arrive the station."

Throughout the paper, I shall use the term "external argument" in general to define the individual or the object that is performing or undergoing an ACTION or experiencing a psychological activity (EXPERIENCER). The important perspective of using the term is to show whether the individual or the object has the potentiality to complete or achieve the RESULT when interacting with *de/bu*. I shall discuss potentiality more in this section.

authority or by conditions. However, the permission reading is not available in *de/bu* sentences. I suggest that *de/bu* sentences correspond to *neng/bu-neng* sentences in their ability or possibility readings but not in the permission reading. I shall provide three arguments and argue that *de/bu* sentences and *neng/bu-neng* sentences are semantically parallel to each other.

Li & Thomson (1981:56) state that *de* and *bu* have the effect of giving RVC compounds an affirmative and a negative potential meaning respectively. The potentiality meaning of *de/bu* in (2) then can be interpreted as either {It is (not) possible/There is (not) a potential situation for Lisi to chop the tree down.} or {Lisi has (does not have) the potential ability to chop the tree down.}. To integrate the two modality meanings, possibility and ability, of *de/bu* constructions and *neng/bu-neng* constructions, I follow Li & Thompson (1981) in using the term potentiality throughout this paper to define these two intervening elements *de* and *bu* in RVCs stating whether the external argument has the potentiality (namely, the possibility for/the ability of the external argument) to achieve successfully or complete a certain RESULT by performing or undergoing the ACTION/psychological activity denoted by V.

2.1 The modality status of *de/bu* and *neng/bu-neng*

Both *de*-sentences and *neng*-sentences bear potentiality meanings, possibility or ability. Besides the two meanings, *neng*-sentences also convey a permission reading, as indicated in (4a-iii). By using the permission verb *yun-xu*, however, only the permission, rather the possibility or ability reading, is available in *neng*-sentences, as shown in (4b). On the other hand, *de*-sentences cannot be freely combined with the permission verb *yun-xu* 'allow/permit', as illustrated in (4c).

(4) a. Lisi ***neng*** *zou-chu* zhe-ge fangjian.
         Lisi can   walk-out this-CL room
         i. "Lisi is able to walk out of the room."   (ability)
         ii. "It is possible for Lisi to walk out of the room."   (possibility)
         iii. "Lisi is allowed to walk out of the room."   (permission)
     b. laoshi **yun-xu** Lisi ***neng*** *zou-chu* fangjian. (permission only)
        teacher allow   Lisi can   walk-out this-CL room
        "(lit.) The teacher allowed Lisi to walk out of the room."
     c.*laoshi **yun-xu** Lisi *zou-de-chu* zhe-ge fangjian. (*permission)
        teacher allow   Lisi walk-DE-out this-CL room
        "(Intended) The teacher allowed Lisi to walk out of the room."

Accordingly, while *neng*-sentences convey ability, possibility or permission readings, *de*-sentences correspond ability or possibility, rather than permission, reading to that of

neng-sentences.[5] Another fact to show *de*-sentences lacking a <u>permission</u> reading is from the coöccurrence of *neng* and *de* in a single sentence. As indicated in Cheng & Sybesma (2002), when *neng* and *de* coöccur in a single sentence, such as (5a), the sentence does not convey <u>permission</u> meaning. The incompatibility of <u>permission</u> use of *neng-de* coöccurrence can be diagnosed by combining (5a) with *yun-xu* 'allow/permit'. Compare (5b) with (4b) and (4c):

(5)   a. Lisi (***bu-)neng*** kan-***de***-dao   zhe-ke   shu.
          Lisi   not-can   chop-DE-fall this-CL   tree
          "Lisi can chop the tree down."
     b.*laoshi **yun-xu** Lisi   ***neng*** kan-***de***-dao   zhe-ke   shu.
          teacher allow   Lisi   can   chop-DE-fall this-CL   tree
          "(Intended) The teacher allowed Lisi to chop the tree down."

As analyzed in Lin & C.-C. Tang (1995), the difference between <u>possibility</u> and <u>ability</u> readings is attributed to a structural distinction between control and raising modals. Mandarin modals such as *neng(gou)* '(ability) can', *hui* '(volition) will', *gan* 'dare', and *xiang* 'want' are deontic modals, whereas *(ke)neng* '(possibility) can', *yinggai* 'should', *hui* '(future) will', *keyi* 'may' and *bixu* 'must' are epistemic modals. Deontic modals contain a control construction while epistemic modals have a raising construction.

One piece of evidence provided by Lin & Tang (1995) to show the structural differences between epistemic and deontic modals is the licensing of an intensifying *ziji* 'self' in the sentences.[6] The intensifying function of *ziji* may intensify either a subject or the predicate phrase that follows it. The matrix subject position of an epistemic modal sentence, since it contains a raising construction, is unfilled at D-structure. It follows that in a deontic modal sentence, which contains a control construction, the intensifier *ziji* thus is able to occur with either the matrix subject or the embedded subject position, as shown in (6a). In contrast, the intensifier *ziji* can only occur with the embedded subject but not with the matrix subject, as illustrated in (6b).

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[5] The fact that *de*-sentences convey <u>potentiality</u> meanings does not add to any incomparability of *de* and *neng*. On the contrary, it actually narrows down the scope of discussion concerning the semantic readings of *neng*-sentences by eliminating the <u>permission</u> use of *neng*. <u>Potentiality</u> might not be the best term to cover both <u>possibility</u> and <u>ability</u>. For the purpose of integration, however, the term separates the <u>permission</u> from <u>possibility</u> and <u>ability</u> of *neng*. After §2, the <u>permission</u> use of *neng* will not be discussed.

[6] Lin & C.-C. Tang (1995) provide several pieces of evidence to support the argument of the structural differences between deontic Modals and epistemic Modals. For detailed discussion, please refer to their article.

(6) a. Lisi (**ziji**) ***neng(gou)/bu-neng(gou)*** [(**ziji**) *xie-wan*   zuoye] (deontic)
　　　 Lisi self   can/not-can   self   write-finish homework
　　　 "Lisi is able/unable to finish reading the homework by himself."
　　 b. Lisi (***ziji**) *(ke)neng/bu-(ke)neng* [(**ziji**) *xie-wan*   zuoye]. (epistemic)
　　　 Lisi   self can/not-can   self   write-finish homework
　　　 "It is possible/impossible for Lisi to finish reading the homework by himself."

Moreover, the intensifier *ziji* may optionally appear in *de/bu* sentences, as shown in (7a), whereas when *ziji* interacts with the *neng-de* coöccurrence (5a), the sentence denotes three possible readings: p̲ossibility, a̲bility and a double-modality reading, as shown in (7b):

(7) a. Lisi (**ziji**)   *xie-**de/bu**-wan*   zuoye.
　　　 Lisi self   write-DE/BU-finish homework
　　　 "Lisi can/cannot finish reading the homework by himself."
　　 b. Lisi (***ziji**)/(**ziji**) ***neng/bu-neng*** [(**ziji**) *xie-**de**-wan*   zuoye].
　　　 Lisi self /self can/not-can   self write-DE-finish homework
　　　 i. "It is possible/impossible for Lisi to finish reading the homework by himself."
　　　 ii. "Lisi is able/unable to finish reading the homework by himself."
　　　 iii. "It is possible/impossible for Lisi to (be able to) finish reading the homework
　　　　　 by himself."

It is not obvious to tell from the surface whether the intensifier *ziji* in (7a) is with the matrix subject or with the embedded subject, it is, however, clear that the *de*-sentence (7a) denotes either p̲ossibility or a̲bility reading and the double-modality reading as that in (7b-iii) is not available. One thing, though, might be worth addressing concerning the possible reading in (7a). As indicated in footnote 3, when appropriate contexts and predicates are given, we can accentuate the p̲ossibility or a̲bility reading (Tsai 2001). Although the sentence (7c) without *ziji* (= footnote 3 (ia)) is prominent with a p̲ossibility reading, with the appearance of *ziji* in (7c), the a̲bility reading (7c-ii) emerges on top of the p̲ossibility reading (7c-i).

(7) c. Lisi **ziji**   qu-***de/bu***-liao   Taiwan.
　　　 Lisi   self   go-DE/BU-finish   Taiwan
　　　 i. "It is possible/impossible for Lisi to go to Taiwan by himself."
　　　 ii. "Lisi is able/unable to go to Taiwan by himself."

Since both *neng* and *de* denote p̲ossibility and a̲bility, the *neng-de* coöccurrence (5a) may contain four possible readings: (i) p̲ossibility (both *neng* and *de*), (ii) a̲bility (both *neng* and *de*), (iii) p̲ossibility *neng* + a̲bility *de* and (iv) a̲bility *neng* + p̲ossibility *de*.

The last possibility is ruled out by a structural problem,[7] the other three readings are restructured as (8):

(8) Lisi (**bu-**)***neng*** kan-***de***-dao   zhe-ke   shu.
     Lisi not-can   chop-DE-fall   this-CL tree
     a. "It is possible/impossible for Lisi to chop the tree down."
     b. "Lisi is able/unable to chop the tree down."
     c. "It is possible/impossible for Lisi to be able to chop the tree down."

The above discussion serves to show that *de*-sentences like (2) correspond to the potentiality meaning, rather than the permission meaning, of *neng*-sentences like (3). In the next section, I shall argue that semantically *de*-sentences are interpreted as *neng*-sentences, that is, (2) and (3) are interpreted with the same potentiality meanings.

2.2 Semantic interpretation of *de/bu* sentences and *neng/bu-neng* sentences

There are at least three factors suggesting that the potentiality meaning expressed in *de*-sentences is semantically parallel to that in *neng*-sentences.

(A) Both *de*- and *neng*-sentences involve only the potentiality of the completion of the RESULT denoted by R. Whether the ACTION has been initiated is underdetermined.

(B) Both *de*- and *neng*-sentences denote a non-assertion reading of the RESULT. Temporally they are not related to past or present tense and aspectually they are incompatible with the perfective *-le* or the experiential *-guo* which assert perfectivity.

(C) In some dialects of Chinese, the counterparts of *de/bu* and *neng/bu-neng* even have the same phonological form, such as *e/be* in Taiwanese.

2.2.1 Initiation of the ACTION (V) and potentiality of completion of RESULT

On the surface, *neng* appears higher than both V and R, whereas *de* occurs between them. A question might arise: does the initiation of the ACTION depend on the surface position of *de* or *neng*? Light (1977), based on their different surface positions, claims that the material that follows *de* or *neng* should be within their domain. He argues that "the AGENT of an RVC constructed with *de* must have initiated the primary

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[7] The impossible reading with ability *neng* and possibility *de* in (8) is due to the fact that structurally the epistemic possibility modal is located higher than the deontic ability modal (cf. Lin &Tang 1995, Cinque 1999) and the licensing of possibility *de* from a high *Modal* position would be blocked by the ability *neng* which is located lower. More details will be discussed in §3 and §6.

ACTION referred to by the compound …, whereas the use of *neng* suggests the possibility of initiating or not initiating the ACTION in question." Li & Thompson (1981), following Light (1977), maintain that the material that follows *de* or *neng* is in their scope. The previous claims propose that the initiation of the ACTION depends on the surface positions of *de* and *neng*: in *de*-sentences only R is within the domain of *de* so the ACTION must have been initiated, whereas both V and R are within the domain of *neng* so the initiation of the ACTION in *neng*-sentences is not determined. In contrast, Y.-C. Li (1988) suggests that although *de* appears between V and R on the surface, the extent of the *de* still applies to the both V and R. In the English counterpart *John can(not) finish writing the homework by tomorrow*, the speaker does not mention whether or not John has started writing or not but focuses on the fact that John will not finish the homework by tomorrow. I argue, following Y.-C. Li (1988), that the fact that *de* and *neng* appear in the different surface positions does not necessarily entail that they should be interpreted in their S-Structure positions. What matters here is the potentiality of completion of the RESULT and the question of whether the ACTION has been initiated or not is underdetermined. The examples (9) and (10) can be used to diagnose the initiation of ACTION in *neng*-constructions and *de*-constructions:

(9) a. Lisi **xie-*bu*-wan**   zuoye,   yinwei ta genben hai mei dong-bi.
        Lisi write-BU-finish homework because he after.all yet not move-pen
        i. "Lisi cannot finish the homework, because he hasn't started writing it yet."
        ii. "It is impossible for Lisi to finish the homework, because he hasn't started writing it yet."
    b. Lisi xie-le   san-tian zuoye,   haishi **xie-*bu*-wan**   (zuoye).
        Lisi write-PERF three-day homework yet   write-BU-finish   homework
        i. "Lisi has been writing the homework for three days, yet he wasn't able to finish writing it."
        ii. "Lisi has been writing the homework for three days, yet it is impossible for him to finish writing it."

(10) a. Lisi ***bu-neng*** **xie-wan**   zuoye,   yinwei ta genben hai mei dong-bi.
        Lisi   not-can   write-finish homework because he after.all yet not move-pen
        i. "Lisi cannot finish the homework, because he hasn't started writing it yet."
        ii. "It is impossible for Lisi to finish the homework, because he hasn't started writing it yet."
    b. Lisi xie-le   san-tian zuoye,   haishi ***bu-neng*** **xie-wan**   (zuoye).
        Lisi write-PERF three-day homework yet   not-can write-finish homework
        i. "Lisi has been writing the homework for three days, yet he wasn't able to finish writing it."
        ii. "Lisi has been writing the homework for three days, yet it is impossible for him to finish writing it."

Both of (9a) and (10a) suggest that the deadline is approaching and ensure that *Lisi* does not have the potentiality to finish writing his homework on time because he has not even started writing it yet. On the other hand, both (9b) and (10b) ensure that *Lisi* does not have the potentiality to finish writing his homework although he has been writing

for three days. It is thus clarified by (9) and (10) that *de*-sentences are semantically equivalent to *neng*-sentences in that both concern the potentiality of the external argument in completing the RESULT and both contain an unspecified reading in that the ACTION may or may not have been initiated. Hence, *de/bu* cannot be interpreted simply based on the S-Structure position, instead, *de/bu* show the same domain interpretation as *neng/bu-neng*.

2.2.2 Non-assertion of the accomplishment of RESULT

As indicated in the previous section, both *de*-sentences and *neng*-sentences convey the <u>potentiality</u> of completing the RESULT, while the question of whether the ACTION (V) has been initiated or not is underdetermined. In fact, both *de*-sentences and *neng*-sentences merely convey the <u>potentiality</u> of completing the RESULT but do not assert that the RESULT has or has not been accomplished. In another word, the non-assertion of the RESULT in *de*-sentences and *neng*-sentences is not temporally related to past or present tense but does conflict aspectually with perfectivity. One may consider the following examples in (11)[8] denoting realized events.

(11) a. Zhangsan *zuotian* (hai) ***neng** tui-kai*   na-shan men, *jintian* jiu ***bu-neng*** le
     Zhangsan yesterday still can push-open that-CL door today then not-can PRT
     "Yesterday, Zhangsan could open the door by pushing it, but he cannot do it today."

    b. Zhangsan *zuotian* (hai) *tui-**de**-kai*   na-shan men, *jintian* jiu *tui-**bu**-kai*   le
     Zhangsan yesterday still push-DE-open that-CL door today then push-BU-open PRT
     "Yesterday, Zhangsan could open the door by pushing it, but he cannot do it today."

However, both (11a) and (11b) do not assert the accomplishment of the RESULT, that is, the RESULT may or may not have happened. The non-assertion in both (11a) and (11b) can be diagnosed by giving certain contexts. Assuming Zhangsan was healthy yesterday and he would not have a problem opening the door by pushing it, but Zhangsan is so sick today that he cannot do it now. Both (11a) and (11b) express that it was possible for Zhangsan (or Zhangsan was able) to open the door yesterday. Both (11a) and (11b) also express either a realized situation that Zhangsan has actually opened the door yesterday, or a non-realized situation that Zhangsan did not open the door yesterday even though it was possible for Zhangsan (or Zhangsan was able) to do so. Accordingly, I propose that both *de*-sentences and *neng*-sentences do not assert the accomplishment of the RESULT. Moreover, *neng* and *de* are not temporally related to tense. This can be tested by replacing *zuotian* 'yesterday' and *jintian* 'today' in (11)

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[8] The examples in (11) are generously provided by the reviewer.

with *mingtian* 'tomorrow' and *houtian* 'the day after tomorrow' respectively. Under the future tense, it is not possible that the events can be realized. Thus, potential modality sentences do not assert the accomplishment of the RESULT and are not temporally related to tense. Hence, sentences that assert a <u>perfectivity</u> meaning of events like those contain perfective marker *-le* or experiential marker *-guo* are then not compatible with the potential modals *de/bu* or *neng/bu-neng*:

(12) a. Lisi *kan-**de/bu**-wan*(*-***le**/*-**guo***) zhe-ben shu.
     Lisi read-DE/BU-finish-LE/-GUO this-CL   book
     "Lisi can/cannot finish reading this book."

   b. Lisi ***(bu)-neng*** *kan-wan*(*-***le**/*-**guo***) zhe-ben shu.
     Lisi not-can   read-finish-LE/-GUO this-CL   book
     "Lisi can/cannot finish reading this book."

The two aspectual markers *-le* and *-guo* assert the perfectivity of the events and are possibly related to past tense (cf. Ross 1995), whereas the potential modal sentences, as analyzed above, are not temporally related to past or present tense (cf. Iatridou 1990, Laka 1993). Aspect and modal should be consistent in terms of their semantic temporal properties. The incompatibility of the potential modals and perfective markers in (12) is then attributed to such a semantic reason. Thus, we distinguish the potential modals from perfective markers with respect to their non-assertion and assertion properties.

2.2.3 Phonological forms in other dialects

One more piece of evidence to argue for the semantic parallelism between *de*-sentences and *neng*-sentences is from a Chinese dialect, Taiwanese. In Taiwanese, the counterparts of the infix and the modal share the same phonological form, *e(tang)* 'can' and *be(tang)* 'cannot':[9]

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[9] One may argue from the examples (i) that Taiwanese does not always have RVCs of the kind found in Mandarin:
   (i) a. Zhangsan ***chi-ni**-le*   niurou mian.   (Mandarin)
         Zhangsan eat-bored-PERF beef   noodle
      b.*Ong-e ***jia-sen***   guba mi.   (Taiwanese)
         Ong-e eat-bored beef noodle
   However, the grammaticality of (ib) might be improved in two ways: first, by adding an adverb *yik-kieng* 'already' and *a*, an inchoative marker implying some change has occurred:
   (ii) Ong-e **yik-kieng** *jia-sen* guba   mi   **a**.
         Ong-e already   eat-sick beef   noodle INCH
   Second, by reduplicating the main predicate V and adding the inchoative marker *a*:

(13) a. Li-e **xia-*e(tang)/be(tang)*-liao**   hit-di^{N}u^N pue.
  Li   write-E/BE-finish   that-CL   letter
  "Li can/cannot finish writing the letter."
 b. Li-e ***e(tang)/be(tang)* xia-liao**   hit-di^{N}u^N pue.
  Li   can/cannot   write-finish   that-CL   letter
  "Li can/cannot finish writing the letter."

R. Cheng (1978) claims that (13a) implies that the external argument *Li-e* is likely to try to write, but the question is whether he is able to finish it, while (13b) makes no such implication, the external argument *Li-e* may or may not try to write, therefore, the *e(tang)/be(tang)* in (13a) cannot be interpreted as the same as the *e(tang)/be(tang)* in (13b). Cheng further argues that *e(tang)/be(tang)* in (13b) are auxiliaries and they share some syntactic feature as ability to precede a verb, to take an *A-not-A* question and to stand alone as a short answer. Similar to Light (1977) and Li & Thompson (1981), Cheng proposes, based on the surface position, that the domain of *e(tang)/be(tang)* depends on their syntactic positions, that is, *e(tang)/be(tang)* in (13a) has scope over R, but over both V and R in (13b). However, I shall show in (14) and (15),[10] corresponding to Mandarin (9) and (10), that even though *e(tang)/be(tang)* are in different surface positions in (13a) and (13b), it does not necessarily entail that they should be interpreted in their S-Structure positions. Instead, what matters here is the potentiality of completion of the RESULT and the question of whether the ACTION has been initiated or not is not at issue.

(iii) Ong-e **jia** guba mi   *jia-sen* **a**.
   Ong-e eat beef noodle eat-sick INCH

Another reason that (ib) does not sound as good as (ia) might be attributed to that the RESULT R is predicated of the external argument instead of the internal argument (see Wu (2003) for discussion). Under this situation, the V-reduplication in (iii) is essential since there are two complements to the main predicate V, the internal argument and the RESULT. The point here is to show that the semantic parallelism between *de*-sentences and *neng*-sentences can also be found in Taiwanese in that the modal and the infix share the same phonological form *e(tang)/ be(tang)*.

[10] Native speakers consider the sentences (14a) and (15a) acceptable even without the adverb, *yit-ting* 'definitely'. The addition of the adverb *yit-ting* 'definitely', however, may enhance the grammatical judgment of these two sentences in that both (14a) and (15a) ensure that *Lisi* does not have the potentiality to finish writing the letter on time because he has not even started writing it yet.

(14) a. Li-e (yit-ting) **xia-*be(tang)*-liao** hit-di^{N}u^N pue, yinwi yi ya be kaishi xia.
Li definitely write-BE-finish that-CL letter because he yet did.not start write
"Li is definitely cannot finish the letter, because he hasn't started writing it yet."

 b. Li-e yikkieng xia sa^N-kang-a, hit-di^{N}u^N pue ya **xia-*be(tang)*-liao**.
Li already write three-day-PERF that-CL letter yet write-BE-finish
"Li has been writing for three days, but it is not possible/he won't be able to finish writing it."

(15) a. Li-e (yit-ting) ***be(tang)* xia-liao** hit-di^{N}u^N pue, yinwi yi ya be kaishi xia.
Li definitely cannot write-finish that-CL letter because he yet did.not start write
"Li is definitely cannot finish the letter, because he hasn't started writing it yet."

 b. Li-e yikkieng xia sa^N-kang-a hit-di^{N}u^N pue ya ***be-(tang)* xia-liao**.
Li already write three-day-PERF that-CL letter yet not-can write-finish
"Li has been writing for three days, but it is not possible/he won't be able to finish writing it."

Based on the evidence provided in (9)-(15) above, I propose that *de*-sentences and *neng*-sentences are semantically interpreted the same: they both express <u>potentiality</u> meaning; both sentences show the potentiality of completion of the RESULT but the ACTION may or may not have been initiated; both sentences express a non-assertion reading of the RESULT and conflict with perfectivity; and the fact that they share the same phonological form in their Taiwanese counterpart supports the argument that they represent the same meaning components.

3. Syntactic differences between *de/bu* and *neng/bu-neng*

I have argued that *de*-sentence (2) and *neng*-sentence (3) are semantically parallel to each other denoting <u>potentiality</u> meanings and that the *neng-de* coöccurrence (8) may denote three possible modality meanings. One might suggest, according to the discussion in §2, that *de* cannot be interpreted in its S-Structure position, rather, it should be generated at the same positions as the modal *neng*, as argued in Tsai (2001). This same-position-modal analysis may be able to account for simple *de*-sentences like (2), simple *neng*-sentences like (3) and sentences with *neng-de* coöccurrence like (8c) since *neng* and *de* in these sentences are located in different modal positions: *neng* is an epistemic modal (<u>possibility</u>), while *de* is a deontic modal (<u>ability</u>). However, this analysis may not account for sentences with a single <u>possibility</u> meaning in (8a) and a single <u>ability</u> meaning in (8b) since *neng* and *de* in these types of sentences coöccur in a single sentence.

(8) Lisi (***bu-***)***neng*** kan-*de*-dao zhe-ke shu.
Lisi not-can chop-DE-fall this-CL tree
 a. "It is <u>possible/impossible</u> for Lisi to chop the tree down."
 b. "Lisi <u>is able/unable to</u> chop the tree down."
 c. "It is <u>possible/impossible</u> for Lisi to <u>be able to</u> chop the tree down."

There are three things that need to be addressed concerning the characteristics of *de* in the *neng-de* coöccurrence (8). First, although the *neng-de* coöccurrence (8c) is considered as a double-modal sentence containing two types of modals, epistemic and deontic, the sentences in (8a) and (8b) cannot be treated as a double-modal construction, in fact, each denotes only one modality meaning, epistemic possibility or deontic ability.

Second, the *de* in the *neng-de* coöccurrence (8) cannot be analyzed as the same *de* as that in Resultative or Descriptive constructions although they all share the same phonological form.[11] There are several pieces of evidence to show the distinctions among the three constructions. Crucially, as pointed out by Huang (1988b), the Resultative, but not the Descriptive, constructions may also take a form like (16a) (= Huang 1988: (3) not including the potential modal *neng*), in which the second verb/predicate *shi* 'wet' has its own subject NP *shoupa* 'handkerchief' appearing before it. Moreover, the *de* in the Resultative Construction (16a), unlike the *de* in (8), cannot coöccur with the modal *neng*. Furthermore, *de*-sentences contain a different word order from that in Resultative Constructions. The NP *shoupa* 'handkerchief' appears after the second verb/predicate *shi* as the object of the *de*-sentence (16b) and certainly the *de* can coöccur with the potential modal *neng*:

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[11] I appreciate the reviewer's drawing my attention to the possibility of *de* as the Resultative/Descriptive marker *de*. The reviewer kindly offers the following similar coöccurrence structures as possible counterexamples and provides his/her judgments to argue that the *de* in (8) and those acceptable sentences (ia), (ic), and (ie) is more like the Resultative/Descriptive marker *de* and the unacceptable sentences (ib), (id), and (if) have a stronger sense of potentiality than those that are acceptable:

  (i) a. Lisi ***nenggou*** chi-*de*-wan yi-da-wan niurou mian.
      Lisi can eat-DE-finish one-big-bowl beef noodle
      (Note: the judgments from (ia) through (if) are from the reviewer.)
    b.*Zhemo duo shiwu ***nenggou*** wei-*de*-bao wushi ren.
      Such much food can feed-DE-full fifty person
    c. Zhe-zhang chuang ***nenggou*** shui-de-xia wu-ge ren
      this bed can sleep-DE-down five-CL person
    d.*Lisi ***nenggou*** chi-*de*-liao yi-da-wan niurou mian
      Lisi can eat-DE-finish one-big-bowl beef noodle
    e. Lisi ***nenggou*** chi-*de*-xia yi-da-wan niurou mian
      Lisi can eat-DE-down one-big-bowl beef noodle
    f.*Zhe-ping yao ***nenggou*** du-*de*-si yi-da-qun ren
      this-bottle medicine can poison-DE-dead one-big-bunch person

However, there are two concerns about this argument. First, for the grammatical judgments of those in (i), native speakers (including myself) consider that all of the sentences in (i) are perfectly grammatical and all contain potentiality meanings. Second, given the evidence provided in (16)-(19) and (22a)-(22b) below, *de* in (8) cannot be analyzed as the Resultative/Descriptive marker *de* and the sentences in (i) therefore cannot be considered as counterexamples.

(16) a. tamen (*neng) ku ***de*** **shoupa** dou **shi**-le. (Resultative Construction)
they can cry DE handkerchief also wet-PERF
"They (*can) cried so much that even the handkerchief got wet."

b. tamen (*neng*) ku-***de*-shi** **shoupa** (*De*-Construction)
they can cry-DE-wet handkerchief
"They are able to cry and make the handkerchief wet."

As for Descriptive Constructions, they can coöccur with *neng*, as shown in (17a) below. While the negated perfective *mei-you* 'not-have' is not allowed to appear in *de*-sentences, as indicated in (17b), since it conveys perfectivity, which is not compatible with *de*-sentences, as discussed in §2.2.2, the empirical evidence shows that Descriptive Constructions are perfectively compatible with the negated perfective *mei-you* 'not-have'.

(17) a. tamen ((*bu-*)*neng*/***mei-you***) pao ***de*** hen **kuai**. (Descriptive Construction)
they not-can/not-have run DE very fast
"They can(not)/did not run fast."

b. tamen ((*bu-*)*neng*/****mei-you***) ku-***de*-shi** **shoupa** (*De*-Construction)
they not-can/not-have cry-DE-wet handkerchief
"They can(not)/*have not been able to cry and make the handkerchief wet."

Additionally, both Resultative and Descriptive constructions can freely form passives, as shown in (18a)-(19a) and *ba*-constructions (a construction where the logical object appears in a preverbal position as the surface object of a marker *ba*), as exemplified in (18b)-(19b), while *de*-sentences are banned in these two constructions, as illustrated in (22a) and (22b) in §3.1.

(18) a. *shoupa* ***bei*** ta ku ***de*** dou *shi*-le. (Resultative Construction)
handkerchief BEI he cry DE also wet-PERF
"(lit.) The handkerchief became wet by his crying."

b. ta ***ba*** **shoupa** ku ***de*** dou **shi**-le.
He BA handkerchief cry DE also wet-PERF
"He cried so much that even the handkerchief got wet."

(19) a. *zi* ***bei*** ta xie ***de*** *hen piao-liang*. (Descriptive Construction)
character BEI he write DE very beautiful
"The characters were written beautifully by him."

b. ta ***ba*** *zi* xie ***de*** *hen piao-liang*.
He BA character write DE very beautiful
"He wrote the characters beautifully."

Given the distinctive distribution provided in (16)-(19) and (22a)-(22b), I propose

that the *de* in *de*-constructions cannot be analyzed as the same *de* in Resultatives or Descriptives.

Third, the *neng-de* coöccurrence in (8a) and (8b) suggests that structurally *de* should have a different projection from *Modal*. Moreover, the fact that the *neng-de* coöccurrence in (8a) and (8b) only convey a single modality (possibility or ability) reading suggests that *de* and the *neng* might have some kind of correlation. In this paper, I propose that *de* and *neng* should project as two different projections rather than be located at the same *Modal* position and that *de* and *neng* should be structurally correlated to each other since the *neng-de* coöccurrence in (8a) and (8b) denotes a single modality meaning.

Some questions then arise. (i) How do *de*-sentences and *neng*-sentences structurally correlate to each other? (ii) Does *de* denote any semantic content? (iii) If *de* and *neng* are separated as two projections but together denote a single modality reading, as in (8a) and (8b), and *de*-sentences are structurally correlated to *neng*-sentences, what will make the coöccurrence in (8a) and (8b) different from double-modal constructions like (8c)? For question (i), *de*-sentences and *neng*-sentences should display syntactic evidence of their being related through some syntactic operation. For question (ii), it is necessary to examine the semantic properties of *de*-constructions. As for question (iii), one then needs to consider whether *de*-constructions involve some kind of quantificational operation that is akin to multiple *wh*-questions, like English {Who bought what?} in which the raised *wh*-phrase (*who*) and the *in situ wh*-phrase (*what*) in the same [+Q] Comp would then absorb to form a single quantificational element (cf. Higginbotham & May 1981, Huang 1982), or that is similar to Negative Concord, in that two negative constituents express a single negation and that it is analyzed as an operation of absorption (cf. Haegeman & Zanuttini 1991, Haegeman 1995).

Based on the discussion above, I propose that structurally *de* projects as a different projection from the modal *neng* and is generated lower than *Modal*. I assume that *de* is an independent head, say De^0, licensed by $Modal^0$ (epistemic or deontic) which can be either a null modal (e.g. (2)) or be filled by the overt modal *neng* (e.g. (8a) and (8b)). De^0 and $Modal^0$ share the same potentiality modality feature [M], either [$M_{possibility}$] or [$M_{ability}$], which brings out a single modality denotation to the sentence, as schematized in (20a) and (20b) respectively. As for the *neng-de* coöccurrence (8c) denoting a double-modal expression, it actually contains two types of modals, epistemic and deontic. I suggest that $De_{Deontic}$ in (8c) is licensed by a null deontic modal $Modal_{Deontic}$ and the overt epistemic modal *neng* in (8c) is located at higher modal position $Modal_{Epistemic}$, as represented in (20c). A reading of ability *neng* + possibility *de* is not possible because the licensing of $De_{Epistemic}$ by $Modal_{Epistemic}$ is blocked by a potential licenser modal $Modal_{Deontic}$, as represented in (20d):

(20) a. [… *Modal* Epistemic [M] …[… *De* Epistemic [M] …]]   (cf. (2), (8a))
    b. [… *Modal* Deontic [M] … [… *De* Deontic [M] …]]   (cf. (2), (8b))
    c. [… *Modal* Epistemic …   [… *Modal* Deontic [M] …[… *De* Deontic [M]…]]]   (cf. (8c))
    d. *[… *Modal* Epistemic [M] …[… *Modal* Deontic …   [… *De* Epistemic [M]…]]]

The parallel semantics between *de*-sentence (2) and *neng*-sentence (3), the single modality expressions in *neng-de* coöccurrence in (8a) and (8b) as well as the double-modality in (8c) thus are attributed to some syntactic correlation of two different projections, De^0 and $Modal^0$.

3.1 Intervention effects

Syntactically *de*-constructions and *neng*-constructions behave differently in at least four ways in terms of their interaction with passive constructions,[12] *ba*-constructions, focus elements and manner adverbs. Sentences with *neng* like (21) work perfectly with the passive/*bei* phrase, the *ba*-phrase, the focus element *zhi* 'only'[13, 14, 15] and the

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[12] There are two types of passive constructions in Mandarin, long passive and short passive, which differ with respect to the appearance of the external argument. I shall have a detailed discussion in §5.1.

[13] Focus elements in Chinese (i), unlike English (ii), must occur preverbally but not postverbally:
   (i) *Zhi??(you)* Lisi *(zhi(you))*   chi-wan   *(*zhi(you))*   zhe-wan mian   *(*zhi(you))*
       Only(have) Lisi only(have) eat-finish   only(have) this-CL   noodles   only(have)
       "(Only) Lisi (only) finished eating this noodle soup."
   (ii) *(Only)* John *(only)* kisses *(only)* Mary *(only)*.
   Except for postverbal position, Chinese focus elements can appear in various positions in a sentence, such as at the initial position of a sentence, as shown in (i). However, only those positions that are relevant to *neng*-constructions and *de*-constructions will be discussed here.

[14] Besides *zhi* 'only', other focus elements *shenzhi* 'even' and *ye* 'also' also function like *zhi* in that they appear in various preverbal positions and are adjoined to a verbal functional category as indicated in S.-W. Tang (1998). Interestingly, *shezhi* and *ye* also show the same blocking effects as that in (22c), when they intervene between the Modal and *de*, as indicated in (i):
   (i) Lisi **neng**   (**zhi/*shenzhi/*ye*) kan-**de**-dao   zhe-ke   shu.
       Lisi can   only/even/also   chop-DE-fall this-CL   tree
       "Lisi can only/even/also chop the tree down."
   In this paper, I shall take the focus element *zhi* 'only' to represent focus elements in general.

[15] The reason that I put an overt Modal *neng* in the *de*-sentence (22c) is to make clear where the focus element *zhi* 'only' can legitimately appear. Focus elements like *zhi* 'only' are able to appear in several positions under certain conditions depending on which constituent they modify (see Cinque (1999), S.-W. Tang (1998), etc. for discussion). There are two possible analyses for a focus sentence without the overt Modal. One of the analyses is like (22c) and the other one is as illustrated in (i) where *zhi* is placed before both the modal *neng* and *de*:

manner adverb *manman-de* 'slowly', whereas sentences containing *de* in (22), are banned in those four constructions:

(21) a. zhe-ke shu ***neng bei*** (Lisi) kan-dao.   (Passives)
       this-CL tree can BEI Lisi chop-fall
       "This tree can be chopped down."
   b. Lisi ***neng ba*** zhe-ke shu kan-dao.   (*Ba*-Constructions)
       Lisi can BA this-CL tree chop-fall
       "Lisi can chop the tree down."
   c. Lisi ***neng zhi*** kan-dao zhe-ke shu.   (Focus element)
       Lisi can only chop-fall this-CL tree
       "Lisi can only chop the tree down."
   d. Lisi ***neng manman-de*** kan-dao zhe-ke shu.   (Manner Adverb)
       Lisi can slow-ly chop-fall this-CL tree
       "Lisi can slowly chop the tree down."

(22) a.*zhe-ke shu ***bei*** (Lisi) kan-***de***-dao.   (Passives)
       this-CL tree BEI Lisi chop-DE-fall
       "(Intended) This tree was possible/was able to be chopped down by Lisi."
   b.*Lisi ***ba*** zhe-ke shu kan-***de***-dao.   (*Ba*-Constructions)
       Lisi BA this-CL tree chop-DE-fall
       "(Intended) Lisi can chop the tree down."
   c. Lisi ***neng*** (*****zhi**) kan-***de***-dao zhe-ke shu.   (Focus element)
       Lisi can only chop-DE-fall this-CL tree
       "(Intended) Lisi can only chop the tree down."
   d. Lisi (*****manman-de**) kan-***de***-dao zhe-ke shu.   (Manner Adverb)
       Lisi slow-ly chop-DE-fall this-CL tree
       "(Intended) Lisi can slowly chop the tree down."

As proposed in (20), De^0 is licensed by $Modal^0$ and projects as a different head from $Modal^0$. I also propose that these two different projections, De^0 and $Modal^0$, are syntactically correlated and the different syntactic behavior between *de-* and *neng-* sentences shown in (21) and (22) is an indication suggesting that the syntactic correlation between De^0 and $Modal^0$ is blocked when the *bei*-phrase, the *ba*-phrase, the focus element and the manner adverb intervene.

(i) Lisi ***zhi neng*** kan-***de***-dao zhe-ke shu.
    Lisi only can chop-DE-fall this-CL tree
    "Lisi is only possible/able to chop the tree down."

Sentences like (i) do not cause any blocking effect, whereas when *zhi* is placed between the modal and *de*, like (22c), the grammaticality judgment is then reversed. The position of *zhi* therefore matters to the grammaticality of a sentence. A grammatical sentence that allows a focus element *zhi* to appear in *de*-constructions should be analyzed with a covert modal projecting between *zhi* and *de* like (i), instead of before both *zhi* and *de* like (22c).

Note that the *neng-de* coöccurrence in a single sentence (8a) and (8b) as well as the distinct behavior between them in (21) and (22) do not necessarily imply that the relation between *de* and *neng* is an adjacency requirement since some other elements, such as some adverbs/adverbials, can appear between *neng* and *de,* and can be interchangeable, as shown in (23):

(23) a. Lisi (*bu-*)*neng* [*ti wo*] [*cong   xuexiao*] [*xiang laoshi*] jie-*de*-dao   LGB
           Lisi (not)can   for me from   school   to   teacher borrow-DE-arrive LGB
           "Lisi can/cannot borrow LGB from the teacher from school for me."
       b. Lisi (*bu-*)*neng* [*ti wo*] [*cong xuexiao*][*xiang laoshi*]   jie-*de*-dao   LGB.
       c. Lisi (*bu-*)*neng* [*xiang laoshi*] [*ti wo*] [*cong xuexiao*] jie-*de*-dao   LGB.
       d. Lisi (*bu-*)*neng* [*xiang laoshi*] [*cong xuexiao*][*ti wo*]   jie-*de*-dao   LGB.
       e. Lisi (*bu-*)*neng* [*cong xuexiao*][*xiang laoshi*] [*ti wo*]   jie-*de*-dao   LGB.
       f. Lisi (*bu-*)*neng* [*cong xuexiao*][*ti wo*] [*xiang laoshi*]   jie-*de*-dao   LGB.

Additionally, the licensing of *De* cannot be analyzed as the same kind of licensing as that of Negative Polarity Items (NPI). As illustrated in (24), the NPI *renhe* 'any' and its trigger, the negation *meiyou* '(did) not', do not show the same intervening phenomena as those found in *de*-constructions (22):[16]

(24) a. zhe-ben shu   **meiyou *bei*** wo fang zai **renhe** yi-zhang zhuo shang.
           this-CL   book didn't   BEI me put   on   any   one-CL   table top
           "The book wasn't put on any table by me."
       b. wo **meiyou *ba*** zhe-ben shu   fang zai **renhe** yi-zhang zhuo shang.
           I   didn't   BA this-CL   book put on   any   one-CL   table top
           "I didn't put this book on any table."
       c. Lisi **meiyou *zixi-de***   kan-guo **renhe** yi-ben   shu.
           Lisi didn't   carefully read-EXP any   one-CL   book
           "Lisi didn't carefully read any book."

Based on the discussion that *de-* and *neng*-sentences are interpreted the same and the fact that the *de-neng* coöccurrences in (8a) and (8b) express single modality

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[16] As noted in (24), *bei*-phrase, *ba*-phrase and manner adverbs work similarly in NPI licensing, whereas the focus element *zhi* 'only' does not. The focus element *zhi* actually is not compatible with NPI, as shown in (i):
  (i) *Lisi **meiyou *zhi*** kan-guo **renhe** yi-ben   shu.
       Lisi didn't   only read-EXP any   one-CL   book
       "(Intended) Lisi didn't only read any book."
The incompatibility in (i) might be attributed to that fact that *zhi* contains some independent characteristics (cf. Bayer 1996). The discussion of this issue is beyond the domain of this research. I would leave it open for further research.

meanings, I propose that *De* and *Modal* share the same potential modality feature [M] yet structurally they are generated at different positions. As a result, *De* and *Modal* should be syntactically related. I shall argue that *De* (or its Spec) has to undergo LF movement to the *Modal* (or its Spec) for checking its [M] feature. The ungrammaticality in (22a)-(22d) should be attributed to some intervention effects that prevent the *De* (or its Spec) from undergoing LF movement to *Modal* (or its Spec).

3.2 Intervention effects application I—On *dou*-quantification

Interestingly enough, the similar intervention effects found in *de*-constructions (22) are also observed in *dou*-quantification. As illustrated in (25a), (25b) and (25d), the quantifier *dou* 'all' fails to quantify the plural subject NP when *bei*, *ba* and manner adverbs intervening between them. Note that (25c) is not ruled out but interpreted differently. Nevertheless, the plural subject NP in (25c) cannot be quantified by *dou* when the focus element *zhi* intervening between them.

(25) a. *zhe-xie   sanmingzhi* **dou** ***bei***   Lisi   (***dou***)   chi-le.
       Those   sandwich   all   BEI   Lisi   all   eat-ASP
       "All of those sandwiches were eaten by Lisi."

    b. *tamen* **dou** ***ba*** *zhe-ben*   *shu*   (***dou***)   *kan-le*.
       They   all   BA   this-CL   book   all   read-ASP
       "All of them read that book."

    c. *tamen* ***zhi***   **dou**   *chi* *sanmingzhi*.
       They   only   all   eat   sandwich
       "*All of them only ate sandwiches."
       (ok: "They only ate sandwiches (all the time).")

    d. *tamen* (***manman-de***) **dou**   *chi-le*   *sanmingzhi*.
       They   slow-ly   all   eat-PERF   sandwich
       "All of them ate sandwiches slowly."

Many approaches have dealt with *dou* universal quantification in the literature (see Li & Thompson 1981:335-339, Lee 1986, Chiu 1993, Cheng 1995, among others). The element *dou* is generally defined as a universal quantifier and it quantifies a preceding plural NP which is the subject or the topic of the sentence. Chiu (1993) proposes that *dou* is generated as a head Dou^0 and must be incorporated into a verbal or inflectional head ($AgrS^0$, Asp^0 or $AgrO^0$). Cheng (1995) argues, following Travis (1988), that *dou* is a kind of "defective" adverb that does not project to a maximal projection. She proposes that *dou* has to be licensed by a head that contains verbal features, such as Asp^0 or V^0, and can be adjoined to various positions (Asp', Asp^0, V' and V^0). To quantify over regular plural NPs, *dou* must adjoin to the NP at LF and the quantification of *dou* is

required to satisfy a locality restriction.[17] Under the analyses in Chiu (1993) and Cheng (1995), passive marker *bei* in (25a) and the object-preposing marker *ba* in (25b) are the blockers preventing *dou* from undergoing LF movement. As for the intervention effect caused by manner adverbs in (25d), Cheng notices that manner adverbs cannot appear before *dou*. Unfortunately, she does not offer any further arguments to account for the interaction of manner adverbs and *dou*. Cheng simply indicates that the coöccurrence of adverbs in (25d) may be attributed to some kind of "ordering restrictions" which do not follow any apparent rules (Li & Thompson 1981) and for some unknown reason *dou* cannot appear after manner adverbs. To account for the ungrammaticality of (25d), Lee (1986) claims that it is due to the characteristics of the manner adverb. He suggests that manner adverbs denote neither an entity nor an event. Therefore, manner adverbs cannot be an object of *dou*-quantification and the sentence (25d) is ruled out. As for the intervening focus element *zhi* in (25c), none of the previous analyses has provided any relevant discussion. I present the following analysis.

  Dou in (25c) fails to quantify the plural subject due to the intervention of the focus element *zhi* 'only'. At first glance, it looks like *zhi* does not cause any intervention effect at all since the sentence is grammatical. However, the sentence (25c), as shown in the translation, is interpreted differently. Compare the interaction of *dou* and *zhi* 'only' in (26). As shown in (26a), since the focus element *zhi* does not appear between *dou* and the subject, nothing prevents *dou* from quantifying over the plural NP *tamen* 'they'. The individual *Lisi* in (26a) cannot be quantified by *dou* since it is not plural. Now consider (26b) where *zhi* intervenes between *dou* and the plural subject NP and (26b) should be ungrammatical. However, not only (26b) is well-formed, the singular NP *Lisi*

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[17] One may consider that (i), which has a complex NP as the topic, might be a potential problem for the analysis of *dou*-constructions since *dou* can quantify over elements that do not c-command it at the surface structure.

  (i) [[*piping   renhe   ren   de*] *shu*],   wo **dou**   xihuan   kan.
       criticize any   person REL book   I   all   like   read

In (i), *shu* 'book' is the head N, while *piping renhe ren* 'criticize any person' is a relative clause modifying the head. The N and the relative clause form a complete complex NP acting as the topic of the sentence. As argued in Cheng (1995:213-215), *dou* can quantify over a topic if the topic and *dou* originate from the same sentence. She assumes, following Xu & Langendoen (1985), that topicalization in Mandarin is in fact left-dislocation. The topic is a left-dislocated NP, as in the LF representation (ii), associated with a resumptive pronoun (the index *i*) which is an *in-situ* operator *pro* that links the gap (t_i) and the topic (cf. Cheng 1995: (41)). Cheng proposes that *dou* and the resumptive pronoun move to adjoin to the AspP and hence the quantification on *dou* is satisfied. The movement of *dou* is local. Since *dou* does not cross an AspP boundary, the *dou*-quantification over the topic in (i) is legitimate.

  (ii) [$_{NP}$[*piping   renhe   ren   de*] *shu*]$_i$, [$_{AspP}$ [*pro$_i$* **dou**$_j$] [$_{AspP}$ wo *t$_j$* xihuan kan *t$_i$*]
          criticize any   person REL book   all   I   like   read

can also appear as the subject like the plural NP *tamen* 'they':

(26) a. tamen/*Lisi **dou** *zhi* chi sanmingzhi.
     they/*Lisi   all   only eat sandwich
     "All of them/*Lisi only ate sandwiches."
   b. tamen/Lisi   *zhi* **dou** chi sanmingzhi.
     they/Lisi   only all   eat sandwich
     "*All of them only ate sandwiches."

The contrast between (26a) and (26b) has to be associated with the multiple uses of *dou*. The element *dou* 'all', as indicated in Tsai (1994:23), has four types of uses, each nearly corresponding to English: 'all', 'always', 'already' and 'also'. The most familiar use of *dou* 'all' is a universal quantifier quantifying over a plural NP or a *wh*-NP to its left (see also Cheng 1995). However, *dou*-quantification is not always constrained by the plurality restriction of the subject NPs. As specified in Tsai (1994), the aspectual interpretations indicate that *dou* actually can induce universal quantification over time segments (or temporal-spatial slices of an event in terms of intensional semantics), it could be either collective interpreted as 'always/all the time' or distributive interpreted as 'already'. The fourth use of *dou* is that it can quantify over the contrast set implicated by the semantics of *lian* 'even' rather than the closest NP and it can alternate with *ye* 'also'. In (26a), the 'all' use of *dou* cannot quantify over *Lisi* since it is singular, but *dou* does quantify over the plural NP since *zhi* does not block *dou*-quantification. Note that (26a) is grammatical with the singular NP *Lisi* as the subject when *dou* is interpreted as the other three uses, 'always', 'already' or 'also'. On the other hand, since *zhi* in (26b) blocks the 'all' use of *dou* quantifying over the plural subject NP, *dou* can only be interpreted as the other three uses but not the 'all' use. The reason that (26b) is grammatical in fact induces the *dou* quantification over <u>temporal</u> <u>segments</u>, rather than over the subject NP. The appropriate translation of (26b), thus, is {They/*Lisi* only ate sandwiches <u>all</u> <u>the</u> <u>time</u>.}. At this point, the singular NP *Lisi* is expected to grammatically appear as the subject in (26b).

Accordingly, we can conclude that the focus element *zhi*, like *bei*-phrases, *ba*-phrases and manner adverbs, is also an intervener preventing *dou* from quantifying over the preceding plural NP. If the ungrammaticality in *dou*-quantification in (25a-d) is attributed to the violation of locality constraint when *dou* undergoes LF movement, the syntactic categories, either X^0s or XPs, of the interveners and *dou* have to be consistent with respect to Relativized Minimality. Under the previous approaches, the quantifier

dou is analyzed either as an X^0 (Chiu 1993, Cheng 1995,[18] Li 1997) or as an XP (Li & Thompson 1978 and Lee 1986). I shall provide a detailed discussion in §5 to examine the syntactic categories of *dou* and the interveners.

3.3 Intervention effects application II—On *A-not-A* questions

Mandarin *A-not-A* questions are a special type of *yes/no* question. Huang (1982, 1991) proposes that morphologically a question operator [+Q] triggers a reduplication of some part of the string following INFL and insertion of the morpheme *bu* 'not' between the original and copied sequence. Normally, only verbs, auxiliaries/modals and adjectives can be reduplicated to form *A-not-A* questions. An *A-not-A* question, like *de*- and *dou*-constructions, also shows intervention effects when interacting with *bei*, *ba*, *zhi*, and manner adverbs, as illustrated in (27):

(27) a.*zhe-ben shu ***bei*** Lisi **kan-bu-kan**?
     this-CL book BEI Lisi read-not-read
     "Was the book read by Lisi?"
  b.*Lisi ***ba*** zhe-ben shu **kan-bu-kan**?
     Lisi BA this-CL book read-not-read
     "Does Lisi read this book?"
  c. Lisi (*****zhi***) **kan-bu-kan** zhe-ben shu?
     Lisi only read-not-read this-CL book
     "Does Lisi only read this book?"
  d. Lisi (*****zixi-de***) **kan-bu-kan** zhe-ben shu?
     Lisi carefully read-not-read this-CL book
     "Does Lisi read this book carefully?"

To derive grammatical *A-not-A* sentences for those in (27), an auxiliary verb *shi* 'to be' has to be added, that is, *shi* should be reduplicated as *shi-bu-shi* and the *A-not-A* form must appear higher than those four elements, as exemplified in (28):

(28) a. zhe-ben shu **shi-bu-shi** ***bei*** Lisi *kan*-le?
     this-CL book be-not-be BEI Lisi read-ASP
     "Was the book read by Lisi?"

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[18] Chiu (1993) proposes that *dou* is the head of *Dou*P, whereas Cheng (1995) argues, following Travis (1988), that *dou* is a defective adverb adjoined to an X^0 or X'. Since the *dou* in Cheng (1995) is adjoined to an X^0 or X', I assume that it is an incorporated head (cf. Travis 1988) with its licenser (X^0 or Asp^0). Thus, *dou* can be an X^0 level category under both of Chiu and Cheng's analyses.

b. Lisi **shi-bu-shi** *ba* zhe-ben shu *kan*-le?
    Lisi be-not-be BA this-CL book read-ASP
    "Does Lisi read this book?"

c. Lisi **shi-bu-shi** *zhi* *kan* zhe-ben shu?
    Lisi be-not-be only read this-CL book
    "Does Lisi only read this book?"

d. Lisi **shi-bu-shi** *zixi-de* *kan* zhe-ben shu?
    Lisi be-not-be carefully read this-CL book
    "Does Lisi read this book carefully?"

Huang (1982, 1991) proposes that Chinese *A-not-A* questions are derived from an interrogative INFL with a [+Q] feature. The constituent *A-not-A* is a question operator containing the [+Q] feature and must raise to have scope over the sentence at LF. The LF movement of [+Q] has to obey strict locality requirements. Ernst (1994), differing from Huang, proposes that the *A-not-A* operator [+Q(u)] projects as a head, either a functional head immediately c-commanding V or a feature on V, which originates very low in the structure instead of being generated on INFL as claimed in Huang (1982, 1991). Ernst argues that [+Q(u)] is free to occur on any verbal element in principle, but will only be realizable on the highest verb, either a main verb or an auxiliary (aspectual or modal). Ernst suggests that unlike other adjuncts, such as *weisheme* 'why' which is bound by an empty [+Q(u)] operator in Spec of CP at S-S (as proposed in Aoun & Li 1993), the *A-not-A* operator requires head-movement from where it is generated to Comp at LF. According to Huang and Ernst's analyses, [+Q(u)], either on INFL (Huang 1982, 1991) or on a verbal element (Ernst 1994), must undergo LF movement to Comp and the movement has to satisfy a locality restriction. If there is any intervening head, as proposed in Soh (2001), the LF movement of the *A-not-A* operator [+Q(u)] will be illegitimate.

Another line to take, however, is that the *A-not-A* constituent is the Chinese counterpart of the English *wh*-word *whether* (Huang 1991:331, fn.7) which is a *wh*-scope indicator for disjunction. Larson (1985) postulates that disjunctions in English have a similar underlying structure to conjunctions. The scope indicator *whether* is under the conjunctive element CONJ with *or*. Adopting Larson's analysis, Borer (1989) argues that *wh*-word *whether* needs to undergo *wh*-movement to the Spec of CP. If the Chinese *A-not-A* operator can be treated as an XP, an A-bar element like *whether*, we then have to consider the categories of the blockers in (27) with respect to Relativized Minimality. There are again two possibilities to define the status of the *A-not-A* operator, X^0 (Huang 1982, 1991, Ernst 1994) and XP (Borer 1989).

3.4 Interactions of *A-not-A*, *dou*, *neng* and *de*

If the intervention effects of LF movement in *de*-constructions (22) can be attributed to the same as those in *dou*-quantification (25) and *A-not-A* constructions (27), the LF movement in *de*-constructions (22) then should be restricted under the locality constraints as well. We predict that the same locality constraint should take place when *dou*, *A-not-A*, *de*, and *neng* interact with each other. In the following example (29a),[19] the *A-not-A* operation is blocked by *dou*, while in (29b), *dou*-quantification is blocked by the *A-not-A* operator [+Q]. To avoid being blocked by *dou*, the [+Q] in (29a) has to generate on a higher verbal element as discussed. Thus, an auxiliary *shi* 'to be' functioning like *do*-support is inserted in (29a), as illustrated in (29c):

(29) a.?*zhexie xiaohai **dou** *xie-bu-xie*   zuoye?
   these   child   all   write-not-write   homework
  b. *zhexie xiaohai *xie-bu-xie*   **dou**   zuoye?
   these   child   write-not-write   all   homework
  c. zhexie xiaohai *shi-bu-shi* **dou** *xie* zuoye?
   these   child   be-not-be   all   write homework
   "Is it the case that these children all write homework?"

Syntactically, the auxiliary *shi* behaves like Chinese epistemic modals (cf. Huang 1988a) as a raising verb (cf. Lin & C.-C. Tang 1995) imposing no selectional restrictions on the subjects. Thus, the plural NP *zhexie xiaohai* 'these children' in (29c) is not the

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[19] Some speakers might consider (29a) is acceptable (although my own judgment for (29a) is not as good as (29c)). Nevertheless, for those who accept (29a), they accept (ia) which contains a universal intensifier *quanbu* 'all, the whole' referring to the subject plural NP itself but reject (ib) where *A-not-A* is involved.
  (i) a. zhexie   xiaohai (*quanbu*)   **dou** *xie*   zuoye.
    these   child   all/the.whole   all   write   homework
   "All of the children write (their) homework."
  b. zhexie   xiaohai (**quanbu*)   **dou** *xie-bu-xie*   zuoye?
    these   child   all/the whole   all   write-BU-xie   homework
If (29a) is acceptable, it could be due to the reason that *dou* quantifies over temporal segments, as indicated in 3.2. The *dou* in (29a) should be interpreted as 'always', 'already', or 'also', but not 'all' and (29a) may mean {Did these children write homework all the time/already/as well?}. Since *dou* quantifies over temporal segments, (29a) is expected to be incompatible with temporal adverbials that indicate a specific time, such as *zuotian* 'yesterday':
  (ii)* zhexie   xiaohai *zuotian* **dou** *xie-bu-xie*   zuoye?
    these   child   yesterday   all   write-not-write   homework
   "(Intended) Did all of the children write homework yesterday?"

subject of *shi* but the logical subject of the main verb *xie* 'write', as represented in (30):

(30) [[*zhexie xiaohai*]*ᵢ* ***shi-bu-shi*** [*tᵢ* [**dou**] *xie* zuoye]]]?

Accordingly, I suggest that structurally *dou* is not higher than *A-not-A* operator. I assume that *De* is an inner modal licensed by *Modal* and generated between V and R. *De*, then, is within the c-command domain of *Modal*. Presumably, an *A-not-A* operator, the quantifier *dou* and *De* all contain some correlation to higher positions and satisfy their semantic interpretations by undergoing LF movement. If the ungrammatical *de*-sentences (22) are attributed to the violation of a locality constraint and an LF movement is involved, then when *de* and *neng* interact with *dou* and *A-not-A*, the same syntactic restrictions will show among them as well. As illustrated below, the modal *neng* is a blocker preventing *dou*-quantification in (31a) and (31b), while the *A-not-A* operation in (31c), and the quantifier *dou* in (31b) prevents *De* from moving to *Modal*.

(31) a.?*zhexie xiaohai (***bu-***)***neng*** **dou** xie-wan zuoye.[20]
        these child not-can all write-finish homework
    b. *zhexie xiaohai (***bu-***)***neng*** **dou** xie-*de*-wan zuoye.
        these child not-can all write-DE-finish homework
    c. *zhexie xiaohai (***bu-***)***neng*** **xie-*BU*-xie-*de*-wan** zuoye?
        these child not-can write-not-write-DE-finish homework

The examples in (31) indicate that structurally both *dou* and *A-not-A* operator should be higher than *Modal* and *De*. With the observations in (29) and (31), we then derive a hierarchical order of these four categories (32a) and develop a grammatical sentence like (32b):

(32) a. ***A-not-A > dou > Modal > De***
    b. zhexie xiaohai ***shi-bu-shi*** **dou** (***bu-***)***neng*** xie-*de*-wan zuoye?
        these child be-not-be all not-can write-DE-finish homework
        "Is this the case that these children are all able to finish writing their homework?"

3.5 Summary

I have proposed that *de* projects as an independent head *De* licensed by *Modal* and

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[20] Some speakers may accept (31a). This may be attributed to that *dou* quantifies over the embedded subject PRO, since deontic modals have a control structure. This can be tested by the interaction with the adverb *jintian* 'today':
    (i) [[zhexie xiaohai]*ᵢ* (**dou**) *(bu-)neng* (*****dou***) *jintian* [**PRO**ᵢ (**dou**) xie-wan zuoye]].

is generated in a position lower than *Modal*. The correlation between these two positions is derived via LF movement from *De* to *Modal* (or from [Spec, *De*P] to [Spec, *Modal*P]) to check the shared potentiality feature [M]. The syntactic behavior shown in *de*-constructions (22) indicates that the same intervention effects analyzed for *dou*-constructions (25) and *A-not-A* questions (27) are also found in *de*-constructions. The inability of *de* to coöccur with *bei*, *ba*, *zhi*, and manner adverbs should be attributed to the violation of locality restrictions since the LF movement in *de*-constructions is blocked by the four intervening elements, *bei*, *ba*, *zhi*, and manner adverbs.

I further examined the interactions among the *A-not-A* operator, *dou*, *neng*, and *de* and developed a hierarchical order of their relative positions.

As proposed, the four elements, *bei*, *ba*, *zhi*, and manner adverbs, are interveners in *de-*, *dou-*, and *A-not-A* constructions. It has also been pointed out that some other elements, such as adverbs/adverbials shown in (23), do not cause intervention effects when placed between *neng* and *de*. To clarify the puzzle of the distributional differences between *neng*-sentences (21) and *de*-sentences (22), it is necessary to examine the four intervening elements. The constructions that are formed by the four elements are widely discussed in the literature. As shown latter, the passive marker *bei* is treated as a main verb selecting a predicate, IP or VP depending on the appearance of the NP after *bei* (Ting 1998, Huang 1999), or as a *Modal*/*v* (Tsai 1993); *ba* is analyzed to be the head *CAUS*/*v* (Sybesma 1992, 1999); the focus element *zhi* 'only' is argued as an intervening quantifier blocking LF adjunct *wh*-movement (cf. Beck 1996, Soh 2001); whereas manner adverbs are taken as XP adjuncts adjoined to *v*P (C.-C. Tang 1990, S.-W. Tang 1998), as non-maximal projections licensed by a verbal element (Travis 1988), or as adverbs in the Spec position of a functional projection (Cinque 1999). Accordingly, the positions of these four elements could occur either in *v*P or adjoined to *v*P.[21] I shall examine the four constructions in §5. In the next section, I shall first discuss the status of *de* and *bu*.

4. The status of *de*/*bu*

Previously I proposed that *De* (or its Spec) should undergo LF movement to *Modal* (or its Spec) for feature checking. This is related to the question raised earlier: whether *de* denotes any semantic content or not. In this section I trace back to the history of *de* and *bu* and then provide an analysis concerning the status of *de*/*bu* in modern *de*-constructions.

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[21] S.-W. Tang (1998) proposes that the focus feature of focus elements is associated with functional categories in which focus elements can merge with *v*P, TP, and CP. In this paper, only the position adjoined to *v*P is relevant.

4.1 A sketch of *de*/*bu* and the history

In Classical Chinese, *de* was used as a regular verb meaning 'to gain, obtain, reach'. As indicated in Yue (1984), in the oracle-bone inscriptions *de* was used as both a transitive and an intransitive verb (before the 11th century B.C.). Around 220 B.C., *de* preceded other verbs or appeared alone functioning as a modal denoting permission or obligation. In the Han Dynasty (206 B.C.), sequences [V-*de*] and [V-(Object)-*bu-de*] were found in many ancient writings. In the Tang Dynasty (618-907 A.D.), the sequence [V-*de*-V/A] was frequently used. Lü (1984) considers that *de* in [V-*de*-V/A] today is not a verb but a degenerative morpheme even though it still contains the verbal meaning, 'to gain'. T.-C. Tang (1992) notes that the sequences found in the Han and Tang Dynasties are the prototypes of the patterns in modern Chinese languages since structurally and semantically they are similar. In fact, *de* alone still retains the verbal meaning 'to gain, obtain' today and can be used as a regular verb, as shown in (33):

(33) wo **de**-le   yi-bi   jiang-xue-jin.
     I   gain-PERF one-CL   prize-study-money
     "I gained (won) a scholarship."

Although *de* in [V-*de*-R] might retain the meaning of 'to gain' today,[22] *de* in [V-*de*-R] cannot be analyzed as a full-fledged verb or modal like *neng*. There are two reasons for this argument. First, the surface realization of *neng*-sentences is [*neng* V-R], whereas it is [V-*de*-R] rather than *[*de* V-R] in *de*-sentences. Second, *de* in [V-*de*-R] conveys potentiality reading rather than other modality reading (permission or obligation). Thus, *de* in [V-*de*-R] is not a full-fledged verb or modal but a morpheme containing some verbal or modal properties.

As for the negative *bu* in RVC, it was formed as [*bu-de*], a negative counterpart of *de*, in *Lun Yu* (the Confucian Analects, 500 B.C.) and the pattern could precede verbs (Lü 1984). The sequence [V-(Object)-*bu-de*] was frequently used in the Tang Dynasty. In Southern Song (1127-1279 A.D.), the sequence [V-*bu-de*-V/A] was commonly found in ancient writings. Unfortunately, this pattern [*bu-de*] is not preserved in modern Mandarin: *de* does not coöccur with *bu* in Mandarin *de*-constructions and there is no object intervening in RVCs. Although the pattern [*bu-de*] does not exist in modern Mandarin, it has been maintained in some other modern Chinese dialects, such as [*m-det*] in Hakka (34a) and [*m-dak*] in Cantonese (34b):[23]

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[22] Native speakers may interpret RVC [V-*de*-R] as "it is possible (for someone) to gain the RESULT by doing the ACTION" or "(someone) to be able to gain the RESULT by doing the ACTION".

[23] I appreciate Sze-Wing Tang's generous contribution of the Cantonese example (34b).

(34) a. gi   *au-**m**-(**det**)-ton*   liak-ji   shuki.   Hakka
      he   bend-BU-DE-apart   this-CL   branch
      "He cannot bend this branch apart."

    b. keoi   *sik-**m**-(**dak**)-baau.*   Cantonese
      he   eat-BU-DE-full
      "He cannot be full after eating."

Based on the discussion above, I propose that *de* contains a semantic feature [M] and structurally projects as a head *De*, as shown in (35a). The negative counterpart *bu* is base-generated as an incorporated head with *de* and together they create a complex head [*bu-de*], as shown in (35b). In modern Mandarin, *bu* provides negative reading while *de* is covert. The negative counterpart *bu* contains a [+*neg*] feature for its negative interpretation, while *de* contains [-*neg*]. The head *De*, thus, contains either [+*neg*] or [-*neg*] feature through percolation.

(35) a.   *De*P   b.   *De*P

De^0 [M, *-neg*] De^0 [M, *+neg*]

     |

    de   *bu* [*+neg*]   *(de)*
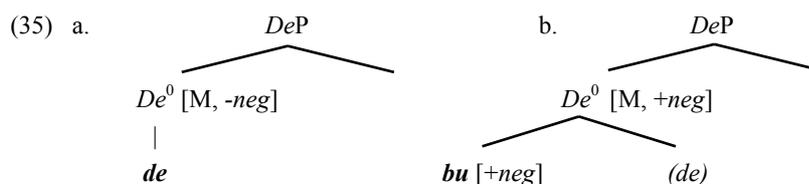
4.2 *De/bu* are not XP adjuncts

In the literature, the category of *de/bu* has never been consistent. Scholars have suggested that *de/bu* are adverbs (Li & Thompson 1981), or infixes (Tang 1992, Sun 1996), or *Modal* light verbs like *neng/gan/xiang* 'can/dare/want' (Tsai 2001). In this section, I shall argue that *de/bu* cannot be analyzed as XP adjuncts that are adjoined to some projections, such as VP.

Note that *de/bu* only appear between V and R in RVCs but not anywhere else. Under the syntactic approach, V and R project different verbal projections (as in Sybesma (1992, 1999), S.-W. Tang (1997), Stewart (1998), Nishiyama (1998), and Wu (2002)). If *de/bu* are XP adjuncts, they must be adjoined to the maximal projection of R, the second predicate projection in RVCs. If this is the case, other XP adjuncts that can also be adjoined to VP, such as those adverbs/adverbials exemplified in (23), like *cong xuexiao* 'from school', or temporal/locative adverbs, like *mingtian* 'tomorrow' and *zai jia-li* 'at home', would be allowed to be placed between V and R. However, as depicted in (36a)-(36c), this predication is not borne out:

(36) a.*Lisi **jie**   *cong*   *xuexiao* **dao**   zhe-ben shu.
   Lisi borrow from   school   arrive   this-CL   book
  b.*Lisi **xie**   *mingtian*   **wan**   zuoye.
   Lisi write   tomorrow   finish   homework
  c.*Lisi **xie**   *zai* *jia-li*   **wan**   zuoye.
   Lisi write   at   home   finish   homework

One might suggest that the ungrammaticality in (36) could be attributed to a phonological distinction,[24] that is, there might be a specific rule that allows only monosyllable or monomoraic morphemes to be legitimately placed between V and R. However, empirical evidence shows that the possibility of phonological distinction is excluded, since, monosyllabic adverbs such as *quan* 'totally' or monomoraic morphemes like *ye* 'also' are not permitted to appear between V and R, as illustrated in (37):

(37) a.*Lisi **kan** *quan*   **wan**   zhe-ben shu.
   Lisi read   totally finish   this-CL   book
  b.*Lisi **kan** *ye*   **wan**   zhe-ben shu.
   Lisi read   also   finish   this-CL   book

Moreover, if *de/bu* can be analyzed as XP adverb adjuncts like other VP adjuncts, we may then expect that *de/bu* can be adjoined to either VP or RP since V and R project as separate verbal heads respectively under the syntactic approach. As the position of a VP adjunct should be hierarchically higher than the head V itself, this analysis may come up with a realization *[*de/bu* V-R] on the surface. However, this realization does not exist. Accordingly, it is problematic to analyze *de/bu* as XP adjunct adverbs as proposed in Li & Thompson (1981).

4.3 *De/bu* project as an X^0 level category

The other option for categorizing *de/bu* is that *de/bu* project as an X^0 level category. As indicated in (8), *de* and *neng* can coöccur in a single sentence, the X^0 projection of *de/bu* thus cannot be at the same position as *Modal*, as proposed in Tsai (2001). In the previous section, I suggested the structures of (35a) and (35b) to account for the status of *de/bu* by categorizing them as an X^0 level category De^0. I assume, following the argument in (20), *De* is licensed by *Modal* and both share the same potentiality feature [M] (either [$M_{possibility}$] or [$M_{ability}$]). Based on the *neng-de* coöccurrence in (8), I postulate that structurally *De* is not generated at *Modal* position but between the projections of V and R where *De* is c-commanded by *Modal*:

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[24] I appreciate that Mark Baker and Lisa Travis pointed out the possibilities.

(38) [...***Modal***_[M] ...[...V...[...***De***_[M]...[...R...]]]]

As argued previously, *de*-sentences are semantically interpreted the same as *neng*-sentences and structurally *De* should be correlated to *Modal*. A question then arises: how are *De* and *Modal* correlated? To account for Mandarin *de*-constructions, I propose that a Null Operator (OP), either an X^0 or an XP operator, in the projection of *De* (either the head De^0 or its Spec) must undergo LF movement to the projection of *Modal* for the sake of checking the relevant feature [M]. There are then two possibilities to account for the LF movement: it is either an X^0/head movement or an XP/A-bar movement.

First, under the XP movement approach, as illustrated in (39) below, the Spec of *De*P is an OP that undergoes an A-bar movement to *Modal*P. After the LF movement, both V and R are within the c-command domain of *De*. The *de*-sentence (2) then obtains the same semantic interpretation as the *neng* sentence (3) and the semantic parallelism between them is explained.

(39)   *Modal*P   Option I: XP/A-bar Movement
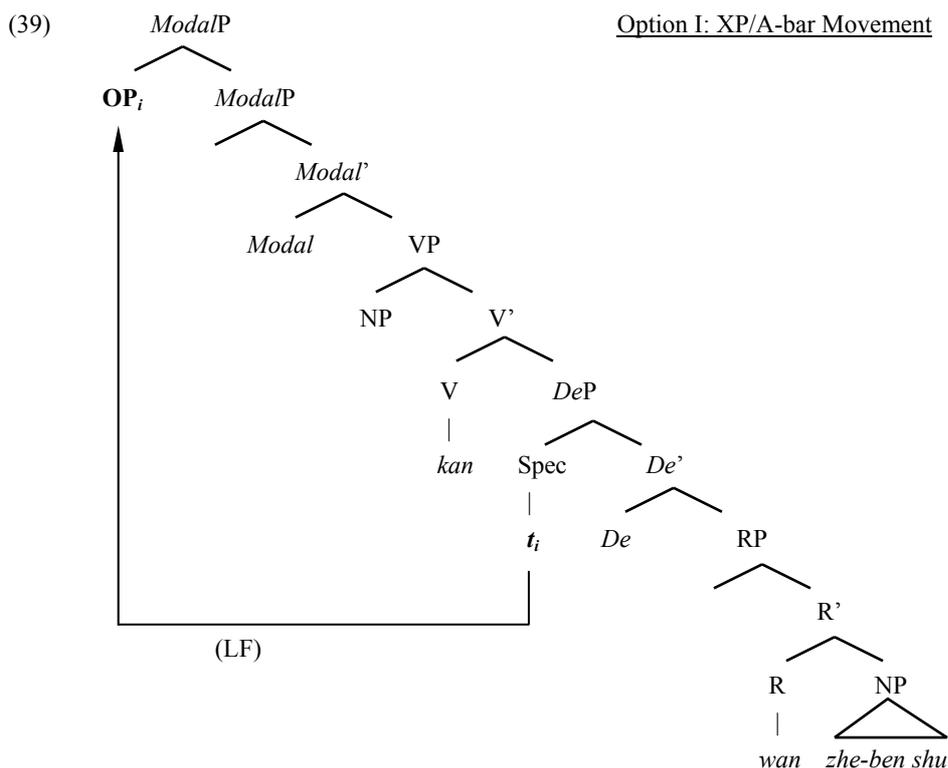
The second possibility is an X^0/head movement approach, as illustrated in (40),

where the head *De* undergoes LF X^0/head movement to the head position of *Modal*P to check the relevant feature [M] with the head *Modal*:

(40)   *Modal*P   <u>Option II: X^0/head Movement</u>

kan-[$_{De}$ ***de/bu***]$_i$-*wan*]$_j$

zhe-ben shu
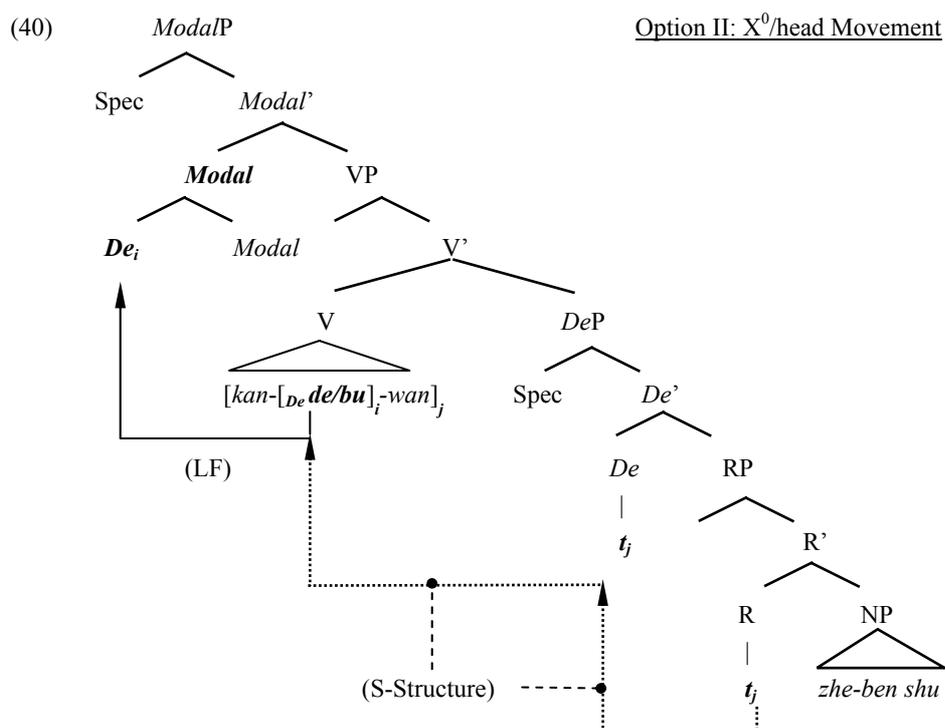
Under the syntactic approach, RVCs are derived by head movement and incorporation (cf. Sybesma 1992, S.-W. Tang 1997, Nishiyama 1998, Stewart 1998, Wu 2002, among others).[25] The head movements from R through *De* to V form a [V-*De*-R] complex motivated possibly for some aspectual reason. (See Stewart (1988), Wu (2002) for relevant discussions.) I propose that, motivated by checking its [M] feature with *Modal*^{0}, *De*^{0} then excorporates from the verbal complex and raises to *Modal* at LF.[26, 27]

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[25] Another possibility to form the S-structure verbal complex [V-*de/bu*-R] is "phonological/ morphological merger" of V, *De* and R (cf. Bobaljik 1995). Please refer to Cheng & Sybesma (2002) for relevant discussion.

[26] Jonathan Bobaljik (p.c.) provided an argument that when excorporation of *De* is assumed, *De* could be allowed to raise to the head position of one of the interveners, *bei*, *ba*, *zhi*, and manner adverbs, and further *De* excorporates to *Modal* as it did from the [V-*de/bu*-R] complex. This argument, however, is not tenable for the following two reasons. First, if this were possible, the intervention effects in (22) should not happen. Second, the excorporation of *De* from the [V-*de/bu*-R] complex to *Modal* is motivated by [M] feature-checking, whereas

This analysis is depicted in the configuration (40). With the X^0/head movement approach, the semantic parallelism between (2) and (3) as well as the *neng-de* coöccurrence (8a) and (8b) can be explained.

The parallel semantic interpretation between *de*-sentences and *neng*-sentences is, as proposed, a result of LF movement, either XP (39) or X^0 (40) movement, from [Spce, *De*P] to [Spce, *Modal*P] or from De^0 to $Modal^0$. Following Rizzi's (1990) Relativized Minimality, the LF movement has to obey strict locality constraints. With the LF movement approach, the intervening effects in (22) can be attributed to the violation of Relativized Minimality. Moreover, the status of the four interveners needs to be investigated and the same intervention effects occurring in *dou-* and *A-not-A* constructions need to be taken into consideration as well.

5. Intervention effects revisited

As proposed, *De* and *Modal* are syntactically correlated through an LF movement from *De* to *Modal* for checking the [M] feature. The distinct distributions between *neng*-sentences (21) and *de*-sentences (22) involving the interaction with *bei*, *ba*, *zhi*, and manner adverbs then can be attributed to the violation of a syntactic restriction. As indicated above in (25) and (27), these four elements affect *dou*-quantification and *A-not-A* operation as well. In this section, I shall examine these four constructions in detail and discuss which movement approach, XP (39) or X^0 (40), can properly explain the intervention effects in *de-*, *dou-*, and *A-not-A* constructions.

5.1 Passive constructions

A typical and standard analysis for English passive constructions like (41) is a hypothesis of an NP-movement where the internal argument *John* undergoes A-movement to the subject position for the sake of Case assignment. The English passive morpheme *-ed* is assumed to be responsible for the "suppressed" subject theta-role of the main verb. The "suppressed" subject theta-role is realized as an implicit argument associated with an optional adjunct *by*-phrase.

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the excorporation of *De* from the [V-*de/bu*-R] complex to the head position of any of the interveners does not have any motivation.

[27] If adapting Chomsky's (1995) suggestion, when a given feature F of the head H is attracted, the set of all formal features of H undergoes movement as a package (pied-piping), it is then the whole complex [V-*de/bu*-R] that raises to the head *Modal* for feature checking since the complex contains the semantic feature [M].

(41) **John**$_i$ was killed t_i (by Bill).

Ting (1998) and Huang (1999), on the other hand, suggest for passive constructions in Chinese a different analysis from that for English. It has been noticed that there are two well-known forms of Mandarin passives, long passives and short passives, as shown in (42a) and (42b) respectively, depending on whether the AGENT is present or not:[28]

(42) a. <u>The long passive</u>: **bei** NP-VP
          Zhangsan **bei** **Lisi** da-le
          Zhangsan BEI Lisi   hit-PERF
          "Zhangsan was hit by Lisi."
      b. <u>The short passive</u>: **bei** VP
          Zhangsan **bei** da-le
          Zhangsan BEI hit-PERF
          "Zhangsan was hit."

Ting (1998) and Huang (1999) argue that the Chinese passive marker *bei* is actually a main verb,[29] a two-place predicate meaning 'to undergo, experience'. They propose that there is no object NP movement involved in Chinese passives. Ting (1998) and Huang (1999) further argue that the short passive (42b) cannot be analyzed as a derived version of the long passive (42a) simply via deletion of the AGENT NP.[30] Ting (1998) and Huang (1999) propose that structurally a long passive should have a structure like English *tough* constructions: the complement of the passive verb *bei* is an IP predicate involving either an A-bar movement or an A-bar binding, as represented in

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[28] Ting (1998) notes there are in fact three types of *bei*-sentences. Besides the long and short passives indicated here, a third type passive involves a lexical passive compound verb (or a "complex passive verb") which is a sequence containing the morpheme *bei* and a root verb, such as *bei-bu* 'to be arrested', *bei-qie* 'to be stolen', etc. Ting argues that these lexical sequences have to be fed into syntax as a whole and intervention, such as an adverb, between *bei* and the root verb is not allowed. Thus, **bei-mimi-bu* 'to be secretly arrested' and *bei mimi daibu* 'to be secretly arrested' have to be two different types of *bei*-constructions formed in the lexicon and by syntactic process respectively. The third type of passive is not discussed in this paper.

[29] Tsai (1993) offers a slightly different but similar argument. He considers *bei* as a modal light verb, a two-place predicate taking a PATIENT as its external argument and a proposition as its complement.

[30] Ting (1998) and Huang (1999) provide several pieces of evidence to support the argument, such as island sensitivity, the particle *suo* and resumptive pronouns, etc. Please refer to their articles for detailed discussion.

(43a) below. On the other hand, the passive verb *bei* in a short passive (42b), according to Ting (1998) and Huang (1999), has the status akin to that of a root modal or a light verb and creates a control construction by subcategorizing a VP. As represented in (43b), the VP itself is a short passive structure containing internal NP movement with the underlying PATIENT argument moved into the non-thematic [Spec, VP] position binding the trace. In (43b), the moved PATIENT NP is an empty category, a PRO, which has to be controlled by the base-generated subject of *bei*. Unlike the long passive, the short passive involves A-movement of a PRO controlled by the subject of the passive verb *bei*:

> (43) a. The long passive:
> [Zhangsan$_i$ [$_v$ **bei** [$_{IP}$ **OP**$_i$ [$_{IP}$ Lisi [$_{VP}$ [$_{v'}$ da-le t_i]]]]]]   (A-bar Movement)
> Zhangsan   BEI   Lisi   hit-PERF
> b. The short passive:
> [Zhangsan$_i$ [$_v$ **bei** [$_{VP}$ **PRO**$_i$ [$_{v'}$ da-le t_i]]]]   (A-Movement)
> Zhangsan   BEI   hit-PERF

The following fact in (44) is provided as a piece of the evidence to support the argument that Mandarin long passives involve an A-bar configuration. It is noted that not only a gap *t* can occupy the complement position of the underlined passivized verb as that shown in (43a), an overt logical object pronominal, a resumptive pronoun, *ta* 'him' in (44), that is coïndexed with the subject of *bei*, *Zhangsan*, can also appear in this position:

> (44) [Zhangsan$_i$ [$_v$ **bei** [$_{IP}$ **OP**$_i$ [$_{IP}$ Lisi [$_{VP}$ [$_{v'}$ da-le   **ta**$_i$ yi-xia]]]]]]
> Zhangsan   BEI   Lisi   hit-PERF him once
> "Zhangsan was hit once by Lisi."

Note that Mandarin RVCs, like ordinary verbs, can construct both long and short passives. However, neither of the passives can be grammatically formed when *de/bu* are involved, as illustrated in (45):

> (45) a. zhe-ke   shu   **bei**   **Lisi**   kan-(***de/*bu**)-dao
> this-CL   tree   BEI   Lisi   chop-DE/BU-fall
> "(Intended) This tree was possible to be chopped down (by Lisi)."
> b. zhe-ke   shu   **bei**   kan-(***de/*bu**)-dao
> this-CL   tree   BEI   chop-DE/BU-fall
> "(Intended) This tree was possible to be chopped down."

Consider now the two possibilities, XP and X^0, for the LF movement of *De*. First,

under the XP approach, the OP of *De* has to move to Spec of *Modal*P. As illustrated in (46a) below, in a long passive, the XP movement of the OP of *De* (indexed *j*) is blocked by the passive OP (indexed *i*), which explains the ungrammaticality of (45a). In a short passive, since PRO does not block the A-bar movement, we may expect that the OP of *De* can freely move to Spec of *Modal*P, as illustrated in (46b). However, this analysis wrongly predicts the short passive (45b) to be a grammatical sentence. Therefore, the XP/A-bar approach is not appropriate.

(46) a.*[zhe-ke   shu$_i$ [$_{ModP}$ **OP$_j$** [Mod] [$_{VP}$ *bei* [$_{IP}$ **OP$_i$** [$_{IP}$ Lisi [$_{VP}$ kan [$_{DeP}$ t_j [$_{De}$ *de*] t_i dao]]]]]
　　　　 this-CL   tree　　　　　　　　BEI　　　　 Lisi　　 chop　　　　 DE　 fall

　 b. [zhe-ke   shu$_i$ [$_{ModP}$ **OP$_j$** [Mod] [$_{VP}$ *bei* [$_{VP}$ **PRO$_i$** [$_{V'}$ kan [$_{DeP}$ t_j [$_{De}$ *de*] t_i dao]]]]]
　　　　 this-CL   tree　　　　　　　　BEI　　　　　　　 chop　　　　 DE　 fall

Under the X^0 approach, on the other hand, the passive OP (indexed *i*) in the long passive (45a) would not influence the head movement of *De*, rather, it is the passive head *bei* that prevents the head *De* from undergoing LF head movement to *Modal*, as shown in (47a). In the short passive (45b), the passive head *bei* once again blocks the head movement from *De* to *Modal*, as represented in (47b). Thus (45b) is ruled out by principle as expected.

(47) a.*[zhe-ke shu$_i$ [$_{ModP}$ [$_{Mod}$ ***De$_j$*** *Mod*] [$_{VP}$ ***bei*** [$_{IP}$ OP$_i$ [$_{IP}$ Lisi [$_{VP}$ kan [$_{DeP}$ [$_{De}$ ***t$_j$***] t_i　 dao]]]]]]]
　　　　 this-CL tree　　　　　　　　　　　 BEI　　　　 Lisi　 chop　　　　　 fall

　 b.*[zhe-ke shu$_i$ [$_{ModP}$ [$_{Mod}$ ***De$_j$*** *Mod* [$_{VP}$ ***bei*** [$_{VP}$ PRO$_i$ [$_{V'}$ kan [$_{De}$ ***t$_j$***] t_i dao]]]]
　　　　 this-CL tree　　　　　　　　　　　 BEI　　　　　 chop　　　 fall

The XP approach explains the ungrammatical long passive (45a). However, it fails to account for the ungrammatical short passive (45b). In contrast, the X^0 approach properly elucidates the illegitimate head movements of *De* in both long and short passives. Accordingly, I propose that the X^0 approach is appropriate to account for passive intervention in *de*-sentences.

Recall that passive constructions also render *dou*-quantifications and *A-not-A* questions ungrammatical, as repeated in (25a) and (27a) respectively:

(25)　a.　zhe-xie　 sanmingzhi　 ***bei***　 Lisi (*****dou***) chi-le.
　　　　　 those　　 sandwich　　 BEI　 Lisi　 all　 eat-ASP
　　　　　 "(Intended) All of those sandwiches were eaten by Lisi."
(27)　a.*zhe-ben　shu　 ***bei***　 Lisi　 ***kan-bu-kan***?
　　　　　 this-CL　 book　 BEI　 Lisi　 read-not-read
　　　　　 "(Intended) Was the book read by Lisi?"

Note that neither *dou*-quantification nor *A-not-A* can form a short passive, as shown in (48):

(48) a. zhe-xie sanmingzhi **bei** (***dou**) chi-le.
　　　 those　　 sandwich　　 BEI 　　 all　　　 eat-ASP
　　　 "(Intended) All of those sandwiches were eaten."
　　 b. *zhe-ben shu　　 **bei**　 **kan-bu-kan**?
　　　　this-CL　 book　　 BEI　　 read-not-read
　　　　"(Intended) Was the book read?"

As mentioned earlier, the quantifier *dou* and the *A-not-A* operator may be categorized as an X^0 or an XP. Under the XP approach, the representation of the ungrammatical long passives in (25a) and (27a) is given in (49a) where the A-bar movements of *dou* and the *A-not-A* operator are blocked by the passive OP, as that in the *de*-sentence (46a). Similarly to the incorrect prediction for the *de*-sentence (46b), the XP approach also wrongly predicts that the A-bar movements in short passives (48a) and (48b) are grammatical, as represented in (49b):

(49) a.*[$\mathbf{OP}_{[+Q]j}$/ $\mathbf{OP}_{DOUj}$ [$_{VP}$ *bei* [$_{IP}$ $\mathbf{OP}_i$ [$_{IP}$ $\mathbf{t}_j$ V t_i]]]]
　　 b.　[$\mathbf{OP}_{[+Q]j}$/ $\mathbf{OP}_{DOUj}$ [$_{VP}$ *bei* [$_{VP}$ $\mathbf{PRO}_i$ $\mathbf{t}_j$ V t_i]]]]

Under the X^0 approach, however, the passive verb *bei* is an intervener blocking the head movements of *dou* and [+Q] in both long passives, (25a) and (27a), and short passives, (48a) and (48b). Hence, the sentences are ruled out as expected, as represented in (50):

(50) a.*[[+Q]$_j$ /***Dou***$_j$ [$_{VP}$ ***bei*** [$_{IP}$ OP$_i$ [$_{IP}$ $\mathbf{t}_j$ t_i]]]]
　　 b.*[[+Q]$_j$ /***Dou***$_j$ [$_{VP}$ ***bei*** [$_{VP}$ PRO$_i$ [$_{VP}$ $\mathbf{t}_j$ t_i]]]]

Cheng (1995) offers a similar argument to account for passivization in *dou*-quantification (25a). She considers, adopting Travis (1988), that the quantifier *dou* is <u>defective</u> adverb adjoined to an X^0 or X',[31] and, following Tsai (1993), the element *bei* is a two-place modal light verb. Cheng argues that the inability of *dou* quantifying over a plural subject NP in passives is because the passive head *bei* creates an intervention effect for the quantification. Cheng's analysis in fact supports the X^0 account for the intervention of *dou*-quantification in (25a).

In conclusion, the ill-formed passives in *de*-constructions, *dou*-quantification and *A-not-A* questions are attributed to the same reason that the head *bei* acts as an

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[31] Please refer to the discussion in footnote 18 for the categorical analysis of *dou*.

intervener preventing the X^0/head movements of De^0, *dou* and the *A-not-A* operator. Hence, the X^0 approach appropriately predicts the results of the interaction of *bei* and these three constructions.

5.2 *Ba*-constructions

The logical object of the verb in a *ba*-sentence like (51a) is promoted to a preverbal position as the surface object of the element *ba*. Sybesma (1992, 1999) argues that *ba* is a causative verb *Cause* and a *ba*-construction should be treated as a type of causative construction headed by *ba*.[32] Accordingly, the subject of a *ba*-sentence is the CAUSER and the *Cause* verb *ba* selects a VP while the promoted object is the CAUSEE. Sybesma proposes that the VP embedded under the verb *ba* is unaccusative in the sense that it is an ACTION involving termination but no initiator. Structurally, Sybesma suggests, the embedded verb (V) takes an XP, a SMALL CLAUSE denoting a RESULT state, as its complement. A *ba*-sentence thus can be interpreted as that the ACTION (V) that the CAUSER (subject) has done has an effect on the CAUSEE (*ba*-object) and that gives the RESULT (XP/R) to the *ba*-object. Sybesma claims that the object NP is base-generated in Spec of XP and is adjoined to VP in order to be Case-marked by *ba*. (51a) is represented as (51b):

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[32] Some *ba*-sentences might not convey a solid causative meaning. An example like (i) which contains a verb of psychological activity *wang* 'forget' cannot be translated as {Lisi caused the key to be forgotten in home.}.

    (i) Lisi ***ba***   yaoshi ***wang***   zai jia-li   le.
       Lisi BA key   forget at   home-in CRS

The straightforward causative interpretation might not be appropriate for *ba*-sentences like (i). However, (i) can still be interpreted as that the EXPERIENCER (Lisi) has done the psychological activity of forgetting that has an effect on the object (the key) and gives a RESULT (the key is in home). This paper is not trying to provide a complete discussion about *ba*-constructions rather it attempts to show that *ba*-constructions cannot be structured with *de/bu* but work perfectly with the modal *neng*, as shown in (iia) and (iib) where the verb *wang* 'forget' is the V in RVCs.

    (ii) a.*Lisi ***ba***   yaoshi ***wang*-*de/bu*-diao.**
          Lisi BA key   forget-DE/BU-lose
          "(Intended) Lisi can/cannot forget (about) the key."
      b. Lisi (***bu***)-***neng*** ***ba*** yaoshi ***wang*-diao.**
         Lisi not-can   BA key   forget-lose
         "Lisi can/cannot forget (about) the key."

(51) a. ta ***ba*** *shoupa* *ku-shi*-le
  he BA handkerchief cry-wet-PERF
  "He cried so much and (as a result) the handkerchief got wet."

 b. ta [$_{CauseP}$ [$_{Cause}$ ***ba***] [$_{VP}$ [$_{ba-NP}$ ***shoupa$_i$***] [$_{VP}$ *ku* [$_{XP/SC}$ t_i *shi*-le]]]]]
  he   BA   handkerchief cry   wet-PERF

Ba-constructions require the existence of an empty category in the post-verbal position.[33] Thus, an overt pronoun or a reflexive cannot be placed post-verbally, as shown in (52):

(52) *Zhangsan$_i$* ***ba*** **Lisi$_j$** da-shang-le   (***ta***$_{*i/*j}$)/(***ziji***$_{*i/*j}$)
  Zhangsan BA Lisi hit-injured-PERF him/self

The sentence (52) shows the following: (i) the post-*ba* verb is an unaccusative verb which is not able to assign Case to its object, (ii) the *ba*-NP is not the object of *ba* but a theta-selected THEME/PATIENT of the post-*ba* verb undergoing an NP/A-movement and (iii) unlike passive constructions, there is no null operator involved in *ba*-constructions.

Let us return to the interaction of *de*-construction and *ba*-construction in (22b). Under the XP approach, the OP of *De* is allowed to move from Spec of *De*P to Spec of *Modal*P, as represented in (53), since there is no OP involved in *ba*-constructions (51b). However, the XP approach falsely predicts the *ba*-sentence containing *de* (22b) to be a grammatical sentence:

(53) [Lisi [$_{ModP}$ **OP$_i$** [$_{Mod}$ *Mod*] [$_{CauseP}$ *ba* [$_{VP}$ zhe-ke shu [$_V$ kan [$_{DeP}$ t_i [$_{De}$ *de*] [dao]]]]]
  Lisi   BA   this-CL tree chop   DE fall

On the other hand, the X^0 approach (54) correctly accounts for the ungrammatical sentence (22b) in that the *Cause* verb *ba* intervenes the head movement from *De* to *Modal*:

(54)*[Lisi [$_{ModP}$ [$_{Mod}$ ***De$_i$*** *Mod*] [$_{CauseP}$ ***ba*** [$_{VP}$ zhe-ke shu [$_V$ kan [$_{De}$ t_i] dao]]]]
  Lisi   BA   this-CL tree chop   fall

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[33] The post-verbal position of *ba*-constructions may exceptionally allow some overt elements, so-called "retained objects", such as *pi* 'skin' in (i):

 (i) wo *ba* juzi   bo-le   ***pi***
  I BA orange peel-PERF skin
  "I peeled the skin off the orange."

J.-I. Li (1997) suggests that retained objects are one of the objects of the post-*ba* verb so that they can get Partitive Case, an inherent Case, from the post-*ba* verb. Please see J.-I. Li (1997) for relevant discussion.

Based on the analyses in (53) and (54), I propose that the X^0, rather than the XP, approach is the appropriate analysis to account for the LF movement in *de*-constructions when interacting with *ba*-constructions.

Recall the examples in (25b) and (27b) where the intervention of *ba* renders ungrammatical *dou*-quantification and *A-not-A* question.

(25) b. tamen ***dou   ba*** zhe-ben shu (*dou) kan-le.
         they   all   BA   this-CL book all   read-ASP
         "All of them read that book."
(27) b.*Lisi ***ba*** zhe-ben   shu   ***kan-bu-kan***?
         Lisi   BA   this-CL   book   read-not-read
         "Does Lisi read this book?"

The X^0 approach for *de*-constructions (54) can also account for the intervention effect incurred in the *dou*-construction (25b). The X^0 approach explains that the ungrammaticality of (25b) is attributed to the failure of the second *dou* quantifying over the plural subject NP *zhe-xie shu* 'these books' since the *Cause* verb *ba* blocks *dou*-quantification. The XP approach, on the other hand, wrongly predicts that the second *dou* can quantify over the subject NP. The XP approach for the ungrammatical *A-not-A* operator movement in (27b) is also not appropriate, since, like the analyses of *de*-constructions and *dou*-quantifications, the XP approach incorrectly predicts the grammaticality of (27b). In contrast, the X^0 approach properly accounts for the ungrammaticality of (27b) in which the intervener, the *Cause* verb *ba*, prevents *A-not-A* operator [+Q] from undergoing LF head movement. The representation of the ungrammatical head movements in *dou*-quantifications and *A-not-A* questions is shown in (55):

(55)   * $[[$**+Q**$]_i$ /***Dou*** $_i$ $[_{CauseP}$ ***ba*** $[_{VP}$ V $[_{De}$ ***t****$_i$* $]$ R $]]]$

With the analyses above, I conclude that the ungrammatical *ba*-constructions in (22b), (25b) and (27b) are attributed to the intervention of the *Cause* verb *ba* which prevents the X^0/head movements of *De*, *dou* and *A-not-A* operator from raising to an associated X^0 positions.

5.3 Focus elements

As discussed previously in §3.2, the material that follows the focus element *zhi* 'only' is in the focusing scope of *zhi*. Consider the interaction of *neng*-constructions with *zhi* in (56). The overt modal *neng* is under the scope of *zhi* in (56a), whereas it is

outside of the scope of *zhi* in (56b). As indicated in the translations, the different positions of *zhi* thus give different scopes and different interpretations.

(56) a. Lisi ***zhi   neng*** kan-dao   *yi-ke   shu*,   danshi ***bu-neng/*neng*** kan-dao   *shi-ke*.
Lisi only   can   chop-fall one-CL tree   but   not-can/*can   chop-fall   ten-CL
"Lisi can only chop one tree down, but he cannot chop down ten."
   b. Lisi ***neng zhi***   kan-dao   yi-ke   shu, suiran   ta ***neng/*bu-neng*** kan-dao   shi-ke.
Lisi can   only   chop-fall one-CL tree although he can/*not-can   chop-fall   ten-CL
"Lisi can chop only one tree down, although he can chop ten trees down."

Let us turn to the *de*-constructions (57). The parallel interpretation as that in (56a) can be obtained in (57a) when *zhi* does not intervene between the covert *Modal* and *de* but scopes over both of them, whereas when *zhi* intervenes between the covert *Modal* and *de*, as shown in (57b), it blocks the LF movement of *de* to the *Modal* position. Therefore, the same interpretation that we get in the *neng*-sentence (56b) can never be obtained in *de*-sentence (57b):

(57) a. Lisi ***zhi*** [$_{Mod}$ Ø] kan-***de***-dao   yi-ke   shu,   danshi kan-***bu/*de***-dao   shi-ke.
Lisi   only   chop-DE-fall one-CL tree   but   chop-BU/*DE-fall   ten-CL
"Lisi can only chop one tree down, but he cannot chop down ten."
   b. Lisi [$_{Mod}$ Ø] ***zhi***   kan-***de***-dao   yi-ke   shu, suiran   ta kan-****de/*bu***-dao   shi-ke.
Lisi   only chop-DE-fall one-CL tree although he chop-*DE/*BU-fall   ten-CL
"Lisi can chop only one tree down, although he can chop ten trees down."

Based on Beck (1996a, b), Soh (2001) argues that Chinese focus element *zhi* 'only' is an intervening quantifier blocking LF adjunct *wh*-movement. Soh shows that Chinese LF *wh*-movement operations, such *wh*-adjunct *weisheme* 'why' and *A-not-A* questions, that are constrained by island conditions also exhibit intervention effects, as illustrated in (58):

(58) a.*Ni   ***zhi***   renwei Lisi ***weisheme*** cizhi?   (= Soh 2001: (11a))
You   only   think   Lisi   why   resign
"What is the reason x such that you only think Lisi resigned for x?"
   b.*Ni   ***zhi   hui-bu-hui***   shuo   Yingyu?   (= Soh 2001: (13a))
You   only   can-not-can   speak   English
"Can you only speak English?"

Recall (21c) and (22c), it has been observed that the focus element *zhi* shows the same blocking phenomenon in *de*-sentence (22c) as that in the LF *wh*-sentences (58) but *zhi* can be placed in *neng*-sentence (21c). The contrast between (21c) and (22c) suggests that some kind of LF movement like that in (58) is responsible for the ungrammaticality

of (22c) where *zhi*, or its projection, might be an intervener preventing *De* from undergoing LF movement to *Modal*.

Regarding the generation of the focus element *zhi*, S.-W. Tang (1998) provides an argument that Chinese focus elements are adverbs adjoined to a verbal functional category, such as *v*P, TP or CP, depending on their focusing scope. The position we are interested is the one adjoined to *v*P. Under the XP approach, the ungrammaticality of (22c) is attributed to the OP of *De* crossing over the intervening focus element *zhi* while undergoing XP/A-bar movement:

(59) *$[_{ModP}\textbf{OP}_i[_{Mod}Mod][_{vP}$ ***zhi*** $[_{VP}$ kan $[_{DeP}$ ***t****_i* $[_{De}$ *de*$][_{RP}$ dao $[_{NP}$ zhe-ben shu $]]]]$

From (59), it seems that the ungrammatical *de*-construction (22c) can be accounted for by the XP approach. However, it is not clear why focus elements like *zhi* behave differently from other XP adjuncts. In the following, I shall show that focus elements, such as *zhi*, are different from other XP adverbials in terms of their syntactic distribution. First of all, some XP adverbials, like *ti wo* 'for me', *xiang laoshi* 'to teacher' in (23), repeated below, and some XP adverbials, such as *cong xuexiao* 'from school', *jintian* 'today' and *mingtian* 'tomorrow' shown in (60a)-(60c), can appear freely between *Modal* and *De* without triggering the same intervention effects as the focus element *zhi* does in (22c), (25c) and (27c):[34]

(23) a. Lisi (*bu-*)*neng*   [***ti wo***] [***cong xuexiao***] [***xiang laoshi***]   jie-***de***-dao   LGB
        Lisi (not)can   for me from   school   to   teacher borrow-DE-arrive LGB
        "Lisi can/cannot borrow LGB from the teacher from school for me."
    b. Lisi (*bu-*)*neng*   [***ti wo***] [***cong xuexiao***] [***xiang laoshi***]   jie-***de***-dao   LGB.
    c. Lisi (*bu-*)*neng*   [***xiang laoshi***] [***ti wo***] [***cong xuexiao***] jie-***de***-dao   LGB.
    d. Lisi (*bu-*)*neng*   [***xiang laoshi***] [***cong xuexiao***] [***ti wo***] jie-***de***-dao   LGB.
    e. Lisi (*bu-*)*neng*   [***cong xuexiao***] [***xiang laoshi***] [***ti wo***] jie-***de***-dao   LGB.
    f. Lisi (*bu-*)*neng*   [***cong xuexiao***] [***ti wo***] [***xiang laoshi***] jie-***de***-dao   LGB.

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[34] One possible explanation for the absence of the blocking effect in (23a)-(23f) and (60) is that those XP adverbials are non-quantificational, while *zhi* 'only' is. I appreciate the reviewer pointing out this possibility. It is true that the focus elements like *zhi* are quantificational and thus the different distribution from that of other XP adverbials would be accounted for. In fact, Cinque (1999) considers adverbials like those in (23a)-(23f) to be "predicates". (See as well the discussion in §5.4.) In this paper, I follow Cinque (1999) and suggest that *zhi* is actually a quantifier head projecting as Foc(us)P.

(60) a. Lisi (***cong xuexiao***) (*bu-*)*neng* (***cong   xuexiao***)   jie-***de***-dao   LGB.   (cf. (22c))
        Lisi from school   not-can   from   school   borrow-DE-arrive LGB
        "Lisi can/cannot borrow LGB from school."

  b. (***jintian***) tamen (***jintian***) ***dou*** chi-le   sanmingzhi.   (cf. (25c))
        today   they   today   all   eat-PERF   sandwich
        "All of them ate sandwiches today."

  c. (***mingtian***) Lisi (***mingtian***) ***hui-bu-hui***   cizhi?   (cf. (27c))
        tomorrow   Lisi   tomorrow   will-not-will   resign
        "Will Lisi resign tomorrow?"

Secondly, focus elements can be fronted together with their modified elements under Focus Movement or Clefting but other adverbs cannot:

(61) a. [***Zhi***   kan-wan   zhe-ben shu],   Lisi   yiding   neng.
        only   read-finish this-CL   book   Lisi   definitely   can
        "Only finish reading this book, Lisi definitely can."

  b.*[***Tongchang*** qu tushuguan],   Lisi   yiding   hui.
        usually   go library   Lisi   definitely   will

Cinque (1999) argues, according to those properties indicated above,[35] that focus elements form a constituent with the phrase following them and it is plausible to treat focus elements as heads taking their modifiees as complements (cf. Bayer 1996). If Cinque's analysis is correct, focus elements then should be treated differently from other XP adverbials based on their different syntactic behavior, and we might then consider the possibility that focus elements in fact project as heads. Following Cinque (1999), I assume that *zhi* is a head, say Foc(us), projecting as Foc(us)P and taking a VP as its complement. Thus, once again the X^0 approach explains why the intervention of focus elements in the *de*-construction (22c) blocks the head movement of *De* to *Modal*. The representation is provided in (62):

(62)   *[$_{ModP}$ [$_{Mod}$ ***De$_i$*** *Mod*] [$_{FocP}$ [$_{Foc}$ ***zhi***][$_{VP}$ [$_V$ kan [$_{De}$ *t_i*] dao]$_j$ [$_{DeP}$ t_j [t_j […]]]]]]
                only   chop   fall

The X^0 approach (59) can also explain the ungrammaticality in *dou*-quantification (25c) and *A-not-A* question (27c) where the focus element *zhi* also blocks the head

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[35] Cinque (1999) has one more piece of evidence to support the argument. It is the fact that focus elements can intervene between a verb and its object, such as English {John loves **only** Mary.}, but not other kind of adverbs, such as o*ften* in {*John forgot **often** his name.}. However, Chinese focus elements can only occur preverbally due to some unknown reason. I would leave out this property for now and expect further research for proper explanation.

movements of *dou* and the *A-not-A* operator [+Q]:

(63)   *[[+Q]*ᵢ* /***Dou*** *ᵢ* [$_{FocP}$ [$_{Foc}$ ***zhi***][$_{VP}$ V [$_{De}$ ***tᵢ***] R]]]

5.4 Manner adverbs

Traditionally manner adverbs are usually treated as maximal projections adjoined to *v*P (cf. C.-C. Tang 1990, S.-W. Tang 1997, among others). Under the XP approach, the OP of *De* moves to the Spec of *Modal*P for feature checking. The ungrammatical *de*-sentence (22d) would be attributed to the intervening XP manner adverb blocking the XP movement of OP of *De*:

(64)   *[$_{ModP}$**OP***ᵢ*[$_{Mod}$*Mod*][$_{vP}$ ***manmande*** [$_{VP}$ kan [$_{DeP}$ ***tᵢ*** [$_{De}$*de*][$_{RP}$ dao [$_{NP}$ zhe-ben shu]]]]]

The XP analysis (64) seems to be able to explain the intervention of manner adverbs in *de*-construction (22d), *dou*-quantification (25d) and *A-not-A* question (27d), repeated below:

(25) d. tamen (****manman-de***) **dou**   chi-le   sanmingzhi.
        they   slow-ly   all   eat-PERF   sandwich
        "All of them ate sandwiches slowly."
(27) d. Lisi (****zixi-de***)   ***kan-bu-kan***   zhe-ben shu?
        Lisi   carefully   read-not-read   this-CL   book
        "Does Lisi read this book carefully?"

Some other analyses, however, have treated manner adverbs as an X^0 category. Travis (1988) proposes that due to their "defective" nature, adverbs do not project to a maximal projection. Travis proposes that adverbs are not licensed in the same way that maximal projections are. Rather, adverbs are licensed by a head feature, such as the feature of a verb, and are in a <u>head</u>-<u>to</u>-<u>head</u> relationship with their licenser. Travis suggests that structurally adverbs are base-generated as an incorporated head with the head of their licenser, as shown in (65) (= Travis 1988: (49b)):

(65)   VP
                      ╱   ╲
                    V
              ╱   ╲
          ADV   V
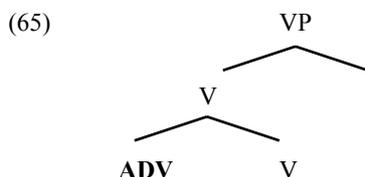
Under the X^0 approach (65), manner adverbs such as *manmande* 'slowly' are then base-generated as an incorporated head with the head of the licenser, the V, as depicted in the configuration (66). As proposed, the functional head *De* excorporates from the verbal complex [V-*de/bu*-R] and raises to *Modal* at LF to check the [M] feature. However, this X^0 analysis (66) falsely predicts that *de*-sentence (22d) is grammatical. Since in (66) the manner adverb is an incorporated head incorporated with the verbal complex [V-*de/bu*-R], it does not block the excorporation of *De* undergoing LF head movement to *Modal*.

(66)
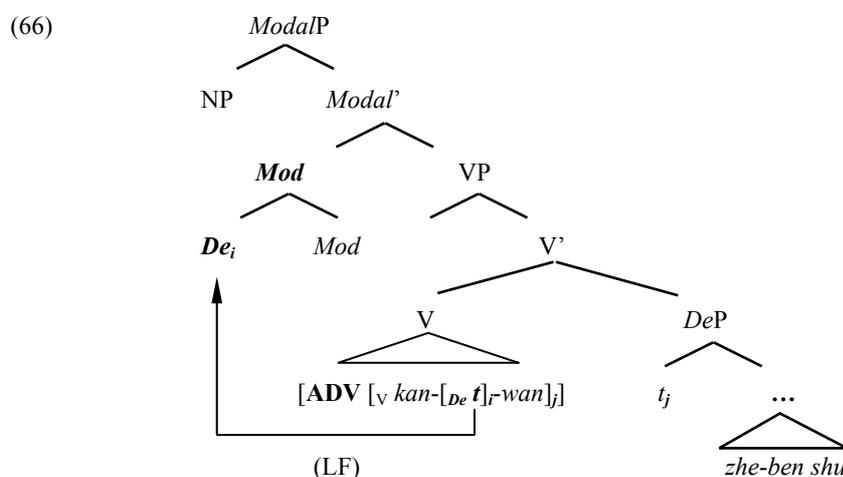
In fact, the X^0 approach (66) is also problematic in terms of the differences between adverb phrases (XP) and root/head adverbs (X^0). Manner adverbs like *manmande* 'slowly' are XP phrases formed by reduplicating the root adverb and optionally adding the adverb suffix *-de* '-ly' in the lexicon since any other elements are not allowed to intervene in between. Thus, adverbs that are intervened by, for instance, *you* 'again' formed as *man-you-man-de 'slow-*again*-slow-ly' are ungrammatical. X^0/root adverbs like *man* 'slow', on the other hand, cannot appear independently in contexts, such as ***man** *kan-wan* 'slowly read-finish'. An X^0/root adverb can incorporate to a root verb to form a modifier-head compound verb like (67a) but cannot incorporate to a compound verb like in (68b), whereas an XP adverb can do both, as shown in (68a) and (68b). Moreover, X^0/root adverb *man* and XP adverb *manmande* are different in terms of being able to be modified by degree adverbs or being structurally independent, as indicated in (67c), (67d) and (68c), (68d) respectively:

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(67) a. ***man-**yong* 'slow-enjoy'
      b.****man-xiang-yong*** 'slow-enjoy-enjoy'
      c.***hen *man-**yong* 'very-slow-enjoy'
      d.****man-**yi-ge-ren**-*yong* 'slow-one-person-enjoy (enjoy alone slowly)'

(68) a. ***man-man-de** yong* 'slowly enjoy'
      b. ***man-man-de** xiang-yong* 'slowly enjoy'
      c. (**hen**) ***man-**(***man***)-**de** (*xiang-*)*yong* '(very) slowly enjoy'
      d. ***man-man-de** **yi-ge-ren** (*xiang-*)*yong* 'enjoy alone slowly'

The observation in (67) and (68) indicates that X^0 and XP adverbs are different in their incorporation formation. Manner adverbs like *manmande* 'slowly' are in fact XP type adverbs. The X^0 approach (66) thus is not appropriate to account for the intervention effects in (22d).

At first glance, it seems that the XP approach (64) is favored over the X^0 approach (66) to account for the ungrammaticality in (22d). However, I shall show in the following that the XP approach (64) does not give a comprehensive explanation to account for the intervention effects in *de*-constructions, *dou*-quantification and *A-not-A* questions. I shall suggest that although the X^0 approach (66) fails to account for the intervention effects in (22d), (25d) and (27d), one should not take it as evidence to completely rule out the possibility of X^0/head movement.

As noted previously, manner adverbs behave differently from other adverbial phrases like those in (60), which do not exhibit the same intervention effects. Moreover, other adverbial phrases, as those exemplified in (23), are interchangeable without changing the meaning of the sentences. The facts in (23) and (60) indicate that there is a systematic difference between adverbs that block LF movements and those which are compatible with them. I would separate two types of adverbs/adverbials with reference to whether they block LF movement or not.

It is noted that adjuncts like those in (23) and (60) do not block LF movement and are freely interchangeable. Cinque (1999) proposes that adverbials like those in (23) (what Cinque calls "circumstantial adverbials") are actually <u>predicates</u> predicated of the VP in the Spec of a distinct VP shell due to the free order of these adverbials (Cinque 1999:30). The predicate properties of these adverbials explain why they do not block LF movement.

On the other hand, adjuncts that trigger intervention effects on LF movement, like manner adverbs, should be treated differently. Ernst (1994) proposes that Mandarin adjuncts can be divided in two types,[36] "Core adjuncts" and "Theta/INFL (argument-

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[36] C.-C. Tang (1993), however, does not agree with Ernst's dichotomous analysis of core and Theta/INFL adjuncts. She argues that the distribution of adjuncts is sensitive to the types of sentences in which they appear. She suggests classifying different adjuncts with feature

like) adjuncts" in terms of their different behavior in blocking *A-not-A* questions. Under Ernst's analysis, core adjuncts include manner, degree, epistemic, aspectual, AGENT-oriented adverbs, etc., whereas Theta/INFL adjuncts include those in (60) and temporal, locative, goal/source, benefactive, instrumental adverbials as well. Cinque (1999) proposes that adverbs in general are hierarchically arranged in distinct Specs of different functional heads and their order will follow from the order of the respective heads under Spec-head agreement, whereas the adverbials that are interchangeable (circumstantial adverbials) should be generated differently.

Inspired by Ernst (1995) and Cinque (1999), I propose that adverb/adverbial adjuncts should be divided into two types, Head Adjuncts and Argument-like Adjuncts. With respect to their characteristics in terms of blocking LF movement, Head Adjuncts act like a quantifier element and affect other quantifiers in the process of quantification operations, such as QR or LF movement, whereas Argument-like Adjuncts do not have such property and behave more like predicates.

(69) a. **Head Adjuncts**: quantificational, affect other quantification operations.
      b. **Argument-like Adjuncts**: non-quantificational, contain properties of predicates.

Let us return to the intervention effects triggered by manner adverbs in the *de*-construction (22d), the *dou*-quantification (25d) and the *A-not-A* question (27d). Based on the proposal above, akin to the analyses in Ernst (1995) and Cinque (1999), I propose that manner adverbs are Head Adjuncts and, adopting Cinque, should be arranged in the Spec position of a functional projection. This functional projection could be *v*P, or say, Man(ner)P[37] for the consideration of interpretation. Through Spec-head agreement, the functional head *v*/Manner is actually an operator itself preventing *De* from undergoing LF X^0/head movement. The revised X^0 approach is provided in (70):

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differences. For instance, some adjuncts like *daodi* 'the-hell' are sorted in Core adjunct category but they actually do not block *A-not-A* operator movement. According to Tang, these adjuncts should be featured with Comp [+Q, -*wh*]. Other adjuncts, such as *xianran-de* 'obviously', need to be licensed by Comp [-Q], thus they are not compatible with *A-not-A* questions. Please see Tang (1993) for discussion.

[37] Cinque (1999) postulates that manner adverbs are in the Spec of "celerative Asp" since they may quantify over the event or the process. I use Man(ner) here as the functional head for the purpose of interpretation.

(70)

```
                    ModalP
                   /      \
                Spec      Modal'
                         /      \
                   Modal          vP/MannerP
                  /     \        /          \
              De_i      Modal  Spec          v'/Manner'
               |                 |           /        \
               |                ADV  (v/Manner)        VP
               |                                      /   \
               *                                   Spec    V'
               |                                          /    \
               |                                         V      DeP
               |                                        / \    /   \
               |                          [kan-[De t]_i-wan]_j  t_j  ...
               |_____|
                              (LF)                           zhe-ben shu
```
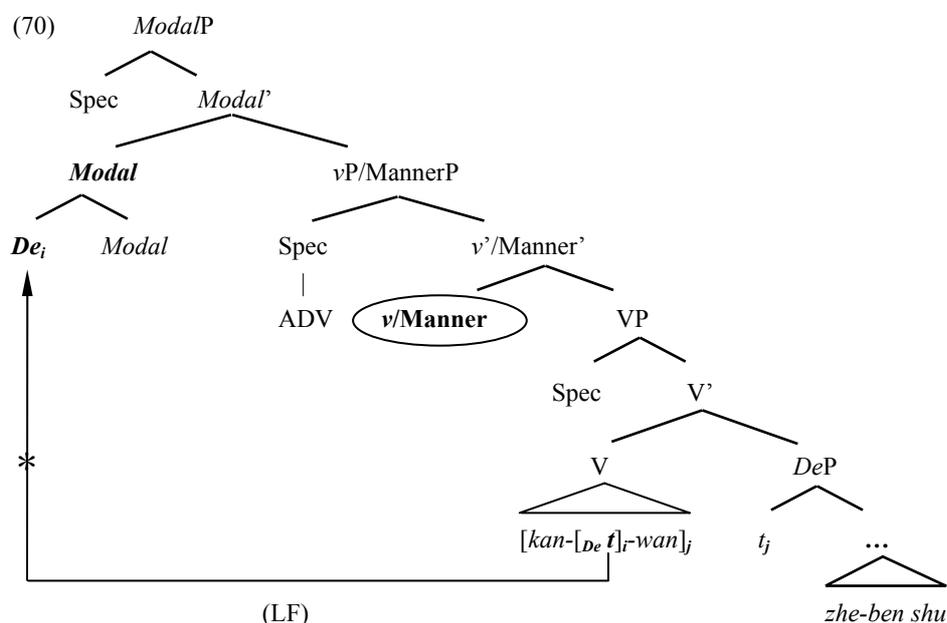
The revised X^0 approach (70) does not have the incorporation problems that the pure X^0 approach (66) has. In addition, it maintains the traditional XP analysis of manner adverbs that the XP approach (64) covers. Therefore, the ungrammatical sentences (22d), (25d) and (27d) are attributed to the violation of locality restrictions in which the functional head *v*/Manner blocks the LF X^0/head movements of *De, dou* and *A-not-A* feature [+Q].

5.5 Summary

I have examined the categorical structures of passive constructions, *ba*-constructions, focus elements and manner adverbs as well as the intervention effects in *de-*, *dou-*, and *A-not-A* constructions when interacting with the four constructions. There are two possibilities, XP and X^0, to categorize the LF movements of *De, dou*, and *A-not-A* operator. The provided evidence shows that the intervention effects should be attributed to the violation of X^0/head movement in terms of Relativized Minimality (Rizzi 1990). As a result, the X^0 approach (40) is favored over the XP approach (39) in accounting for the intervening phenomena in *de-*, *dou-*, and *A-not-A* constructions.

## 6. Single/double modality interpretation and *neng-de* coöccurrence

Recall the coöccurrence (8) where *de* and *neng* occur in a single sentence and denote three possible readings: p<u>ossibility</u> (both *neng* and *de*) in (8a), <u>ability</u> (both *neng* and *de*) in (8b) and "p<u>ossibility</u> (*neng*)" + "ability (*de)*" in (8c).

(8)　Lisi (**bu-**)***neng***　kan-***de***-dao　zhe-ke　shu.
　　　Lisi not-can　　chop-DE-fall　this-CL　tree
　　　a.　"It is possible/impossible for Lisi to chop the tree down."
　　　b.　"Lisi is able/unable to chop the tree down."
　　　c.　"It is possible/impossible for Lisi to be able to chop the tree down."

I have argued that *De* is an operator licensed by *Modal* and requires an LF X^0/head movement to *Modal* for checking the potentiality [M] feature (either [M$_{possibility}$] or [M$_{ability}$]). The *neng-de* coöccurrence in (8) supports the argument that *De* is structurally generated at a different position from *Modal*. As suggested, *De* and *Modal* are involved in the *de*-sentence (2) in which *De* is semantically and syntactically related to *Modal*. Recall (20) which schematizes the *de*-sentence (2) and the possible/impossible readings in *neng-de* coöccurrence (8).

(20)　a.　[… *Modal* $_{\text{Epistemic [M]}}$ …[... *De* $_{\text{Epistemic [M]}}$ …]]　　　　　(cf. (2), (8a))
　　　b.　[… *Modal* $_{\text{Deontic [M]}}$ … [... *De* $_{\text{Deontic [M]}}$ …]]　　　　　(cf. (2), (8b))
　　　c.　[… *Modal* $_{\text{Epistemic}}$ …　[... *Modal* $_{\text{Deontic [M]}}$ …[... *De* $_{\text{Deontic [M]}}$…]]]　　(cf. (8c))
　　　d.*[… *Modal* $_{\text{Epistemic [M]}}$ …[... *Modal* $_{\text{Deontic}}$ …　[... *De* $_{\text{Epistemic [M]}}$…]]]

In (20), both simple *de*-sentence (2) and *neng-de* coöccurrence (8a-b) contain two modality projections, *De* and *Modal*, but denote a single modality meaning, [M*p*] (p<u>ossibility</u>) or [M*a*] (<u>ability</u>). The difference is that the *Modal* in *de*-sentence (2) is covert, as represented in (71a), while it is overt in the *neng-de* coöccurrence (8a-b), as represented in (71b):

(71) a. *Modal*P   (= (2))

            Spec   *Modal'*

                 Modal   VP

        De$_{[Mp]/[Ma]i}$ Ø $_{[Mp]/[Ma]}$ V'

                                    V   *De*P

                            [V-[$_{De}$ **t**$_i$]-R]   …

(71) b. *Modal*P   (= (8a), (8b))

            Spec   *Modal'*

                 Modal   VP

        De$_{[Mp]/[Ma]i}$ **neng**$_{[Mp]/[Ma]}$ V'

                                    V   *De*P

                            [V-[$_{De}$ **t**$_i$]-R]   …
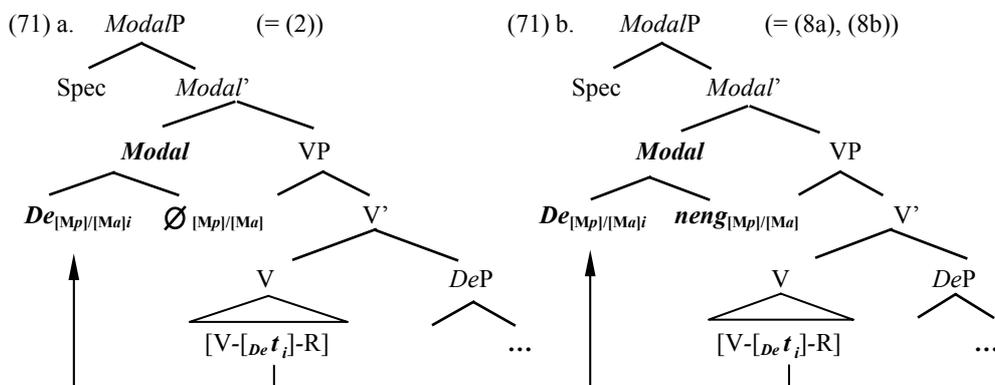
On the other hand, the *neng-de* coöccurrence (8c) conveys a double-modality reading, [M*p*]+[M*a*] ("possibility *neng*" + "ability *de*"), as represented in (71c):

(71) c. *Modal*P   (= (8c))

                     Modal'

        Modal$_{Epistemic}$ …

              |

           neng   *Modal*P

                              Modal'

                 Modal$_{Deontic}$ VP

            De$_{[Ma]i}$ Ø $_{[Ma]}$ V'

                                    V   *De*P

                            [V-[$_{De}$ **t**$_i$]-R]   …
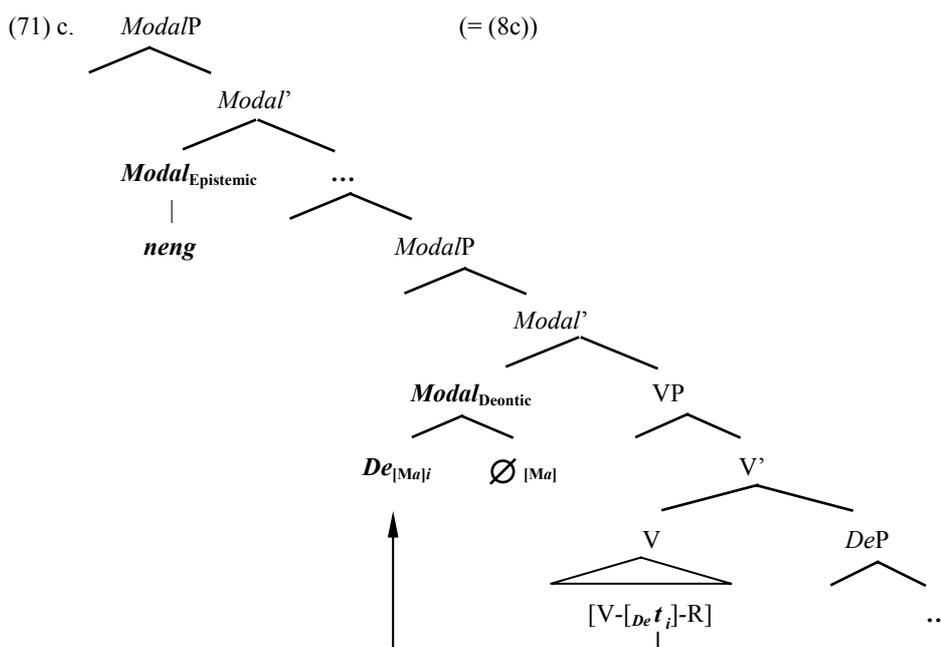
The reason that the fourth reading (20d) "possibility *de*" + "ability *neng*" cannot be generated is because the head *De*$_{[Mp]}$ is licensed by a higher epistemic modal *Modal*$_{[Mp]}$ and the operation of undergoing an LF head movement from *De*$_{[Mp]}$ to *Modal*$_{[Mp]}$ position is blocked by the deontic modal *Modal*$_{[Ma]}$ which is located between *De*$_{[Mp]}$ and *Modal*$_{[Mp]}$, as represented in (71d). The impossible reading of (20d) is attributed to the

structural difference between epistemic modal and deontic modal (cf. Lin & Tang 1995, Cinque 1999) which renders the violation of locality restrictions.

(71) d.   *Modal*P   (= (8d))
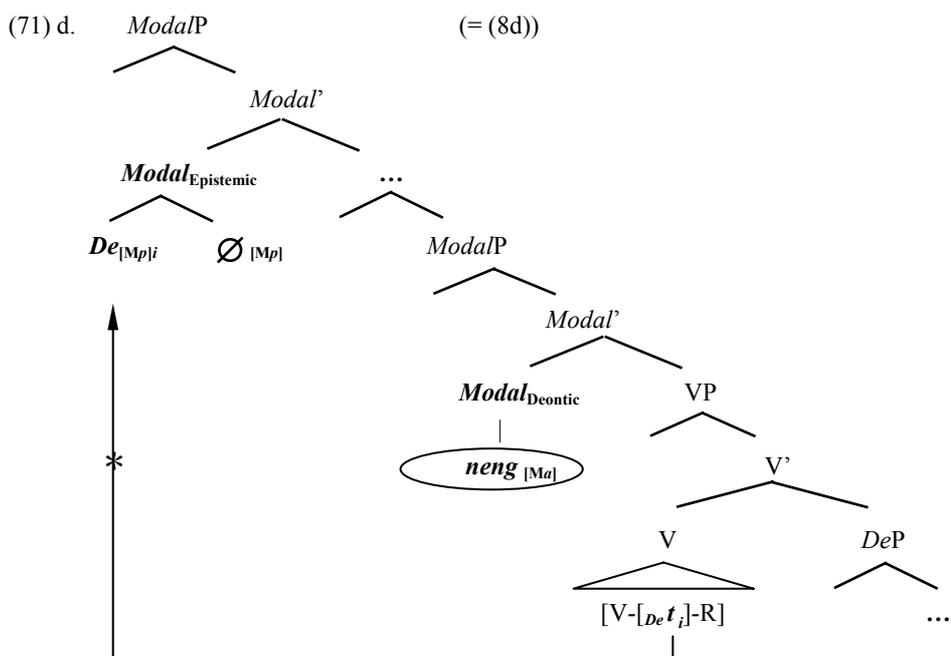
For the single modality reading (71a) (= (2)) and the *neng-de* coöccurrence (71b) (= (8a), (8b)), I suggest that, similar to negation absorption and *wh*-absorption analyzed for Negative Concord and multiple *wh*-questions respectively, (71a) and (71b) also involves an operation of Modality Absorption in that the complex [[*De*] *Modal*] may <u>absorb</u> to form a single quantificational element [*De Modal*] containing a single modality feature [M].

(72)   **Modality Absorption**
        [[*De* [M]]   *Modal* [M]] $\longrightarrow$ [[*DeModal*][M]]

Tsai (2001) proposes that both *de* and *neng* are generated in the same *Modal* position and both denote <u>possibility</u> and <u>ability</u> readings. He provides a V-to-*Modal* argument to account for *de*- and *neng*-constructions: V undergoes head movement to *Modal* overtly or covertly. Tsai argues that while the V in *neng*-constructions undergoes LF movement to *Modal*, *de* in *de*-constructions is an infixal modal generated at *Modal*

position[38] and the V-R complex raises to *Modal* overtly to "wrap around" *de* formed a modal-verb complex [V-*de/bu*-R] on the surface. The main challenge for the one-modal-projection analysis is the fact of *neng-de* coöccurrence in (8a) and (8b) in which two modals appear in a single sentence denoting a single-modality meaning. The advantage of maintaining the two-modal-projection analysis is that this analysis offers two different modal positions, *Modal* and *De*, to account for the *neng-de* coöccurrence in (8) and can explain the single-modality reading in (8a) and (8b) by proposing the requirement of undergoing the LF movement from *De* to *Modal* for the purpose of correlation/feature-checking.

As proposed in (35) in §4.1, *De* is also specified for either a [+*neg*] or a [-*neg*] feature: as indicated in (35a), the positive *De*, *de*, is specified for [-*neg*], while the negative *De*, *bu*, as shown in (35b), is [+*neg*]. The *Modal* position can either be lexically filled by an overt modal like *neng* or generated as an empty head.

The *Modal* in a *de*-sentence like (2) is generated as a null *Modal* head. The covert *Modal* in (2) contains only the modality feature [M] but is not specified [+*neg*] or [-*neg*] feature. *De* undergoes X^0/head movement to check the [M] feature ([Mp] or [Ma]) with the covert *Modal*. Through the X^0/head movement of *De* to *Modal*, the covert *Modal* will receive [+*neg*] or [-*neg*] feature from *De*. Thus, the value of the modality interpretation of sentences with a covert *Modal* is determined by the value of *De* through derivation, as represented in (73):

(73) [Lisi[$_{ModP}$ [$_{Mod}$ ***De***$_{[M][+/-neg]i}$ **Mod**$_{[M]}$] [$_{VP}$[$_V$ kan [$_{De}$-***de/bu***-]$_i$ dao]$_j$ [$_{DeP}$$t_j$ [$_{RP}$ t_j [...]]]]]]]
Lisi   chop   DE/BU   fall

On the other hand, if the *Modal* position is filled by *neng*, like the *neng-de* coöccurrence (8), it is specified for [-*neg*] feature. In the *neng-de* coöccurrence (8), the *Modal* position is lexically filled by the overt modal *neng*. *De* first undergoes X^0/head movement to check the [M] feature ([Mp] or [Ma]) with the modal *neng*. Furthermore,

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[38] Tsai (pc) indicates that the historical predecessor of *de* is actually a full-fledged deontic modal, as exemplified in (i):

(i) a. ping-min   bu ***de***   shan-ru.   (data provided by Tsai)
        ordinary-people not may   enter.without.permission
    b. ***de***   yi-guiding   fa   wu-bai-kuai-qian.
        may   according.to-regulations   fine   five-hundred-dollars

Tsai suggests that (i) makes the V-to-*Modal* analysis for *de*-constructions more likely. It is true that *de* can be used as a full-fledged modal. However, the *neng-de* coöccurrence in (8) and the fact that *de* has to be infixed to V and R and that *de* in [V-*de*-R] denotes only possibility and ability readings rather than permission (cf. (ia)) or obligation (cf. (ib)) must be taken into account to maintain the one-modal-projection analysis.

de and the overt modal also agree with their [-*neg*] feature. Hence, the feature checking for both [M] and [-*neg*] in (8) is satisfied:

(74) $[_{NegP} (bu) [_{ModP}[_{Mod} \boldsymbol{De}_{[M][-neg]i}[\boldsymbol{neng}_{[M][-neg]}]][_{VP}[_V \text{kan} [_{De}\text{-}\boldsymbol{de}\text{-}]_i\text{-dao}]_j[_{DeP}t_j[_{RP} t_j [\ldots]]]]]]]$
        not   can   chop   DE   fall

While *de* can coöccur with either *neng* or *bu-neng*, its negative counterpart *bu* is not allowed to appear with either *neng* or *bu-neng*, as shown in (75):

(75) *Lisi   (**bu-**)**neng**   kan-**bu**-dao   zhe-ke   shu
        Lisi   not-can   chop-BU-fall   this-CL   tree

Due to morphological reasons, Mandarin negation markers, such as *bu* 'not (general)' and *mei* 'not (perfective)', always appear higher than modals and verbs (Ernst 1994). I assume that Mandarin negations project as an independent projection NegP and structurally are higher than *Modal*P and *De*P. Thus, the *bu* and *neng* are in fact generated in separate projections, *bu* is the head of NegP, which projects higher than *Modal*P, where the projection of the modal *neng* is.

As shown in (74), the positive *De* contains [-*neg*] feature, it has nothing to do with Neg^0. Thus, *de* can coöccur with either *neng* or *bu-neng*. However, as indicated in (75), the negative *De*, *bu*, cannot coöccur with either *neng* or *bu-neng*. As proposed in (35b), *bu* is an incorporated head of *De* conveying the negative reading to the whole projection. Therefore, the negative *De* contains not only [M] but also [+*neg*] feature which requires checking with Neg^0. Since Neg^0 and *Modal*^{0} are generated in separate projections, the negative *De* is supposed to check the [M] feature with *Modal* first and then the [+*neg*] feature with Neg^0 after that. Although the [M] feature of negative *De*, *bu*, is satisfied with *Modal*, the [+*neg*] feature of negative *De*, *bu*, conflicts with the [-*neg*] feature of the overt modal *neng*, the sentence then crashes before *bu* moves to Neg^0, as illustrated in (76). Hence, the negative *De*, *bu*, cannot legitimately coöccur with *neng* or *bu-neng*.

(76)   *$[_{NegP}(\boldsymbol{bu}) [_{ModP}[_{Mod}\boldsymbol{De}_{[M][+neg]i}[\boldsymbol{neng}_{[M][-neg]}]][_{VP}[_V \text{kan}[_{De}\text{-}\boldsymbol{bu}\text{-}]_i\text{-dao}]_j[_{DeP}t_j[_{RP} t_j [\ldots]]]]]]]$
        not   can   chop   BU   fall

By proposing the analysis that *de/bu* are generated in a functional projection *De* which is separated from the *Modal* projection, we then explain the phenomenon of coöccurrence of *de* with the modals *neng/bu-neng* in (8) and the ungrammatical coöccurrence of *bu* with overt modals in (75). The analysis also accounts for the different head orders of *De* and *Modal* with respect to V and R by proposing *De* is lower than *Modal*.

7. Conclusion

In this paper, I proposed that *de*-sentences and *neng*-sentences are semantically interpreted with the same potential modality meanings, p<u>ossibility</u> and <u>ability</u>. However, the potentiality items *de* and *bu* cannot be interpreted in their S-Structure position. They should be in an inner modal projection *De* generated between V and R and licensed by the *Modal* in a lower position. The coöccurrence of *de* and *neng* in (8) is due to two different projecting heads, *De* and *Modal*, occurring in a single sentence. *De* and *Modal* share the same potentiality feature [M] (either [M$_{possibility}$] or [M$_{ability}$]). To fulfill the interpretation, the head *De* has to undergo head movement to the head position of *Modal*P at LF to check the [M] feature. The LF head movement from *De* to *Modal* has to obey locality restrictions and no intervening heads can occur between *De* and its trace. Syntactically, *de*-sentences display intervention effects when interacting with four constructions—passive constructions, *ba*-constructions, focus elements, and manner adverbs—while *neng*-sentences do not show the same intervening effects. The evidence for the LF head movement from *De* to *Modal* comes from the intervention effects observed in *de*-sentences. I suggested that the intervention effects triggered by these four constructions in *de*-constructions have to be analyzed as the same LF operations as those in *dou*-quantifications and *A-not-A* questions. Evidence was provided to show that the LF operation in *de*-constructions is an X^0, rather than an XP, movement in terms of Relativized Minimality.

The importance of setting the inner modal projection *De* is that it provides an alternative approach to understand the extraordinary behavior of Mandarin RVCs and intervention effects, and, in the long term, contributes to the debate whether the formation of RVCs is through a lexical or a syntactic procedure.

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論 "得/不" 與結果式複合動詞的句法徵性

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本文以詳盡的句法分析，討論漢語結果式複合動詞結構 (RVC) 中出現在主要動詞 V 及結果動詞 R 間的兩個特殊的中插成份，表可能/能力的情態成份 "得" 和 "不"。這兩個中插成份事實上是一個由在高位的情態動詞主要語 $Modal^0$ 認可並投射在 V 和 R 間的內情態主要語 De^0。句法中在 "都"-量化結構及漢語 "A-不-A" 正反問句中出現的阻礙效應在 "得/不" 結果動詞結構裡也發生了類似的阻礙現象。此內情態主要語 De^0 與情態動詞主要語 $Modal^0$ 共同擁有表可能/能力的情態屬性 [M]（[M可能] 或 [M能力]）。本文以 "得/不" 結果式複合結構中相同的阻礙效應爲證據，提出說明 De^0 與 $Modal^0$ 的關聯性是由 De^0 在邏輯形式裡進行 X^0/主要語移位至 $Modal^0$ 衍生得來，並且 De^0 與 $Modal^0$ 的依存關係必須遵守局部限制（相對最小關係）的規定。

關鍵詞：漢語，情態動詞，可能/能力，阻礙效應，結果式複合動詞