

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 the familiar quantificational intervention/blocking effects have an analogue in *de/bu* constructions of RVCs. It is proposed in this paper that there is an inner functional head De^0 generated between V and R and licensed by $Modal^0$. De^0 and $Modal^0$ share the same potential modality feature [M] ([M_{possibility}] or [M_{ability}]) and the correlation between De^0 and $Modal^0$ is derived by an LF X^0 /head-movement from De^0 to $Modal^0$. The dependency between De^0 and $Modal^0$ must obey locality constraints (Relativized Minimality) and analogous quantificational intervention effects found in *de/bu* constructions are given as evidence for the LF X^0 /head-movement approach.

Key words: Mandarin Chinese, potentiality, modal, intervention, blocking effects, inner functional projection, resultative compound

1. INTRODUCTION

The term Resultative Verbal Compound (RVC) in Mandarin Chinese refers descriptively to a combination which is usually composed of two components, namely V (Verb) and R (Result), on the surface. A sentence that contains an RVC as in (1) is a type of Resultative Construction (RC) that conveys a TELIC event consisting of two subevents, an ACTION denoted by V and a RESULT denoted by R, respectively, as shown in (1):

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

Generally, no element is allowed to intervene between V and R of RVCs¹. However, two particular elements, *de* and *bu*, the so-called “potential modality items”, can exceptionally appear between V and R, as shown in (2):

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¹ There is another kind of RVC that is categorized as “real lexical compound”. RVCs such as *gai-shan* “change-good (improve)”, *tui-guang* “promote-broad (popularize)”, *jia-chang* “extend-long (lengthen)”, etc. should be treated as lexically derived as “words” instead of “phrases” since nothing can intervene between the two

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

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

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

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

If (2) and (3) convey the same semantics, several questions might be raised: (i) Why would *de/bu* occur between V and R as [V-*de/bu*-R] on the surface instead of appearing at the preverbal position similar to *neng/bu-neng* V-R? (ii) Do *de/bu* sentences syntactically show any distributional differences from that of *neng/bu-neng* sentences? (iii) What would the syntax and semantics of *de/bu* constructions tell us? 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 functional head *De* structurally generated between V and R, that is, *De* is not generated at the same structural position as *Modal* but lower. This 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_{Epistemic}] or [M_{Deontic}]. I argue that *De* and *Modal* must be syntactically related in order to check the relevant feature. The correlation between *De* and *Modal* is a derivation through 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 will show that *de/bu* constructions have analogous intervention effects when interacting with four constructions: passives, *ba*-constructions, focus elements and manner adverbs. There are two possibilities to categorize the LF movement: either an X⁰/head-movement or an XP/A-bar movement. I provide syntactic evidence to show that the semantic dependency between *De* and *Modal* is derived by an X⁰/head-movement from *De*⁰ to *Modal*⁰ at LF.

This paper is organized as follows. In section 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 argue in Section 3 that *de* projects as a different projection from the modal *neng*. Section 3 also shows that *de*- and *neng*-sentences are different in their syntactic behavior when interacting with passives, *ba*-sentences, focus

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 convey a meaning of “permission”. I will discuss the differences in Section 2.1.

elements and manner adverbs which significantly display intervening phenomena 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*-sentences when interacting with these four constructions. The status of *de/bu* is discussed in section 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 propose that the dependency between *De* and *Modal* is built up by LF movement, that is, *De* must check its relevant feature [M] with *Modal*. I provide two possibilities for the LF movement, X^0 and XP movements. Section 5 examines in detail the four constructions that render the 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. Section 6 discusses the *neng-de* co-occurrence in a single sentence and the single/double modality interpretation. Finally, section 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” reading or an “ability” reading³ (cf. Tsai 2001). Accordingly, both (2) and (3) are 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”.

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 AGENT/external argument⁴ is “allowed” to chop down the tree by an authority

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

- (i) a. Lisi (*bu-neng*) qu-*de*-lao Taiwan.
Lisi not-can go-DE-finish Taiwan
“It is possible/impossible for Lisi to go to Taiwan.”
b. Lisi (*bu-neng*) pa-*de*-shang Yu Shan.
Lisi not-can climb-DE-UP Yu Shan
“Lisi is not able/unable to climb Yu Mountain.”

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

- (i) a. Zhangsan *wan-de/bu-liao* qi-nian-qian-de shi.
Zhangsan forget-DE/BU-finish seven-year-ago-’s matter
“Zhangsan can/cannot forget the matter that happened seven years ago.”
b. Zhangsan *xia-de/bu-dao* Lisi
Zhangsan scare-DE/BU-fall Lisi
“Zhangsan can/cannot scare Lisi.”

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

- (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 will use the term AGENT in general to define the individual or the object that is performing or undergoing an ACTION or experiencing a psychological activity, although this term AGENT might not be appropriate to cover sentences like (i) and (ii) that are not agentive at all. The important perspective is to show

or by conditions. However, the “permission” reading is not available in *de/bu* sentences. I argue that *de/bu* sentences correspond to *neng/bu-neng* sentences in their “ability” or “possibility” readings but not in the “permission” reading. Moreover, by providing three arguments, I suggest 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 using the term “potentiality” throughout this paper to define these two intervening elements *de* and *bu* in RVCs stating whether the AGENT has the “potentiality” (the possibility for/the ability of the AGENT) to successfully achieve or complete a certain RESULT by performing or undergoing the ACTION/psychological activity V.

2.1 The Modality Status of *De/Bu* and *Neng/Bu-neng*

Both *de*-sentences and *neng*-sentences bear “potentiality” (“possibility” and “ability”). Besides the two meanings, *neng* sentences can also convey a “permission” reading, as shown in (4a). When the “permission” verb *yun-xu* is used in the *neng*-sentence (4b) the sentence conveys only a “permission” reading and no “potentiality” (“ability” or “possibility”) reading. On the other hand, a *de*-sentence cannot express a “permission” meaning since, as shown in (4c), it cannot be combined with the “permission” verb *yun-xu* “allow/permit” freely.

- (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.”

Thus, (4c) illustrates that *de*-sentences do not correspond to the “permission” reading of *neng*-sentences⁵. Another fact to show *de*-sentences lacking a “permission” reading is from the co-occurrence of *neng* and *de* in a single sentence. As indicated in Cheng & Sybesma (2002), when *neng* and *de* co-occur in a single sentence, such as (5a), the sentence does not convey

whether the individual or the object has the “potentiality” to complete or achieve the RESULT when interacting with *de/bu*. I will discuss “potentiality” more in this section.

⁵ The fact that *de*-sentences only express “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*. Thus, after Section 2, the “permission” use of *neng* is not under the discussion.

“permission” meaning. The incompatibility of “permission” use of *neng-de* co-occurrence 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.”

The difference between “possibility” and “ability” readings is attributed to a structural distinction between control and raising modals. As analyzed in Lin & C.-C. Jane Tang (1995), 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 sentences⁶. 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).

- (6) a. Lisi (**ziji**) *neng(gou)/bu-neng(gou)* [(**ziji**) *xie-wan zuoyie*] (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 zuoyie*]. (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* co-occurrence (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 zuoyie*.
 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 zuoyie*].
 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.”

⁶ Lin & C.-C. Jane 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.

Although it is not clear if the intensifier *ziji* in (7a) is with the matrix subject as that in deontic sentence (6a) or with the embedded subject as that in (6a) and (6b), (7a) still denotes either “possibility” or “ability” reading but not a double-modality reading as that in (7b-iii). One thing, though, might be worth addressing concerning the possible reading in (7a). As indicated in Footnote 3, if appropriate contexts and predicates are given, we can accentuate the “possibility” or “ability” reading (Tsai (2001)). The sentence (7c) without *ziji* (= Footnote 3 (ia)) is prominent with a “possibility” reading. However, 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*-lao Taiwan.
 Lisi self go-DE-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* co-occurrence (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 problem⁷, the others 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” meanings, rather than the “permission” meaning, of *neng*-sentences like (3). In the next section, I will argue that semantically *de*-sentences can be 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.

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

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*, 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) argues 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. Following the thought of Y.-C. Li, I argue although *de* and *neng* are in different surface positions, 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, while the question of whether the ACTION has been initiated or not is underdetermined. The following examples (9) and (10) can be used to test for the initiation of ACTION in *neng*-constructions and *de*-constructions:

- (9) a. Lisi **xie-bu-wan** zuoye, yinwei ta genben hai mei dong-bu.
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-tien zuoye, hai shi **xie-bu-wan** (zuoye).
Lisi write-PERF three-day homework yet be 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-bu.
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-tien zuoye, hai shi **bu-neng xie-wan** (zuoye).
Lisi write-PERF three-day homework yet be 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 the constructions in (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, in (9b) and (10b), both constructions ensure that *Lisi* does not have the potentiality to finish writing his homework although he has been writing for three days. 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*. It is thus clarified

by (9) and (10) that *de*-sentences are semantically equivalent to *neng*-sentences in that both convey the potentiality of the AGENT in completing the RESULT and both contain an unspecified reading in that the ACTION may or may not have been initiated.

2.2.2 Non-assertion of the accomplishment of RESULT

As indicated in section 2.2.1, 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, *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 words, the non-assertion of the RESULT in *de*-sentences and *neng*-sentences is not temporally related to past or present tense but does conflict aspectually with perfectivity. One may consider the following examples in (11)⁸ denoting realized events.

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

However, both of the sentences in (11) 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 either a realized situation that Zhangsan has actually opened the door yesterday since he was healthy, or a non-realized situation that the speaker figured that it was possible for Zhangsan (or Zhangsan was able to) to open the door by pushing it since he was healthy yesterday even though Zhangsan did not actually do it, but there is no way for Zhangsan to do that since he is sick today. Therefore, both *de*- 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) with *mintian* “tomorrow” and *hotian* “the day after tomorrow” respectively. Under this situation, it is not possible that the events could 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. Accordingly, sentences that contain potential modals cannot co-occur with *-le* or *-guo*:

- (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.”

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

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. The Taiwanese counterparts of the infix and the modal share the same phonological form, *e(tang)* “can” and *be(tang)* “cannot”⁹:

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

R. Cheng (1978) claims that (13a) implies that the AGENT *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 AGENT *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 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 will show in (14) and (15)¹⁰, corresponding to Mandarin (9)

⁹ One may argue from the examples (i) that Taiwanese does not always have RVCs of the kind found in Mandarin:

- (i) a. Zhangsan **chi-ni-le** niurou mian. (Mandarin)
 Zhangsan eat-bored-PERF beef noodle
- b.* Ong-e **jia-sen** guba mi. (Taiwanese)
 Ong-e eat-bored beef noodle

However, the grammaticality of (ib) might be improved in two ways: first, by adding an adverb *yik-kieng* “already” and *a*, an inchoative marker implying some change has occurred:

- (ii) Ong-e **yik-kieng jia-sen** guba mi **a**.
 Ong-e already eat-sick beef noodle INCH

Second, by reduplicating the main predicate V and adding the inchoative marker *a*:

- (ii) 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 the RESULT denoting R predicated of the subject/external argument instead of the object/internal argument. Under this situation, the V-reduplication version in (iii) is then critical since there would be two complements to the main predicate V, the direct object and the RESULT. The crucial point here is that the semantic parallelism between *de*-sentences and *neng*-sentences can also be found in Taiwanese in that the Modal and the infix share the same phonological form *e(tang)/be(tang)*.

¹⁰ Native speakers consider the sentences (14a) and (15a) are acceptable even without the adverb, *yit-ting* “definitely”. The addition of the adverb *yit-ting* “definitely”, however, may enhance the grammatical judgment of

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, while the question of whether the ACTION has been initiated or not is not at issue.

- (14) a. Li-e (yit-ting) **xia-be(tang)-liao** hit-di^Nu^N pue, yinwi yi ya be kaishi xia.
Li definitely write-BE-finish that-CL letter because he yet did.not start write
“Li is definitely cannot finish the letter, because he hasn’t started writing it yet.”
b. Li-e yikkieng xia sa^N-kang-a, hit-di^Nu^N pue ya **xia-be(tang)-liao**.
Li already write three-day-PERF that-CL letter yet write-BE-finish
“Li has been writing for three days, but it is not possible/he won’t be able to finish writing it.”
- (15) a. Li-e (yit-ting) **be(tang) xia-liao** hit-di^Nu^N pue, yinwi yi ya be kaishi xia.
Li definitely cannot write-finish that-CL letter because he yet did.not start write
“Li is definitely cannot finish the letter, because he hasn’t started writing it yet.”
b. Li-e yikkieng xia sa^N-kang-a hit-di^Nu^N pue ya **be-(tang) xia-liao**.
Li already write three-day-PERF that-CL letter yet not-can write-finish
“Li has been writing for three days, but it is not possible/he won’t be able to finish writing it.”

Based on the evidence provided in (9)-(15) above, I propose that *de*-sentences and *neng*-sentences are semantically interpreted the same: they both express “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” meanings and that the *neng-de* co-occurrence may denote three possible modality meanings. One might suggest, according to the discussion above, that *de* cannot be interpreted in its S-Structure position, rather, it should be generated at the same positions as the modal *neng*, as argued in Tsai (2001). This same-position-modal analysis may be suitable for simple *de*-sentences like (2), simple *neng*-sentences like (3) and the *neng-de* co-occurrence in (8c) in which *neng* and *de* are located in different modal positions, *neng* is an epistemic modal (“possibility”) while *de* is a deontic modal (“ability”). However, this analysis does not account for the single “possibility” meaning in (8a) and the single “ability” meaning in (8b) since *neng* and *de* co-occur in a single sentence.

- (8) Lisi (**bu-neng**) kan-**de**-dao zhe-ke shu.
Lisi not-can chop-DE-fall this-CL tree
a. “It is 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.”

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.

There are three things that need to be addressed concerning the characteristics of *de* in the *neng-de* co-occurrence (8). First, although the *neng-de* co-occurrence (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* co-occurrence in (8) cannot be analyzed as the same *de* as that in Resultative or Descriptive constructions although they all share the same phonological form¹¹. 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 co-occur 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 co-occur with the potential modal *neng* like (8):

- (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, although they can co-occur with *neng*, as shown in (17a), the empirical evidence shows that they can co-occur with negated perfective *mei-you* “not-have” as well. However, the negated perfective *mei-you* “not-have” is not allowed to appear in *de*-

¹¹ I appreciate the reviewer turning my attention to the possibility of *de* as the Resultative/Descriptive marker *de*. The reviewer offers the following similar co-occurrence 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. (Note: the judgments from (ia) through (if) are
 Lisi can eat-DE-finish one-big-bowl beef noodle from the reviewer.)
 b.* Zhemou duo shiwu ***nenggou wei-de-bao*** wushi ren.
 such much food can feed-DE-full fifty person
 c. Zhe-zhang chuang ***nenggou shui-de-xia*** wuge ren
 this bed can sleep-DE-down five 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) cannot be considered as counterexamples.

sentences, as shown in (17b), since it conveys perfectivity which is not compatible with *de*-sentences, as discussed in Section 2.2.2.

- (17) a. tamen ((*bu-*)*neng/mei-you*) pao *de* **kuai**. (Descriptive Construction)
 they not-can/not-have run DE 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 section 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 xia *de* *hen* *piao-liang*. (Descriptive Construction)
 character BEI he write DE very beautiful
 “The characters were written beautifully by him.”
 b. ta **ba** *zi* xia *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*- and *neng*-sentences structurally correlate to each other? *De*- and *neng*-sentences should display syntactic evidence if they are related through some syntactic operation. (ii) Does *de* denote any semantic content? For this question, it is necessary to examine the semantic properties of *de*-constructions. (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)? At this point, 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):

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

The parallel semantics between *de*-sentence (2) and *neng*-sentence (3), the single modality expressions in *neng-de* co-occurrence 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 act differently in at least four ways in terms of their interaction with passive constructions¹², *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 manner adverb *manman-de* “slowly”, whereas sentences containing *de* in (22), are banned in those four constructions:

¹² There are two types of passive constructions in Mandarin, long passive and short passive, which differ with respect to the appearance of the AGENT. I will have a detailed discussion in section 5.1.

¹³ Focus elements in Chinese (i), unlike English (ii), must occur preverbally but not postverbally:

- (i) *Zhi*?(*you*) Lisi (*zhi*(*you*)) kanjian (**zhi*(*you*)) Dufu (**zhi*(*you*))
 Only(have) Lisi only(have) see only(have) Dufu only(have)
 “(Only) Lisi (only) saw Dufu.”
 (ii) (Only) John (only) kisses (only) Mary (only).

Except for postverbal position, Chinese focus elements can appear in various positions in a sentence, such as at the initial position of a sentence, as shown in (i). However, only those positions that are relevant to *neng*-constructions and *de*-constructions will be discussed here.

¹⁴ Besides *zhi* “only”, other focus elements *shenzhi* “even” and *ye* “also” also function like *zhi* in that they appear in various preverbal positions and are adjoined to a verbal functional category as indicated in S.-W. Tang (1998). Interestingly, *shenzhi* and *ye* also show the same blocking effects like that in (22c), when they intervene between the Modal and *de*, as indicated in (i):

- (21) a. zhe-ke shu *neng bei* (Lisi) kan-dao.
 this-CL tree can BEI Lisi chop-fall
 “This tree can be chopped down.”
- b. Lisi *neng ba* zhe-ke shu kan-dao.
 Lisi can BA this-CL tree chop-fall
 “Lisi can chop the tree down.”
- c. Lisi *neng zhi* kan-dao zhe-ke shu.
 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.
 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.
 this-CL tree BEI Lisi chop-DE-fall
 “This tree was able to be chopped down by Lisi.”
- b. * Lisi *ba* zhe-ke shu kan-*de*-dao.
 Lisi BA this-CL tree chop-DE-fall
 “Lisi can chop the tree down.”
- c. Lisi *neng* (**zhi*) kan-*de*-dao zhe-ke shu.
 Lisi can only chop-DE-fall this-CL tree
 “Lisi can only chop the tree down.”
- d. Lisi (**manman-de*) kan-*de*-dao zhe-ke shu.
 Lisi slow-ly chop-DE-fall this-CL tree
 “Lisi can slowly chop the tree down.”

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

Note that the *neng-de* co-occurrence 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

-
- (i) Lisi *neng* (**zhi*/**shenzhi*/**ye*) kan-*de*-dao zhe-ke shu.
 Lisi can only/even/also chop-DE-fall this-CL tree
 “Lisi can only/even/also chop the tree down.”

In this paper, I will 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*:

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

A sentence like (i) does 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).

neng is an adjacency requirement since some other elements, such as some adverbs/adverbials, can appear between *neng* and *de*, and can be interchangeable, as shown in (23):

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

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

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

Given that *de*-sentences and *neng*-sentences are interpreted the same semantics as well as that the single modality meanings the *de-neng* co-occurrence in (8a) and (8b), I propose that *De* and *Modal* share the same potential modality feature [M] yet structurally they are generated at different positions. Therefore, *De* and *Modal* must be syntactically related. I will argue that *De* (or its Spec) has to undergo LF movement to the *Modal* position (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—On *Dou*-Quantification

Interestingly, the 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.

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 *zhi* contains some independent characteristics (cf. Bayer 1996). The discussion of this issue is beyond the domain of this research. I would like to leave it open for further research.

Note that in (25c) *dou* cannot quantify the plural subject NP when the focus element *zhi* intervening between them. Nevertheless, (25c) is not ruled out but interpreted differently.

- (25) a. *zhe-xie sanmingzhi dou bei* Lisi (**dou*) chi-le.
 those sandwich all BEI Lisi all eat-ASP
 “All of those sandwiches were eaten by Lisi.”
- b. *tamen dou ba zhe-ben shu (*dou)* kan-le.
 they all BA this-CL book all read-ASP
 “All of them read that book.”
- c. *tamen zhi dou* chi sanmingzhi.
 they only all eat sandwich
 “*All of them only ate sandwiches.”
 (ok: “They only ate sandwiches (all the time).”)
- d. *tamen (*manman-de) dou* chi-le sanmingzhi.
 they slow-ly all eat-PERF sandwich
 “All of them ate sandwiches slowly.”

Many approaches have tried to deal with the universal quantification of *dou* in the literature (see Li & Thompson (1981: 335-339)), Lee (1986), Chiu (1993), Cheng (1995), among others). The element *dou* is generally defined as a universal quantifier and it quantifies a preceding plural NP which is the subject or the topic of the sentence. Chiu (1993) proposes that *dou* is generated as a head Dou^0 and must be incorporated into a verbal or inflectional head ($AgrS^0$, Asp^0 or $AgrO^0$). Cheng (1995) argues, following Travis (1988), that *dou* is a kind of “defective” adverb that does not project to a maximal projection. She proposes that *dou* has to be licensed by a head that contains verbal features, such as Asp^0 or V^0 , and can be adjoined to various positions (Asp' , Asp^0 , V' and V^0). To quantify over regular plural NPs, *dou* must adjoin to the NP at LF and the quantification of *dou* is required to satisfy a locality restriction¹⁷. Under the analyses in Chiu (1993) and Cheng (1995), passive marker *bei* in (25a) and the object-preposing marker *ba* in (25b) are the blockers preventing *dou* from undergoing LF movement. As for the intervention effect caused by manner adverbs in (25d), Cheng notices that manner adverbs cannot appear before *dou*. Unfortunately, she does not offer any further arguments to account for the interaction of manner adverbs and *dou*. She 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 *dou* cannot appear after

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

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

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

- (ii) $[_{NP} [piping\ renhe\ ren\ de] shu]_i, [_{AspP} [pro_i\ dou_j] [_{AspP}\ wo\ t_j\ xihuan\ kan\ t_i]$
 criticize any person REL book all I like read

manner adverbs. Concerning the ungrammaticality of (25d), Lee (1986) claims that it is due to the characteristics of the manner adverb. He suggests that manner adverbs denote neither an entity nor an event. Therefore, manner adverbs cannot be an object of *dou*-quantification and the sentence (25d) is ruled out. As for the intervening focus element *zhi* in (25c), none of the previous analyses has provided any relevant discussion. I present the following analysis.

Dou in (25c) fails to quantify the plural subject due to the intervention of the focus element *zhi* “only”. At first glance, it looks like *zhi* does not cause any intervention effect at all because the sentence is grammatical. However, sentence (25c), as shown in the translation, is interpreted differently. Compare the interpretation of *dou* and *zhi* “only” in (26). As indicated in (26a), since the focus element *zhi* does not appear between *dou* and the subject, nothing prevents *dou* from quantifying over the plural NP *tamen* “they”. The individual *Lisi* in (26a) cannot be quantified by *dou* since it is not plural. Now consider (26b). Since *zhi* intervenes between *dou* and the plural subject NP, (26b) should be ungrammatical. However, not only (26b) is well-formed, the singular NP *Lisi* 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 related to 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 constrained by the plurality restriction of the subject NPs. As specified by 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 (“always/all the time”) or distributive (“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* can quantify over the plural NP, since *zhi* does not block *dou*-quantification, but not over the singular NP *Lisi*. Note that in (26a) *Lisi* can be 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 grammatically interpreted as the other three uses. The reason that (26b) is grammatical actually induces some kind of quantification over “temporal segments”. The appropriate translation of (26b), thus, is “They (or *Lisi*) only ate sandwiches all the time”. At this point, it is expected that the singular NP *Lisi* can appear as the subject in (26b).

Therefore, 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 X⁰s or XPs, of the interveners and *dou* have to be consistent with respect to Relativized Minimality. In the previous approaches, the quantifier *dou* is analyzed either as an X⁰ (Chiu (1993), Cheng

(1995)¹⁸, Li (1997)) or as an XP (Li & Thompson (1978) and Lee (1986)). I will provide a detailed discussion in Section 5 to examine the syntactic categories of *dou* and the interveners.

3.3 Intervention Effects Application—On *A-not-A* Questions

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

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

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

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

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 X^0 or X' . Since the *dou* in Cheng (1995) is adjoined to an X^0 or X' , I assume that it is an incorporated head (cf. Travis (1988)) with its licenser (X^0 or Asp^0). Thus, *dou* can be an X^0 level category under both of Chiu and Cheng’s analyses.

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*, containing the [+Q] feature, is a question operator 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)] is a head, either a functional head immediately ϵ -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). He argues that [+Q(u)] is free to occur on any verbal element in principle, but will only be realizable on the highest verb, either a main verb or an auxiliary (aspectual or modal). Ernst suggests that unlike other adjuncts, such as *weisheme* “why” which is bound by an empty [+Q(u)] operator in Spec of CP at S-S (as proposed in Aoun & Li (1993)), the *A-not-A* operator requires head-movement from where it is generated to Comp at LF. According to Huang and Ernst’s analyses, [+Q(u)], either on INFL (Huang (1982, 1991)) or on a verbal element (Ernst (1994)), must undergo LF movement to Comp and the movement has to satisfy a locality restriction. If there is any intervening head, as proposed in Soh (2001), the LF movement of the *A-not-A* operator [+Q(u)] will be blocked.

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

3.4 Interactions of *A-not-A*, *Dou*, *Neng* and *De*

If the intervention effects of LF movement in *de*-constructions (22) can be attributed to the same as those in *dou*-quantification (25) and *A-not-A* constructions (27), the LF movement in *de*-constructions (22) then should be restricted under the locality constraints as well. We predict that the same locality constraint should take place when *dou*, *A-not-A*, *de* and *neng* interact with each other. In (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]

¹⁹ Some speakers might consider (29a) is acceptable (although for my own judgment (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 plural NP itself but they reject (ib) where *A-not-A* is involved.

- (i) a. zhexe xiaohai (*quanbu*) **dou xie** zuoye.
 these child all/the whole all write homework
 “All of the children write (their) homework.”
 b. zhexe xiaohai (**quanbu*) **dou xie-bu-xie** zuoye?
 these child all/the whole all write-BU-xie homework

If (29a) is acceptable, it could be due to the fact that *dou* quantifies over “temporal segments”, as indicated in 3.2. In this case, the *dou* in (29a) should be used 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) should be incompatible with temporal adverbials that indicate a specific time, such as *zuotian* “yesterday”, as in (ii):

- (ii) * zhexe xiaohai **zuotian dou xie-bu-xie** zuoye?
 these child yesterday all write-not-write homework
 “(Intended) Did all of the children write homework yesterday?”

in (29a) has to be generated on a higher verbal element, in this case, the auxiliary *shi* “to be” functioning like *do*-support, as in (29c):

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

Syntactically, the auxiliary *shi* behaves like Chinese epistemic modals (cf. Huang 1988a) as a raising verb (cf. Lin & C.-C. Tang 1995) imposing no selectional restrictions on the subjects. Thus, the plural NP *zhexi xiaohai* “these children” in (29c) is not the subject of *shi* but the logical subject of the main verb *xie* “write”. The representation is like (30):

- (30) [[zhexe xiaohai]_i *shi-bu-shi* [*t_i* [**dou**] *xie* zuoye]]?

Accordingly, I suggest that structurally *dou* is not higher than *A-not-A* operator. I assume that *De* is licensed by the potential *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. ?* zhexe xiaohai (*bu-neng*) **dou** xie-wan zuoye²⁰.
 these child not-can all write-finish homework
 b. * zhexe xiaohai (*bu-neng*) **dou** xie-*de*-wan zuoye.
 these child not-can all write-DE-finish homework
 c. * zhexe 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. zhexe 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?”

²⁰ Someone may accept (31a). The could be attributed that *dou* quantifies over the embedded subject PRO, since deontic modals have a control construction. This can be tested by the interaction with the adverb *jintian* “today”:

(i) [[zhexe xiaohai]_i (**dou**) (*bu-neng*) (***dou**) *jintian* [**PRO**_i (**dou**) xie-wan zuoye]].

3.5 Summary

I propose that *de* projects as a head *De* licensed by *Modal* but is generated in a position different from it. The relationship 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 intervening of *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 observed in *neng*-sentences (21) and *de*-sentences (22), it is necessary to examine the four elements that cause intervention effects. These four elements are widely discussed in the literature. 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 Spec of a functional projection (Cinque (1999)). Accordingly, the positions of these four elements should occur in the *vP* or adjoined to *vP*²¹. I will examine these four constructions in section 5. In the next section, I will 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 the history of *de* and *bu* and then provide an analysis concerning the status of *de/bu*.

4.1 A Sketch of *De/Bu* and the History

In Classical Chinese, *de* was used as a regular verb meaning “to gain, to obtain, to reach”. As indicated in Yue (1984), in the oracle-bone writing age *de* was used as both a transitive and an intransitive verb (before 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 articles. 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

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.

4.2 *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 will 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 but not anywhere else. Under the syntactic approach, V and R then project different verbal projections (cf. Sybesma (1992, 1999), S.-W. Tang (1997), Stewart (1998), Nishiyama (1998) and Wu (2002), among others). 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 be adjoined to VP, such as those adverbs/adverbials exemplified in (23) like *cong xuexiao* “from school”, or temporal/locative adverbs, like *mingtian* “tomorrow” and *zai jia-li* “at home”, would be allowed to be placed between V and R. However, as depicted in (36a)-(36c), this predication is not borne out:

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

One might suggest that the ungrammaticality of (36) could be attributed to a phonological distinction²⁴, that is, there might be a specific rule that allows only monosyllable or monomoraic morphemes to be legitimately placed between V and R. Empirical evidence shows that the possibility of phonological distinction is excluded, since, monosyllabic adverbs like *quan* “totally” or monomoraic morphemes like *ye* “also” are not allowed to appear between V and R, as illustrated in (37):

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

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

4.3 *De/Bu* Project as an X⁰ Level Category

The other option for categorizing *de/bu* is that *de/bu* project as an X⁰ level category. However, since *de* and *neng* can co-occur in a single sentence (8), the X⁰ projection of *de/bu*

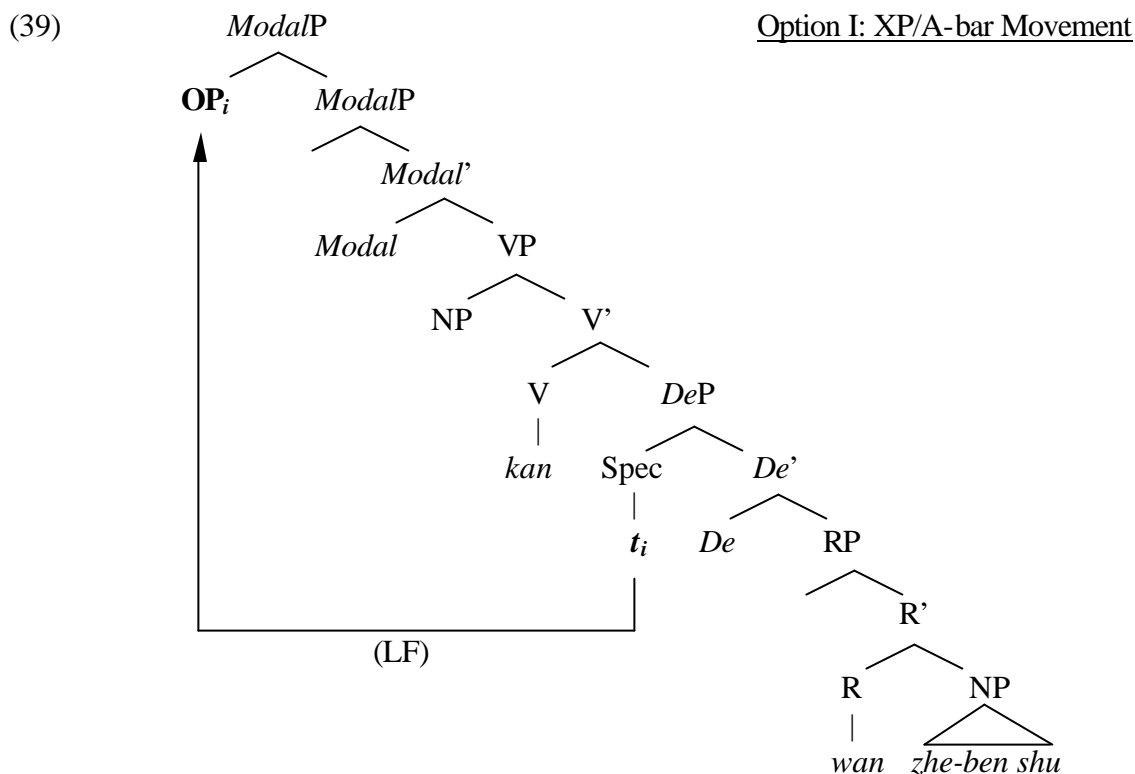
²⁴ I appreciate that Mark Baker and Lisa Travis pointed out the possibilities.

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

(38) $[...Modal_{[M]} ... [...V... [...De_{[M]}... [...R...]]]]$

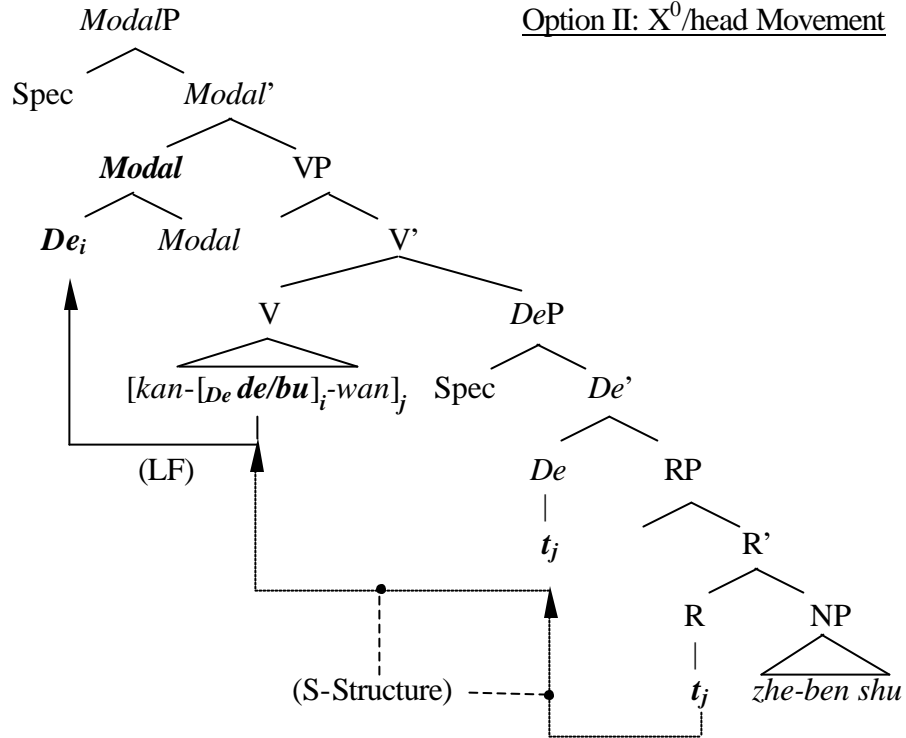
As argued previously, *de*-sentences are semantically interpreted the same as *neng*-sentences and structurally *De* should be correlated to *Modal*. A question then arises: how are *De* and *Modal* correlated? To account for Mandarin *de*-constructions, I propose that a Null Operator (OP), either an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

First, under the XP movement approach, as illustrated in (39) below, the Spec of *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 X^0 /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*:

(40)

Option II: X^0 /head Movement

Under the syntactic approach, RVCs are derived by head movement and incorporation (cf. Sybesma (1992), S.-W. Tang (1997), Nishiyama (1998), Stewart (1998), Wu (2002), among others)²⁵. The cyclic head movements of V, *De* and R form a [V-*De*-R] complex which is motivated possibly by some aspectual reason (see Stewart (1988), Wu (2002) for relevant discussions). I argue that, motivated by checking its [M] feature with *Modal*, De^0 then excorporates from the verbal complex and raises to *Modal* at LF^{26, 27}. 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 *De* to *Modal*. Following Rizzi's (1990) Relativized Minimality, the LF movement has to obey strict locality constraints. With the movement approach, the intervening effects in (22) can be attributed to the violation of Relativized Minimality. Moreover, the status of the four blockers, 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.

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

²⁶ Jonathan Bobaljik (p.c.) provided an argument that when excorporation of *De* is assumed, *De* could be allowed to raise to the head position of one of the blockers, *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, cannot stand. First, if this were possible, the intervention effects in (22) should not happen. Moreover, the excorporation of *De* from the [V-*de/bu*-R] complex to *Modal* is motivated by [M] feature-checking, whereas the excorporation of *De* from the [V-*de/bu*-R] complex to the head position of any of the interveners does not have any motivation.

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

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 will 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 an NP-movement hypothesis where the object NP *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_i* was killed *t_i* (by Bill).

Ting (1998) and Huang (1999) 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 verb²⁹, a two-place predicate meaning “to undergo, to experience”. They propose that there is no object NP movement involved in Chinese. 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

²⁸ Ting (1998) notes there are actually three types of *bei*-sentences. Besides the long and short passives indicated here, a third type involves a lexical passive compound verb (or “complex passive verbs”) 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. 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.

deletion of the AGENT NP³⁰. Ting (1998) and Huang (1999) propose that structurally a long passive should have a structure like English *tough* constructions: the complement of the verb *bei* is an IP predicate involving either an A-bar movement or an A-bar binding, as represented in (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. The VP itself is a passive structure containing internal NP movement with the underlying PATIENT argument moved into the non-thematic [Spec, VP] position binding the trace, as represented 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 the A-movement of a PRO controlled by the subject of the verb *bei*:

- (43) a. The long passive:
 [Zhangsan_i [v *bei* [IP **OP**_i [IP Lisi [VP [v' da-le *t*_i]]]]]] (A-bar Movement)
 Zhangsan BEI Lisi hit-PERF
- b. The short passive:
 [Zhangsan_i [v *bei* [VP **PRO**_i [v' da-le *t*_i]]]] (A-Movement)
 Zhangsan BEI hit-PERF

The following fact in (44) is considered 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, an overt logical object pronominal, a resumptive pronoun that is co-indexed with the subject of *bei* can also appear in this position:

- (44) [Zhangsan_i [v *bei* [IP **OP**_i [IP Lisi [VP [v' da-le *ta*_i yi-xia]]]]]]
 Zhangsan BEI Lisi hit-PERF him once
 “Zhangsan was hit once by Lisi.”

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

- (45) a. zhe-ke shu *bei* Lisi kan-(**de*/**bu*)-dao-le
 this-CL tree BEI Lisi chop -DE/BU- fall-PERF
 “This tree was chopped down (by Lisi).”
- b. zhe-ke shu *bei* kan-(**de*/**bu*)-dao-le
 this-CL tree BEI chop -DE/BU- fall-PERF
 “This tree was chopped down.”

Consider now the two possibilities, XP and X⁰, to account for the LF movement of *De*. First, under the XP approach, the OP of *De* has to move to Spec of *ModalP*. In a long passive, the XP movement of the OP of *De* (indexed *j*) is blocked by the OP of passive (indexed *i*), as illustrated in (46a), which explains the ungrammaticality of (45a). In a short passive, since PRO

³⁰ Ting (1998) and Huang (1999) provide several convincing 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.

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) is a grammatical sentence. Therefore, the XP/A-bar approach is not appropriate.

- (46) a. * [zhe-ke shu_i [_{ModP} OP_j [_{Mod}] [_{VP} bei [_{IP} OP_i [_{IP} Lisi [_{VP} kan [_{DeP} t_j [_{De} de] t_i dao]]]]]]
 this-CL tree BEI Lisi chop DE fall
 b. [zhe-ke shu_i [_{ModP} OP_j [_{Mod}] [_{VP} bei [_{VP} PRO_i [_{V'} kan [_{DeP} t_j [_{De} de] t_i dao]]]]]]
 this-CL tree BEI chop DE fall

Under the X⁰ approach, on the other hand, the passive OP in the long passive (45a) would not affect the head movement of *De*, rather, the head *bei* prevents *De* from undergoing LF head movement to Mod, as shown in (47a). In the short passive (45b), *bei* once again blocks the head movement from *De* to Mod, as represented in (47b), thus (45b) would be ruled out by principle as expected:

- (47) a. * [zhe-ke shu_i [_{ModP} [_{Mod} **De_j** Mod] [_{VP} **bei** [_{IP} OP_i [_{IP} Lisi [_{VP} kan [_{DeP} [_{De} t_j] t_i dao]]]]]]]]
 this-CL tree BEI Lisi chop fall
 b. * [zhe-ke shu_i [_{ModP} [_{Mod} **De_j** Mod] [_{VP} **bei** [_{VP} PRO_i [_{V'} kan [_{De} t_j] t_i dao]]]]]]
 this-CL tree BEI chop fall

The XP approach explains the ungrammatical long passive (45a). However, it fails to account for the ungrammatical short passive (45b). In contrast, the X⁰ approach properly elucidates the illegitimate head movements of *De* in both long and short passives. Accordingly, I propose that the X⁰ approach is appropriate to account for passive intervention in *de*-sentences.

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

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

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

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

As mentioned, 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 like (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 given 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**<sub>[+Q]_j / **OP**_{DOU_j} [VP *bei* [IP **OP**_i [IP *t_j* V *t_i*]]]]
 b. [**OP**_{[+Q]_j / **OP**_{DOU_j} [VP *bei* [VP **PRO**_i *t_j* V *t_i*]]]]}</sub>

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]_j / **Dou**_j [VP *bei* [IP **OP**_i [IP *t_j* *t_i*]]]]
 b. * [[+Q]_j / **Dou**_j [VP *bei* [VP **PRO**_i [VP *t_j* *t_i*]]]]

Cheng (1995) offers a similar argument to account for passive in *dou*-quantification (25a). She considers, adopting Travis (1988), that the quantifier *dou* is “defective” adverb adjoined to an X⁰ or X³¹, 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 actually 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 fact that the head *bei* acts as an intervener preventing the X⁰/head movements of *De*⁰, *dou* and the *A-not-A* operator. Hence, the X⁰ 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 and a *ba*-construction should be treated as a type of causative construction headed by *ba*³². The subject of *ba*-sentence is the CAUSER and the *Cause* verb *ba* selects a VP while the promoted object is the CAUSEE. The VP embedded under the verb *ba* is unaccusative in the sense that it is

³¹ Please refer to the discussion in footnote 18.

³² Some *ba*-sentences might not convey a solid causative meaning. Consider the example (i) which contains a verb of psychological activity *wan* “forget” and cannot be translated as “Lisi caused the key to be forgotten in home.”

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

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 and that has an effect on the object (the key) and gives a RESULT (the key is in home). The paper is not trying to provide a complete discussion about *ba*-constructions rather it attempts to show that *ba*-constructions cannot be structured with *de/bu* but work perfectly with the modal *neng*, as shown in (iia) and (iib) where the verb *wan* “forget” is the V in the RVC.

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

an ACTION involving termination but no initiator. The embedded verb takes an XP, a SMALL CLAUSE denoting a RESULT state, as its complement. A *ba*-sentence can be interpreted as: 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 proposes that the object NP is base-generated in Spec of XP and is adjoined to VP to be Case-marked by *ba*. (51a) is represented in (51b):

- (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 [_{CausP} [_{Caus} *ba*] [_{VP} [_{ba-NP} shoupa_i] [_{VP} ku [_{XP/SC} t_i shi-le]]]]]
 he BA handkerchief cry wet-PERF

Ba-constructions require the existence of an empty category in the post-verbal position³³. Thus, an overt pronoun or a reflexive cannot be placed post-verbally, as shown in (52):

- (52) Zhangsan_i *ba* Lisi_j da-shang-le (ta_{*i/*j})/(ziji_{*i/*j})
 Zhangsan BA Lisi hit-injured-PERF him/self

The sentence (52) shows the following: (i) the post-*ba* verb is an unaccusative verb which is not able to assign Case to its object position, (ii) the *ba*-NP is not the object of *ba* but a 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 the *de*-construction and the *ba*-construction in (22b). The XP approach allows the OP of *De* 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, this approach falsely predicts the *ba*-sentence containing *de* (22b) to be a grammatical sentence:

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

On the other hand, the X⁰ approach (54) correctly accounts for (22b) in that the Cause verb *ba* intervenes in the head movement from *De* to *Modal* and renders the sentence ungrammatical:

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

Based on the analyses in (53) and (54), I suggest that the X⁰, rather than the XP, approach is the appropriate analysis to account for the LF movement in *de*-constructions when interacting with *ba*-constructions.

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

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

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

Recall the examples in (25b) and (27b) where *ba*-constructions render *dou*-constructions and *A-not-A* constructions ungrammatical.

- (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 analysis 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 the second *dou* can quantify over the subject NP. The XP account for the ungrammatical *A-not-A* operator in (27b) is again not appropriate, since, like the analyses of *de*-constructions in (53) and *dou*-quantifications, the XP approach incorrectly predicts (22b) to be grammatical. In contrast, the X^0 approach explains that the ungrammaticality of (27b) is due to the blocker, the Cause verb *ba*, preventing the head movement of the *A-not-A* operator [+Q]. The representation of the ungrammatical head movements in *dou*-quantifications and *A-not-A* questions then can be represented in (55):

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

With the analyses above, I conclude that the ungrammatical *ba*-constructions in (22b), (25b) and (27b) are attributed to the fact that the X^0 /head movements of *De*, *dou* and *A-not-A* operator are blocked by the Cause verb *ba* in X^0 position.

5.3 Focus Elements

As discussed previously in Section 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 scope positions of *zhi* thus cause different interpretations.

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

On the other hand, in the *de*-construction (57a), the parallel interpretation as that in (56a) can be obtained when *zhi* does not intervene between the covert *Modal* and *de* but scopes over both of them. However, when *zhi* intervenes between the covert *Modal* and *de*, as shown in

(57b), it blocks the LF movement of *de* to the *Modal* position. Therefore, the same interpretation that we get in the *neng*-sentence (56b) can never be obtained in *de*-sentence (57b):

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

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

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

Recall (21c) and (22c) where the focus element *zhi* causes the same blocking phenomenon in the *de*-sentence (22c) as that in the LF *wh*-sentences (58) but *zhi* can be placed in the *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 also be a blocker 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) * [*ModP* OP_i [*Mod* *Modal*]_{[vP} *zhi* [*VP* kan [*DeP* t_i [*De* *de*]]_{[RP} dao [*NP* zhe-ben shu]]]]

It seems that the ungrammatical *de*-construction (22c) can be accounted for by the XP approach (59), however, it is not clear why focus elements like *zhi* behave differently from other XP adjuncts. In the following, I will show that focus elements like *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 adverbials like *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 (25c)³⁴:

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 offering 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

- (23) a. Lisi (*bu-*)*neng* [*ti wo*] [*cong xuexiao*] [*xiang laoshi*] jie-*de*-dao LGB
 Lisi (not)can for me from school to teacher borrow-DE-arrive LGB
 “Lisi can/cannot borrow LGB from the teacher from school for me.”
 b. Lisi (*bu-*)*neng* [*ti wo*] [*cong xuexiao*] [*xiang laoshi*] jie-*de*-dao LGB.
 c. Lisi (*bu-*)*neng* [*xiang laoshi*] [*ti wo*] [*cong xuexiao*] jie-*de*-dao LGB.
 d. Lisi (*bu-*)*neng* [*xiang laoshi*] [*cong xuexiao*] [*ti wo*] jie-*de*-dao LGB.
 e. Lisi (*bu-*)*neng* [*cong xuexiao*] [*xiang laoshi*] [*ti wo*] jie-*de*-dao LGB.
 f. Lisi (*bu-*)*neng* [*cong xuexiao*] [*ti wo*] [*xiang laoshi*] jie-*de*-dao LGB.
- (60) a. Lisi (*cong xuexiao*) (*bu-*)*neng* (*cong xuexiao*) jie-*de*-dao LGB.
 Lisi from school not-can from school borrow-DE-arrive LGB
 “Lisi can/cannot borrow LGB from school.”
 b. (*jintian*) tamen (*jintian*) *dou* chi-le sanmingzhi.
 today they today all eat-PERF sandwich
 “All of them ate sandwiches today.”
 c. (*mingtian*) Lisi (*mingtian*) *hui-bu-hui* cizhi?
 tomorrow Lisi tomorrow will-not-will resign
 “Will Lisi resign tomorrow?”

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

- (61) a. [**Zhi** kan-wan zhe-ben shu], Lisi yiding neng.
 Only read-finish this-CL book Lisi definitely can
 “Only finish reading this book, Lisi definitely can.”
 b. * [**Tongcheng** qu tushuguan], Lisi yiding hui.
 usually go library Lisi definitely will

Cinque (1999) argues, according to those properties above³⁵, that focus elements form a constituent with the phrase following them and it is plausible to treat focus elements as heads taking their modifyees as complements (cf. Bayer (1996)). If Cinque’s analysis is correct, then focus elements should be treated differently from other XP adverbials based on their different syntactic behavior, and we might consider the possibility that focus elements are 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 X⁰ approach explains why the intervention of focus elements in the *de*-construction (22c) blocks the head movement of *De* to *Modal*. The representation is provided in (62):

- (62) * [_{ModP} [_{Mod} **De**_i *Mod*]] [_{FocP} [_{Foc} **zhi**]] [_{VP} [_V kan [_{De} **t**_i] *dao*]_j [_{DeP} *t*_j [_t_j [...]]]]
 only chop fall

be accounted for. Moreover, Cinque (1999) considers adverbials like those in (23a)-(23f) are “predicates” (see as well the discussion in Section 5.4). In this paper, I follow Cinque (1999) suggesting that *zhi* is actually a quantifier head projecting as Foc(us)P.

³⁵ Cinque (1999) has one more piece of evidence to support the argument. It is the fact 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 are only permitted to occur preverbally due to some unknown reason. I would omit this property for now and expect further research would provide proper explanation.

The X^0 approach (59) can also explain the ungrammaticality in *dou*-quantification (25c) and *A-not-A* question (27c) in which *zhi* also blocks the head movement of *dou* and the *A-not-A* operator [+Q]:

(63) * [[+Q]_i /*Dou* _i [_{FocP} [_{Foc} *zhi*]] [_{VP} V [_{De} *t*_i] 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)). 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*:

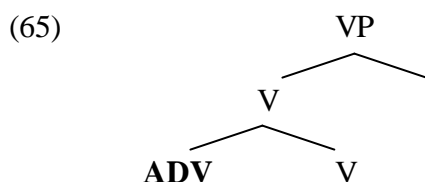
(64) * [_{ModP} OP_i [_{Mod} *Mod*]] [_{vP} *manmande* [_{VP} kan [_{DeP} *t*_i [_{De} *de*]] [_{RP} dao [_{NP} zhe-ben shu]]]]

The XP analysis (64) seems 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.”

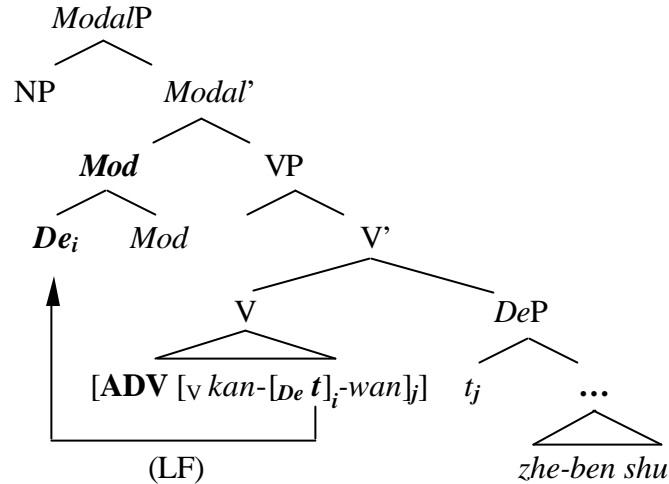
(27) d. Lisi (**zixi-de*) *kan-bu-kan* zhe-ben shu?
 Lisi carefully read-not-read this-CL book
 “Does Lisi read this book carefully?”

However, it is also possible that manner adverbs can be analyzed as an X^0 category. Travis (1988) proposes that due to their “defective” nature, adverbs do not project to a maximal projection. She 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 licensor. Travis proposes that structurally adverbs are base-generated as an incorporated head with the head of their licensor, as shown in (65) (= Travis (1988: (49b)):



Under the X^0 approach (65), the manner adverb *manmande* “slowly” is then base-generated as an incorporated head with the head of the licensor, the V, as depicted in the configuration (66). However, this X^0 analysis (65) falsely predicts that the *de*-sentence in (22d) is a grammatical sentence. After incorporation, the functional head *De* excorporates from the verbal complex and raises alone to *Modal* at LF to check the [M] feature. Since the X^0 manner adverb is an incorporated head incorporated with the verbal complex [*V-de/bu-R*], it does not block the excorporation of *De* undergoing LF head movement to *Modal*.

(66)



In fact, the X^0 approach (66) is also problematic in terms of the differences between adverb phrases (XP) and root/head adverbs (X^0). Manner adverbs like *manmande* “slowly” are XP phrases formed by reduplicating the root adverb and optionally adding the adverb suffix *-de* “-ly” in the lexicon since they do not allow any other elements to intervene in between. Thus, adverbs with something like *you* “again” intervening formed as **man-you-man-de* “slow-again-slow-ly” are ungrammatical. X^0 /root adverbs like *man* “slow”, on the other hand, cannot appear as independent words in contexts, such as **man kan-wan* “slowly read-finish”. An X^0 /root adverb can incorporate to a root verb to form a modifier-head compound verb like (67a) but cannot incorporate to a compound verb like in (68b), whereas an XP adverb can do both, as shown in (68a) and (68b). Moreover, the X^0 /root adverb *man* and the 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:

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

The observation above indicates that X^0 and XP adverbs are different in their incorporation formation. Manner adverbs like *manmande* “slowly” are XP type adverbs. The X^0 approach (66) thus is not an appropriate approach 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) by arguing that the XP movement of the *De* operator violates the locality restriction. However, I will argue 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 will also argue that accurate X^0 approach (66) for the intervention effects cannot be taken as evidence to completely rule out the possibility of X^0 /head movement of in (22d), (25d) and (27d).

As noted previously, manner adverbs behave differently from the adverbial phrases in (60), which do not exhibit the same intervention effects. Moreover, other adverbial phrases, as those shown in (23), are interchangeable without changing the meaning. The observation in (23) and (60) indicates 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 found in (23) and (60) do not block LF movement and are freely interchangeable. Cinque (1999) proposes that adverbials like those in (23) (what he 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 cause intervention effects on LF movement, like manner adverbs, should be treated differently. Ernst (1994) proposes that Mandarin adjuncts can be divided in two types³⁶, “Core adjuncts” and “Theta/INFL (argument-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) argues 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.

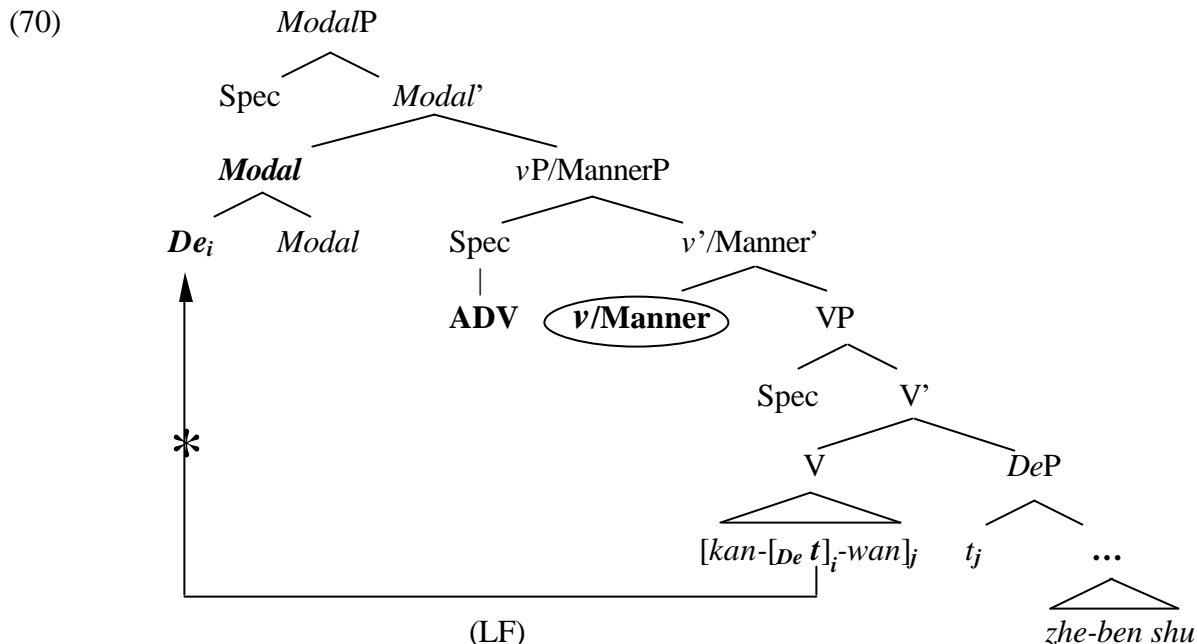
Inspired by Ernst (1995) and Cinque (1999), I propose that adverb/adverbial adjuncts should be divided into two types, “Head Adjuncts” and “Argument-like Adjuncts”. With respect to their characteristics of blocking LF movement, Head Adjuncts act like a quantifier element and affect other quantifiers 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 caused by manner adverbs in the *de*-construction (22d), the *dou*-quantification (25d) and the *A-not-A* question (27d). Based on the proposal above, akin to the analyses of Ernst and Cinque, manner adverbs are Head Adjuncts. Adopting Cinque, I will argue that manner adverbs should be arranged in the Spec positions of functional projections. These functional projections could be ν P, or say, $\text{Man}(\text{ner})\text{P}$ ³⁷ for the consideration of interpretation. Through Spec-head agreement, the functional head ν /Manner is actually an operator itself preventing *De* from undergoing LF X^0 /head movement. The revised X^0 approach is provided in (70):

³⁶ However, C.-C. Tang (1993) 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 differences. For instance, some adjuncts like *daodi* “the-hell” are sorted in Core adjuncts but they actually do not block *A-not-A* operator movement. According to Tang, these adjuncts should be featured with Comp [+Q, -*wh*]. Other adjuncts, such as *xianran-de* “obviously”, need to be licensed by Comp [-Q], thus they are not compatible with *A-not-A* questions. Please see Tang (1993) for discussion.

³⁷ Cinque (1999) postulates that manner adverbs are in the Spec of “celerative Asp” since they may quantify over the event or the process. I use $\text{Man}(\text{ner})$ 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, I propose that the ungrammatical sentences in (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 examined the categorial 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)). Therefore, we conclude that the X^0 approach (40) is favored over the XP approach (39) to account for the intervening phenomena.

6. SINGLE/DOUBLE MODALITY INTERPRETATION AND *NENG-DE* CO-OCCURRENCE

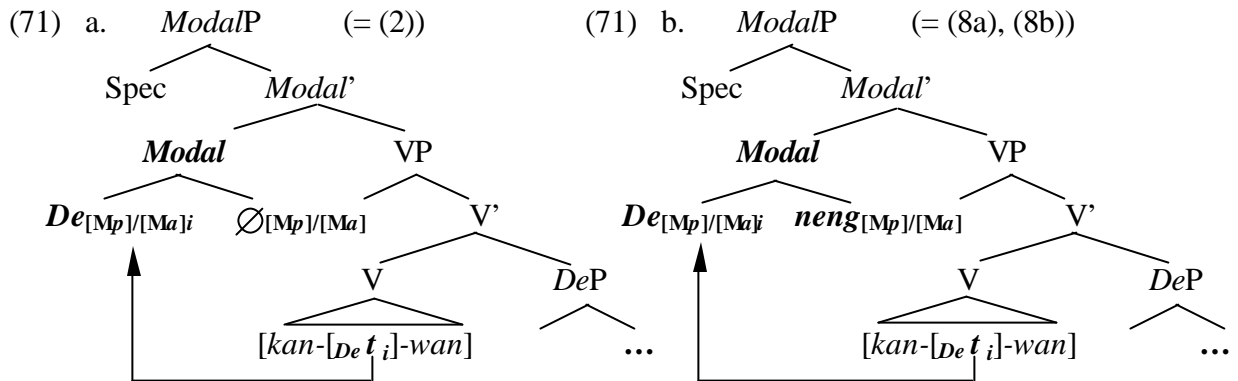
Recall the co-occurrence (8) where *de* and *neng* occur in a single sentence and denote three possible readings: “possibility” (both *neng* and *de*) in (8a), “ability” (both *neng* and *de*) in (8b) and “possibility (*neng*)” + “ability (*de*)” in (8c).

- (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.”

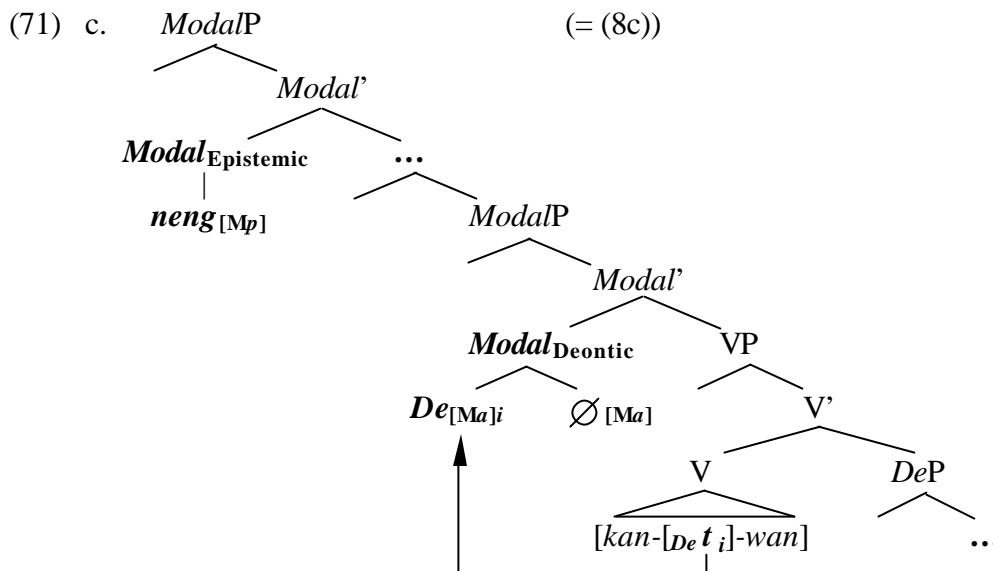
I have argued that *De* is an operator licensed by *Modal* and requires an LF X^0 /head movement to *Modal* for checking its potentiality [M] feature (either [M_{possibility}] or [M_{ability}]). The *neng-de* co-occurrence in (8) supports the argument that *De* is structurally generated at a different 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* co-occurrence (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 this sense of (20), both *de*-sentence (2) and *neng-de* co-occurrence (8a-b) contain two modality projections, *De* and *Modal*, but denote a single modality meaning, [Mp] (“possibility”) or [Ma] (“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* co-occurrence (8a-b), as represented in (71b):



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



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 (8) in which two modals appear in a single sentence denoting a single-modality meaning in (8a) and (8b). 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 (8) by proposing the requirement of undergoing the LF movement from *De* to *Modal* for the purpose of correlation/feature-checking.

As proposed in Section 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 be lexically filled by an overt modal like *neng* or be an empty head.

The *Modal* in a *de*-sentences like (2) is generated as a null *Modal* head. The covert *Modal* contains only the modality feature [M] but is not specified [+*neg*] or [-*neg*] feature. *De* undergoes X⁰/head movement to check the [M] feature ([Mp] or [Ma]) with the covert *Modal*. 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 [_{ModP} [_{Mod} **De**<sub>[M] [+/-neg]_i **Mod**_[M]] [_{VP} [_V kan [_{De}-**de/bu**]_i dao]_j [_{DePtj} [_{RP} t_j [...]]]]]]]
 Lisi chop DE/BU fall</sub>

On the other hand, if the *Modal* position is filled by *neng*, like the *neng-de* co-occurrence in (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 ([Mp] or [Ma]) with the modal *neng*. Furthermore, *de* and the overt modal also agree with their [-*neg*] feature. Hence, the feature checking for both [M] and [-*neg*] in (8) is satisfied, as represented in (74):

- (74) [_{NegP}(*bu*) [_{ModP} [_{Mod} **De**<sub>[M] [-neg]_i [**neng**_{[M] [-neg]}]] [_{VP} [_V kan [_{De}-**de**]_i dao]_j [_{DePtj} [_{RP} t_j [...]]]]]]]
 not can chop DE fall</sub>

While *de* can co-occur with either *neng* or *bu-neng*, its negative counterpart *bu* is not allowed to appear with any of the overt Modals, as indicated in (75):

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

Due to morphological reasons Mandarin negation markers, such as *bu* “not (general)” and *mei* “not (perfective)”, always appear higher than modals and verbs (Ernst (1994)). I assume that Mandarin negations project as NegP and are structurally higher than *ModalP* and *DeP*. Thus, the *bu* and *neng* are 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 Neg⁰. Thus, *de* can co-occur with either *neng* or *bu-neng*. However, as indicated in the co-occurrence (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 to check with Neg⁰. Since Neg⁰ and *Modal*⁰ are generated in separate projections, the negative *De* is supposed to check its [M] feature with *Modal* first and then its [+neg] feature with Neg⁰ 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 crashes before *bu* moves to Neg⁰. Hence, co-occurrence of the negative *De*, *bu*, with either *neng* or *bu-neng* in (75) is ruled out, as shown in (76):

(76) * [NegP(**bu**) [*Mod*P [*Mod***De**_{[M][+neg]} [*neng*_{[M][-neg]}]]] [VP [V kan [*De*-**bu**-]_i-dao]_j [*De*P t_j [_{RP} t_j [...]]]]]]
not can chop BU fall

By proposing the analysis that *de/bu* are generated in a functional projection *De* which is separated from the *Modal* projection, we can 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. CONCLUSIONS

In this paper, I proposed that *de*-sentences and *neng*-sentences are semantically interpreted with the same potentiality meaning. The potentiality items *de* and *bu* cannot be interpreted in their S-Structure position but should be in an inner functional projection *De* generated between V and R and licensed by *Modal*. The co-occurrence of *de* and *neng* in (8) is due to two projecting heads, *De* and *Modal*, occurring in a single sentence. *De* and *Modal* share the same potentiality feature [M]. To fulfill the interpretation, the head *De* has to undergo head movement to the head position of *Modal*P at LF to check the [M] feature. The LF head movement of *De* has to obey a locality restriction 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 proposal for LF head movement comes from the intervention effects observed in *de*-sentences. I suggested that the intervention effects caused 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 is provided to show that the LF operation in *de*-constructions is an X⁰, rather than an XP, movement in terms of Relativized Minimality.

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

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