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 De⁰ generated between V and R licensed by Modal⁰ 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 De⁰ and Modal⁰ share the same potential modality feature [M], either [M_possibility] or [M_ability], and the correlation between De⁰ and Modal⁰ is derived by an LF X⁰/head-movement from De⁰ to Modal⁰. The dependency between De⁰ and Modal⁰ must obey locality constraints (Relativized Minimality) and analogous quantificational intervention effects found in de/bu constructions are given as evidence for the LF X⁰/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

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* I am grateful to the following people for valuable and inspiring comments and discussion relevant to the present article: Lisa Travis, Jonathan Bobaljik, Brendan Gillion, Susi Wurmbrand, Mark Baker, Nigel Duffield, Wei-tien Dylan Tsai, Chih-Chen Jane Tang, Ting-chi Tang, Sze-Wing Tang, Thomas Hun-Tak Lee. I also wish to thank the anonymous reviewer and the audience of GLOW in Asia 2002 for discussion and suggestions. The grammatical judgment of the examples provided in this paper have been diagnosed by consulting several Mandarin and Taiwanese native speakers who have received up to university education in Taiwan and are currently doing their graduate studies in Montreal, Canada. Some materials of this paper were presented at GLOW in Asia 2002 held at National Tsing Hua University, Hsinchu, Taiwan (January 2002). This research was supported in part by SSHRCC grant #410-2001-1486. All errors are certainly mine.
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. 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.} (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 [V-*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 possibility and the deontic ability 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 co-occur 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* co-occurrence, 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* co-occurrence 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

\(^3\) 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.)

\(^4\) 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.”
- (i) 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.
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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 zhe-ge 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
Another fact to show de-sentences lacking a permission reading is from the cooccurrence of neng and de in a single sentence. As indicated in Cheng & Sybesma (2002), when neng and de cooccur in a single sentence, such as (5a), the sentence does not convey permission meaning. The incompatibility of permission use of neng-de cooccurrence 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 possibility and ability 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. 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 potentiality 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 permission use of neng. Potentiality might not be the best term to cover both possibility and ability. For the purpose of integration, however, the term separates the permission from possibility and ability of neng. After §2, the permission 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.
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(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: possibility, ability 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 possibility or ability 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 possibility or ability reading (Tsai 2001). Although the sentence (7c) without ziji (= footnote 3 (ia)) is prominent with a possibility reading, with the appearance of ziji in (7c), the ability reading (7c-ii) emerges on top of the possibility 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 possibility and ability, the neng-de coöccurrence (5a) may contain four possible readings: (i) possibility (both neng and de), (ii) ability (both neng and de), (iii) possibility neng + ability de and (iv) ability neng + possibility de.
The last possibility is ruled out by a structural problem, 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
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, haiishi 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, haiishi 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 potentiality 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 potentiality 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
   “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
   “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)

\(^8\) The examples in (11) are generously provided by the reviewer.
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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 perfectivity 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 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 niu rou 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 **xiao-e(tang)/be(tang)-liao** hit-di"u" 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"u" 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), 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 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).

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.
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(14) a. Li-e (yit-ting) xia-bet(tang)-liao hit-di’u’ pue, yinwi yi ya be kaishi xia.
   Li definitely 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’-kang-a, hit-di’u’ pue ya xia-be(tang)-liao.
   Li already write three-day-PERF that-CL letter yet write-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) bet(tang) xia-liao hit-di’u’ 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’-kang-a hit-di’u’ 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 potentiality 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 potentiality 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.

(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.”
There are three things that need to be addressed concerning the characteristics of *de* in the *neng-de* cooccurrence (8). First, although the *neng-de* cooccurrence (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* cooccurrence (8) cannot be analyzed as the same *de* as that in Resultative or Descriptive constructions although they all share the same phonological form. 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 cooccur 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 cooccur 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 cooccurrence 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 *nenggou* shi-*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 perfectly 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* co-occurrence in (8a) and (8b) suggests that structurally *de* should have a different projection from *Modal*. Moreover, the fact that the *neng-de* co-occurrence 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* co-occurrence 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 co-occurrence 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* co-occurrence (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):
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The parallel semantics between de-sentence (2) and neng-sentence (3), the single modality expressions in neng-de cooccurrence 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

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 (zhilityou) chi-wan (*zhilityou) zhe-wan mian (*zhilityou) Only(have)Lisi only(have) eat-finish only(have) this-CL noodles only(have)

“(Only) Lisi only(have) 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 shenzi ‘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 $neng$ (*zhity shezhity 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* is licensed by *Modal* and projects as a different head from *Modal*. I also propose that these two different projections, *De* and *Modal*, 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* and *Modal* 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 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.

\[
\begin{align*}
(25) \quad &a. \ zhe-xie \ sanmingzhi \ dou \ bei \ Lisi \ (*\text{dou}) \ chi-le. \\
& \hspace{1cm} \text{Those sandwich all bei Lisi all eat-ASP} \\
& \hspace{1cm} \text{“All of those sandwiches were eaten by Lisi.”} \\
& b. \ tamen \ dou \ ba \ zhe-ben \ shu \ (*\text{dou}) \ kan-le. \\
& \hspace{1cm} \text{They all ba this-CL book all read-ASP} \\
& \hspace{1cm} \text{“All of them read that book.”} \\
& c. \ tamen \ zhi \ dou \ chi \ sanmingzhi. \\
& \hspace{1cm} \text{They only all eat sandwich} \\
& \hspace{1cm} \text{“*All of them only ate sandwiches.”} \\
& \hspace{1cm} \text{(ok: “They only ate sandwiches (all the time).”)} \\
& d. \ tamen \ (*\text{manman-de}) \ dou \ chi-le \ sanmingzhi. \\
& \hspace{1cm} \text{They slow-ly all eat-PERF sandwich} \\
& \hspace{1cm} \text{“All of them ate sandwiches slowly.”}
\end{align*}
\]

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 Dou⁰ and must be incorporated into a verbal or inflectional head (AgrS⁰, Asp⁰ or AgrO⁰). 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 Asp⁰ or V⁰, and can be adjoined to various positions (Asp’, Asp⁰, V’ and V⁰). 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.\footnote{One may consider that (i), which has a complex NP as the topic, might be a potential problem for the analysis of \textit{dou}-constructions since \textit{dou} can quantify over elements that do not c-command it at the surface structure.}

Under the analyses in Chiu (1993) and Cheng (1995), passive marker \textit{bei} in (25a) and the object-preposing marker \textit{ba} in (25b) are the blockers preventing \textit{dou} from undergoing LF movement. As for the intervention effect caused by manner adverbs in (25d), Cheng notices that manner adverbs cannot appear before \textit{dou}. Unfortunately, she does not offer any further arguments to account for the interaction of manner adverbs and \textit{dou}. Cheng simply indicates that the co-occurrence 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 \textit{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 \textit{dou}-quantification and the sentence (25d) is ruled out. As for the intervening focus element \textit{zhi} in (25c), none of the previous analyses has provided any relevant discussion. I present the following analysis.

\textit{Duo} in (25c) fails to quantify the plural subject due to the intervention of the focus element \textit{zhi} ‘only’. At first glance, it looks like \textit{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 \textit{dou} and \textit{zhi} ‘only’ in (26). As shown in (26a), since the focus element \textit{zhi} does not appear between \textit{dou} and the subject, nothing prevents \textit{dou} from quantifying over the plural NP \textit{tamen} ‘they’. The individual \textit{Lisi} in (26a) cannot be quantified by \textit{dou} since it is not plural. Now consider (26b) where \textit{zhi} intervenes between \textit{dou} and the plural subject NP and (26b) should be ungrammatical. However, not only (26b) is well-formed, the singular NP \textit{Lisi}

\begin{verbatim}
\begin{enumerate}
  \item[(i)] [[\textit{piping renhe ren de} \textit{shu}], wo \textit{dou} xihuan kan. \\
  \text{criticize any person REL book I all like read}"
\end{enumerate}
\end{verbatim}

\begin{verbatim}
\begin{enumerate}
  \item[(ii)] [[\textit{piping renhe ren de} \textit{shu}]\textit{zhi}, [\textit{AspP pro \textit{dou}}] \textit{AspP wo} \textit{tj xihuan kan} \textit{tj}
  \text{criticize any person REL book all I like read}"
\end{enumerate}
\end{verbatim}
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 temporal segments, rather than over the subject NP. The appropriate translation of (26b), thus, is {They/Lisi only ate sandwiches all the time.}. 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^6s 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 X⁰ (Chiu 1993, Cheng 1995, 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-kang?
   this-cl book bei Lisi read-not-read
   “Was the book read by Lisi?”

   b.*Lisi ba zhe-ben shu kan-bu-kang?
   Lisi ba this-cl book read-not-read
   “Does Lisi read this book?”

   c. Lisi (*zhi) kan-bu-kang zhe-ben shu?
   Lisi only read-not-read this-cl book
   “Does Lisi only read this book?”

   d. Lisi (*zixi-de) kan-bu-kang 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?”

---

18 Chiu (1993) proposes that dou is the head of DouP, whereas Cheng (1995) argues, following Travis (1988), that dou is a defective adverb adjoined to an X⁰ or X'. Since the dou in Cheng (1995) is adjoined to an X⁰ or X', I assume that it is an incorporated head (cf. Travis 1988) with its licenser (X⁰ or Asp⁰). Thus, dou can be an X⁰ 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 $\textit{weisheme}$ ‘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 $\textit{wh}$-word $\textit{whether}$ (Huang 1991:331, fn.7) which is a $\textit{wh}$-scope indicator for disjunction. Larson (1985) postulates that disjunctions in English have a similar underlying structure to conjunctions. The scope indicator $\textit{whether}$ is under the conjunctive element CONJ with $or$. Adopting Larson’s analysis, Borer (1989) argues that $\textit{wh}$-word $\textit{whether}$ needs to undergo $\textit{wh}$-movement to the Spec of CP. If the Chinese $A$-$not$-$A$ operator can be treated as an XP, an A-bar element like $\textit{whether}$, 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):

\[
\begin{align*}
\text{(29)} & \quad \text{a.} \quad \text{zhexie xiaohai} \quad \text{dou xie-bu-xie zuoye?} \\
& \quad \text{these child all write-not-write homework} \\
& \quad \text{b.} \quad \text{zhexie xiaohai xie-bu-xie dou zuoye?} \\
& \quad \text{these child write-not-write all homework} \\
& \quad \text{c.} \quad \text{zhexie xiaohai shi-bu-shi dou xie zuoye?} \\
& \quad \text{these child be-not-be all write homework}
\end{align*}
\]

"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

\(^{19}\) 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.

\[
\begin{align*}
\text{(i)} & \quad \text{zhexie xiaohai (quanbu) dou xie zuoye.} \\
& \quad \text{these child all/the whole all write homework} \\
& \quad \text{‘All of the children write (their) homework.’} \\
\text{(ii)} & \quad \text{zhexie xiaohai (*quanbu) dou xie-bu-xie zuoye?} \\
& \quad \text{these child all/the whole all write-not-write homework}
\end{align*}
\]

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’:

\[
\begin{align*}
\text{(ii)* zhexie xiaohai zuotian dou xie-bu-xie zuoye?} \\
& \quad \text{these child yesterday all write-not-write homework} \\
& \quad \text{‘(Intended) Did all of the children write homework yesterday?’}
\end{align*}
\]
subject of *shi* but the logical subject of the main verb *xie* ‘write’, as represented in (30):

(30) \[[zhexie xiaohai, *shi-bu-shi* [t, [dou] xie zuoye]]\]

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

\(^{20}\) 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], (dou) (bu-)*neng* (*dou* *jintian* [PRO, (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, DeP] to [Spec, ModalP]) 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 co-occur 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 vP (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 vP or adjoined to vP.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.

---

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 vP, TP, and CP. In this paper, only the position adjoined to vP 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 co-occur 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):\(^{23}\)

\(^{22}\) 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).
On de/bu and the Syntactic Nature of Resultative Verbal Compounding

(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. DeP
   De^0 [M, -neg]
   | de

b. DeP
   De^0 [M, +neg]
   | 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:
One might suggest that the ungrammaticality in (36) could be attributed to a phonological distinction,\textsuperscript{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 \textit{quan} ‘totally’ or monomoraic morphemes like \textit{ye} ‘also’ are not permitted to appear between V and R, as illustrated in (37):

\begin{itemize}
\item a. *Lisi \textit{kan quan wan} zhe-ben shu.
\item b. *Lisi \textit{kan ye wan} zhe-ben shu.
\end{itemize}

Moreover, if \textit{de/bu} can be analyzed as XP adverb adjuncts like other VP adjuncts, we may then expect that \textit{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 \textit{de/bu} as XP adjunct adverbs as proposed in Li & Thompson (1981).

\section*{4.3 \textit{De/bu} project as an X\textsuperscript{0} level category}

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

\begin{itemize}
\item a. *Lisi \textit{jie cong xuexiao dao} zhe-ben shu.
\item b. *Lisi \textit{xie mingtian wan} zuo ye.
\item c. *Lisi \textit{xie zai jia-li wan} zuo ye.
\end{itemize}

\textsuperscript{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 X0 or an XP operator, in the projection of De (either the head De0 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 X0/head movement or an XP/A-bar movement.

First, under the XP movement approach, as illustrated in (39) below, the Spec of DeP is an OP that undergoes an A-bar movement to ModalP. 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.

The second possibility is an X0/head movement approach, as illustrated in (40),
where the head \( De \) undergoes LF \( X^0 \)/head movement to the head position of \( ModalP \) to check the relevant feature [M] with the head \( Modal \):

\[
\begin{align*}
(40) \quad & \quad ModalP \\
& \quad Spec \quad Modal' \\
& \quad Modal \quad VP \\
& \quad De, \quad Modal \quad V' \\
& \quad V \quad DeP \\
& \quad [kan-\{de/bu\}_i-wan], \quad Spec \quad De' \\
& \quad De \quad RP \\
& \quad | \quad tj \\
& \quad R \quad NP \\
& \quad | \quad tj \\
& \quad zhe-ben shu
\end{align*}
\]

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). 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.\(^{25,26,27}\)


\(^{26}\) 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* co-occurrence (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, DeP] to [Spce, ModalP] 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.
(41) *John*, was killed *t* 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. The long passive: *bei* NP-VP
   
   Zhangsan *bei* Lisi da-le
   
   Zhangsan *bei* Lisi hit-PERF
   
   “Zhangsan was hit by Lisi.”

b. The short passive: *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) \begin{align*}
\text{a. The long passive:} \\
&[\text{Zhangsan} [v \text{ bei} [\nu \text{ OPi} [\nu \text{ Lisi} [v \text{ da-le} \ t_1]]]]] \\
&\text{(A-bar Movement)} \\
&\text{Zhangsan} \quad \text{bei} \quad \text{Lisi} \quad \text{hit-PERF} \\

\text{b. The short passive:} \\
&[\text{Zhangsan} [v \text{ bei} [\nu \text{ PROi} [v \text{ da-le} \ t_1]]]] \\
&\text{(A-Movement)} \\
&\text{Zhangsan} \quad \text{bei} \quad \text{hit-PERF}
\end{align*}
\]

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 passivized verb as that shown in (43a), an overt logical object pronominal, a resumptive pronoun, \( ta \) ‘him’ in (44), that is coindexed with the subject of *bei*, *Zhangsan*, can also appear in this position:

\[
(44) \begin{align*}
&[\text{Zhangsan} [v \text{ bei} [\nu \text{ OPi} [\nu \text{ Lisi} [v \text{ da-le} \ t_1 \text{ yi-xia}]]]]] \\
&\text{Zhangsan} \quad \text{bei} \quad \text{Lisi} \quad \text{hit-PERF} \quad \text{him once} \\
&\text{“Zhangsan was hit once by Lisi.”}
\end{align*}
\]

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) \begin{align*}
\text{a. zhe-ke} \quad \text{shu} \quad \text{bei} \quad \text{Lisi} \quad \text{kan-(*de/*bu*)-dao} \\
&\text{this-CL} \quad \text{tree} \quad \text{BEI} \quad \text{Lisi} \quad \text{chop-DE/BU-fall} \\
&\text{“(Intended) This tree was possible to be chopped down (by Lisi).”} \\

\text{b. zhe-ke} \quad \text{shu} \quad \text{bei} \quad \text{kan-(*de/*bu*)-dao} \\
&\text{this-CL} \quad \text{tree} \quad \text{BEI} \quad \text{chop-DE/BU-fall} \\
&\text{“(Intended) This tree was possible to be chopped down.”}
\end{align*}
\]

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 ModalP. 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 ModalP, 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 [Mod OP_i] [vp beij [ip Lisi [vp kan [v De] t_i dao]]]]
this-CL tree BEI Lisi chop DE fall
b.*[zhe-ke shu_i [Mod OP_i] [vP PRO_i [v kan [v 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 beij that prevents the head De from undergoing LF head movement to Modal, as shown in (47a). In the short passive (45b), the passive head beij 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 [v Dej Mod] [vp beij [ip Lisi [vp kan [v De] t_i dao]]]]
this-CL tree BEI Lisi chop DE fall
b.*[zhe-ke shu_i [v Dej Mod] [vp PRO_i [v kan [v De] 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 beij 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 beij Lisi kan-bu-kan?
this 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 X₀ 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.* [OP+[Q] / OP_dou / VP bei [VP OP_tj t₁ V t₁]]  
    b. [OP+[Q] / OP_dou / VP bei [VP PRO_tj t₁ V t₁]]

Under the X₀ 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] / Dou / VP bei [VP OP_tj t₁ V t₁]]  
    b.*[[+Q] / Dou / VP bei [VP PRO_tj t₁ V t₁]]

Cheng (1995) offers a similar argument to account for passivization in *dou*-quantification (25a). She considers, adopting Travis (1988), that the quantifier *dou* is defective adverb adjoined to an X₀ or Xₙ, 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 X₀ 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\textsuperscript{0}/head movements of De\textsuperscript{3}, dou and the A-not-A operator. Hence, the X\textsuperscript{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.\textsuperscript{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):

\begin{itemize}
  \item (i) Lisi ba yaoshi wang zai jia-li le.
  \item 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 (iiia) and (iiib) where the verb wang ‘forget’ is the V in RVCs.
  \item (ii) a.*Lisi ba yaoshi wang-de/bu-diao.
     \item Lisi BA key forget-DE/BU-lose
     \textquotedblleft(Intended) Lisi can/cannot forget (about) the key.	extquotedblright
  \item b. Lisi (bu)-neng ba yaoshi wang-diao.
     \item Lisi not-can BA key forget-lose
     \textquotedblleft Lisi can/cannot forget (about) the key.	extquotedblright
\end{itemize}

\textsuperscript{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\}.
(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]]  [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. Thus, an overt pronoun or a reflexive cannot be placed post-verbally, as shown in (52):

(52) Zhangsan  ba  Lisi 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 DeP to Spec of ModalP, 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]  [Mod  Mod]]  ba  [VP  zhe-ke shu [V  kan [DeP  t_i  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  DeP  Mod]]  [CauseP  ba]  [VP  zhe-ke shu [V  kan [De  t_i  dao]]]]
    Lisi  BA  this-cl tree  chop  fall

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],/Dou_i [Causp ba [vp V [n, 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 can only 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 [\text{[\text{Mod} \emptyset]}] kan-de-dao yi-ke shu, danshi kan-bu/*de-dao shi-ke.
   Lisi can 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 [\text{[\text{Mod} \emptyset]}] zhi kan-de-dao yi-ke shu, suiran ta kan-*de/*bu-dao shi-ke.
   Lisi can 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-adject 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?
   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?
   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 *vP*, *TP* or *CP*, depending on their focusing scope. The position we are interested is the one adjoined to *vP*. 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:

\[
(59) \quad *[_{\text{ModOP},[\text{Mod}]}_{vP} \text{zhi} [vP \text{kan} [_{\text{De}},_{\text{ti}}[_{\text{De}}\text{de}]_{[\text{RP dao} [_{\text{NP zhe-ben shu}]]}}]]]
\]

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 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.

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 can/cannot borrow LGB from school
“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 ci zhi? (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
“All 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, that focus elements form a constituent with the phrase following them and it is plausible to treat focus elements as heads taking their modificees 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) *[Mod[Mde, Mod][FocP[Zhi][VP[κ kan [Dn.t] dao], [DnP tj[tj[...]]]]]
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 often 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 t] R]]]

5.4 Manner adverbs

Traditionally manner adverbs are usually treated as maximal projections adjoined to vP (cf. C.-C. Tang 1990, S.-W. Tang 1997, among others). Under the XP approach, the OP of De moves to the Spec of ModalP 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) *[[ModOP_{i} [Mod Mod] [VP manmande [VP kan [DeP t] [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 X0 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 head-to-head 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
```
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Under the X0 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 X0 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 X0 approach (66) is also problematic in terms of the differences between adverb phrases (XP) and root/head adverbs (X0). 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. X0/root adverbs like man ‘slow’, on the other hand, cannot appear independently in contexts, such as *man kan-wan ‘slowly read-finish’. An X0/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, X0/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:
The observation in (67) and (68) indicates that $X^0$ and XP adverbs are different in their incorporation formation. Manner adverbs like \textit{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 predicates 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,\textsuperscript{36} “Core adjuncts” and “Theta/INFL (argument-}

\textsuperscript{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-/bu 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 vP, or say, Man(ner)P37 for the consideration of interpretation. Through Spec-head agreement, the functional head v/Manner is actually an operator itself preventing De from undergoing LF X0/head movement. The revised X0 approach is provided in (70):

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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.
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: possibility (both neng and de) in (8a), ability (both neng and de) in (8b) and “possibility (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'/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 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] • […]]

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] (possibility) or [M_a] (ability). 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):
On the other hand, the *neng-de* cooccurrence (8c) conveys a double-modality reading, [Mp]+[Ma] ("possibility *neng*” + “ability *de*”), as represented in (71c):

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 ModalMp and the operation of undergoing an LF head movement from De[Mp] to ModalMp position is blocked by the deontic modal ModalMa which is located between De[Mp] and ModalMp, 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. $\text{ModalP}$

\[ (\text{= (8d)}) \]

\[ \text{Modal'} \]

\[ \text{Modal_{Epistemic}} \]

\[ \text{De}_{\text{Mepj}} \]

\[ \emptyset_{\text{Mep}} \]

\[ \text{ModalP} \]

\[ \text{Modal'} \]

\[ \text{Modal_{Deontic}} \]

\[ \text{VP} \]

\[ \text{V} \]

\[ \text{DeP} \]

\[ [V-[De_{\text{tj}}]-R] \]

\[ \text{...} \]

For the single modality reading (71a) (= (2)) and the neng-de cooccurrence (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 absorb to form a single quantificational element [De Modal] containing a single modality feature [M].

(72) Modality Absorption

\[ [[\text{De}_{\text{Mh}}] \text{ Modal}_{\text{Mh}}] \rightarrow [[\text{De Modal}]_{\text{Mh}}] \]

Tsai (2001) proposes that both de and neng are generated in the same Modal position and both denote possibility and ability 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 infixed modal generated at Modal
position 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 co-occurrence 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 co-occurrence 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 X0/head movement to check the [M] feature ([M]+ or [M]−) with the modal neng. Through the X0/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[Mod[De][M][+/-neg]Mod[M]]] [VP[Ve kan [de/bu-de] dao] [De]tp [De tp [...]]]]

On the other hand, if the Modal position is filled by neng, like the neng-de co-occurrence (8), it is specified for [-neg] feature. In the neng-de co-occurrence (8), the Modal position is lexically filled by the overt modal neng. De first undergoes X0/head movement to check the [M] feature ([M]+ or [M]−) with the modal neng. Furthermore,

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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 co-occurrence 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) \[
\text{NegP(}bu\text{) [Mod[}De[\text{MI}] [-neg][neng[\text{MI}] [-neg]]][VP[}v \text{kan [}de-de\text{-}] -dao\text{)][}\text{DE fall]\]]
\]

While de can co-occur 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 \text{ (bu-neng) kan-bu dao zhe-ke shu}\n\text{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 ModalP and DeP. Thus, the bu and neng are in fact generated in separate projections, bu is the head of NegP, which projects higher than ModalP, 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\textsuperscript{0}. Thus, de can co-occur with either neng or bu-neng. However, as indicated in (75), the negative De, bu, cannot co-occur 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\textsuperscript{0}. Since Neg\textsuperscript{0} and Modal\textsuperscript{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\textsuperscript{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\textsuperscript{0}, as illustrated in (76). Hence, the negative De, bu, cannot legitimately co-occur with neng or bu-neng.

(76) * \text{Neg(bu) [Mod[}De[\text{MI}] [-neg][neng[\text{MI}] [-neg]]][VP[}v \text{kan[}de-bu\text{-}] -dao\text{)][}\text{DE 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 co-occurrence of de with the modals neng/bu-neng in (8) and the ungrammatical co-occurrence 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, possibility and ability. 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 co-occurrence 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\text{possibility}] or [M\text{ability}]). To fulfill the interpretation, the head *De* has to undergo head movement to the head position of *ModalP* 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\textsuperscript{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.
References


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


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入份，表可能/能力的情態成份 “得” 和 “不”。這兩個中插入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。句法上在 “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^max] 或 [M^min]）。本文以 “得/不” 結果式複合結構中相同的阻礙效應為證據，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 X0/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