

A Minimal Analysis of *Dou*-Quantification*

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5.1. Introduction

The syntax of *dou* has always been controversial and there are at least three competing approaches in generative literature.¹ In this chapter I propose a Minimalist analysis of *dou*-quantification. On this analysis, *dou* is a functional head projecting to Distributional Phrase (DistP for short).² This projection is quantificationally strong whose feature must be checked by a strong element either moved or merged into its spec-position via spec-head agreement. From this it directly follows that *dou* can only quantify an element to its left (Leftward Quantification). Following Barwise and Cooper (1981), I distinguish two types of NPs: strong vs. weak in terms of their Q-feature strength. On the assumption that a checker and checkee must agree not only in their feature but also in their feature strength, another important but hitherto unnoticed fact that *dou* is unable to quantify a weak (whether singular or plural) NP can be attributed to the mismatch of their feature strength. Also, the proposed analysis captures the locality restrictions and blocking effects without invoking any ad hoc assumptions. By extending the strong/weak distinction to other categories, the same account is provided for the fact that *dou* can be associated with strong quantificational adverbs like *yizhi* (always), *changchang* (often), but not with weak ones like *youshi* (sometimes), *ouer* (occasionally). It is further demonstrated that this analysis gives a unified account for the focus use of *dou*, and can be extended to *dou*-quantification of wh-NPs into an island, only with minimal additional assumptions.

5.2. The Syntax and Semantics of *Dou*-Quantification

In this section I set the stage for further discussion by presenting the basic facts concerning the syntax and semantics of *dou*, some of which, to the best of my knowledge, has not been noticed.

5.2.1. The Leftward Quantification

The most conspicuous fact concerning *dou* is that it can only quantify an NP to its left.

- (1) a. zhexie xuesheng dou xihuan wo.
 these student all like me
 All of these students like me.
- b.*dou zhexie xuesheng xihuan wo.
 all these student like me
 All of these students like me.

* As a reviewer points out the central idea that *dou* heads a functional projection called DistP is not new. Li in his dissertation (1997), following Beghelli and Stowell (1995), first makes such a proposal. Since Li's and mine are made independently of each other, it adds credence to the idea itself. Li's focus is more on the correlation between *dou* and the lack of a tense marker in Chinese as well as its historical implication. Mine is to capture all the relevant facts regarding *dou*-quantification in Minimalist terms. The two analyses diverge in their focus but not in their spirit.

¹What I have in mind is Chiu's (1993) floating quantifier analysis, Cheng's (1995) adverbial analysis and Zhang's (1997) binding analysis. The coverage of the three analyses is limited in that they only deal with *dou*-quantification of NPs. As we will see in this chapter, *dou* can be quantificationally associated with some adverbs as well. The proposed analysis can capture this fact without invoking any ad hoc assumption.

² As a matter of fact, the idea that *dou* is the head of a functional projection has been proposed by Lin (1992), Li (1992) and Li (1997) I don't have access to their papers to know enough details of their proposals.

- (2) a. Zhangsan zhexie shu dou kan-le.
Zhangsan these book all read
Zhangsan has read all of these books.
- b. *Zhangsan dou kan-le zhexie shu.
Zhangsan all read these book
Zhangsan has read all of these books.

Sentence (1a) is acceptable where *zhexie xuesheng* (these students) is on the left of *dou*; sentence (1b), by contrast, is unacceptable where the same NP is on the right of *dou*. Similarly, sentence (2a) is acceptable where the object *zhexie shu* is moved to the left of *dou*; sentence (2b) is unacceptable where the same object stays put.³

5.2.2. Locality

Dou does not have to be adjacent to the NP it quantifies, but there is, however, a certain locality restriction.

- (3) a. zhexie xuesheng wo dou xihuan.
these student I all like
All of these students I like.
- b. *zhexie xuesheng zhidao [_{IP} wo dou xihuan Zhangsan]
these student know I all like Zhangsan
All of these students know that I like Zhangsan

Dou in (3a) can quantify the object *zhexie xuesheng* in the topic position even though the subject intervenes between them. *Dou* in the embedded clause of (3b), however, is not able to quantify the matrix subject *zhexie xuesheng*. This indicates that *dou*-quantification is clause bounded.

However, it appears that *dou* sometimes can quantify an NP over clausal boundaries. Consider the following contrast.

- (4) a. zhexie xuesheng_i wo xiangxin [_{IP} Lisi dou xihuan t_i]
these student I believe Lisi all like
All of these students, I believe Lisi likes (them).
- b. *zhexie xuesheng_i wo dou xiangxin [_{IP} Lisi xihuan t_i]
these student I all believe Lisi like
All of these students, I believe Lisi likes (them).

Of interest here is the fact that *dou* in (4a), though in the embedded Infl, can quantify *zhexie xuesheng* in the matrix topic position, whereas *dou* in (4b), being in the same clause as the topic *zhexie xuesheng*, is not able to quantify it. By merely looking at where the topic has been moved from, we can make the following generalization: Cross-clausal *dou*-quantification is only possible when *dou* and the NP it quantifies are base-generated in the same clause. In (4a), but not in (4b), *dou* and the topic were in the same clause before the movement takes place.

³ Note that the singular subject Zhangsan, though to the left of *dou*, cannot be quantified by *dou*. This is not because a singular NP cannot be quantified by *dou*, but because the property expressed by the predicate (reading these books) cannot be distributed over a single person. If a singular NP can lend itself to partition with respect to the property expressed by a predicate, it can be quantified by *dou*. Also, a sentence like (2b) is acceptable under a focus reading where *dou* acts somewhat like English *even*. I will come back to these issues in later discussion.

5.2.3. Plurality Required?

Dou distributes the property of a predicate over an NP. For example, in sentence (1a) *dou* distributes the property of *liking me* over the subject *these students*. Given its semantics, it looks like the NP that *dou* is associated with must be plural. This requirement, however, is not necessary. As pointed out by Lin (1996), among others, *dou* can quantify over parts of a single object.

- (5) zhe-ben shu Zhangsan dou kan-le.
 this CL book Zhangsan all read
 Zhangsan has read every part of the book.

In (5) the object *zhe-ben shu* (this book) that *dou* quantifies is semantically singular, but the sentence is perfectly acceptable. What *dou* does here is quantifying over each and every page of the book.

More importantly, this plurality requirement is not sufficient, either. Sentence (6), for example, is unacceptable, though the subject that *dou* is intended to quantify is semantically plural.

- (6) *yixie xuesheng dou chuxi-le huiyi.
 some students all attend meeting
 Lit. Some students have all attended the meeting.

Given these facts we are forced to abandon the plurality requirement since it is neither necessary nor sufficient. Now, the question is what notion, if any, can be employed to distinguish the NP that is *dou*-quantifiable from those that are not.

Zhang (1997) proposes that an NP that *dou* quantifies must be semantically measurable to the eventuality expressed by the predicate. He notes that though sentence (5) is acceptable, the corresponding sentence where *borrow* is substituted for *read* is unacceptable.

- (7) *zhe-ben shu Zhangsan dou jie-le.
 this CL book Zhangsan all borrow
 *Zhangsan has borrowed all of this book.

Zhang argues that the entity of a single book is measurable to the event of reading, but not to the event of borrowing, hence the contrast.

There is no denying the fact the property of a predicate plays a role in *dou*-quantification since what *dou* does is distributing the property of a predicate over an NP. But measurability cannot be used as a defining property of *dou*-quantification of NPs. Consider the examples in (8).

- (8) a. *yi-ben shu Zhangsan dou du-le
 one CL book Zhangsan all read
 b. *yi-ben shu Zhangsan dou jie-le
 one CL book Zhangsan all borrow

What (8) demonstrates is that an indefinite cannot be quantified by *dou* regardless of what predicate is involved. On Zhang's analysis it is not clear why a definite is measurable and an indefinite is not to the eventuality expressed by the same predicate.

It seems that we need some other notion to characterize NPs with respect to their *dou*-quantifiability, to which I will turn in the next section.

5.3. Two Types of NPs

In this section I first sketch out Barwise and Cooper's (1981) proposal to distinguish two types of NPs in terms of strong/weak distinction. Then I point out that this is the very property that separates the NPs that can be quantified by *dou* from those that cannot.

5.3.1. Strong/Weak NPs

Barwise and Cooper (1981) proposes to distinguish two types of determiners by using the following general form.

(9) Det N' is an N'

They observe that with determiners like *every* and *the*, sentences of this form are always true regardless of the choice of N'.

- (10) a. Every man is man.
 b. Every unicorn is a unicorn.
 c. The man is a man.
 d. The unicorn is a unicorn.

However, with determiners like *some* or *few*, sentences of this form are sometimes true and sometimes false depending on whether the N' in question is or is not true of some object. Therefore, (11a) is true, but (11b) is false; (11c) is false, but (11d) is true.

- (11) a. Some man is a man.
 b. Some unicorn is a unicorn.
 c. Few men are a man.
 d. Few centaurs are centaurs.

They refer to the first type of determiner as strong and an NP containing such a determiner as a strong NP; the second type of determiner as weak and an NP containing such a determiner as a weak NP.

Barwise and Cooper argues that the strong/weak distinction is precisely the property that determines the distribution of NPs in an existential construction, that is, a strong NP cannot appear in such a construction, but a weak one can.

- (12) a. There is some man in the room.
 b. There are few men in the room.
 c. *There is every man in the room.
 d. *There is the man in the room.

5.3.2. Only a Strong NP is *Dou*-Quantifiable

With the above distinction in mind, let us consider what type of NP can be quantified by *dou* and what type cannot. It turns out that all NPs that can be quantified by *dou* are precisely those that are strong in Barwise and Cooper's sense. Consider the following examples.

- (13) a. mei-ge xuesheng dou chuxi-le huiyi.
 every CL student all attend meeting
 Every student has (all) attended the meeting.
- b. dabufen xuesheng dou chuxi-le huiyi.
 most student all attend meeting
 Most students have (all) attended the meeting.
- c. zhexie xuesheng dou chuxi-le huiyi.
 these student all attend meeting
 These students have all attended the meeting
- d. zhe-ben shu Zhangsan dou du-le.
 this CL book Zhangsan all read
 Zhangsan has read every part of this book.

The NP in (13a) is a universal quantifier; the one in (13b) is a quasi-universal quantifier. In (13c) and (13d) the NPs associated with *dou* are both definite: plural in the former and singular in the latter. These NPs are strong as none of them can appear in an existential construction. We have already seen that restriction as exemplified by the English examples in (12c, d) for a universal quantifier or a definite NP. A quasi-universal quantifier (most N') has the same restriction as shown by both the Chinese and English examples in (14).

- (14) *fangjianli you dabufen xuesheng.

in room exist most student

*There are most students in the room.

By contrast, all NPs that can't be quantified by *dou* are precisely those that are weak in Barwise and Cooper's sense. More examples are given below in addition to (6) and (8).⁴

(15) a. *sange xuesheng dou chuxi-le huiyi
three student all attend meeting
Three students have attended the meeting

b. *mei you xuesheng dou chuxi-le huiyi.
no exist student all attend meeting
None of the students have attended the meeting.

That all these NPs are weak is evidenced by the fact that they can all appear in an existential construction.

(16) a. fangjianli you yixie xuesheng.
in room exist some student
There are some students in the room.

b. zhuozishang you yi-ben shu.
on table exist one CL book
There is a book on the table.

c. fangjianli you sange xuesheng.
in room exist three student
There are three students in the room.

d. fangjianli mei you xuesheng.
in room not exist student
There is no student in the room.

This leads me to conclude that the property that determines *dou*-quantifiability of a NP is nothing but this strong/weak distinction, viz., a strong NP is *dou*-quantifiable, a weak one is not.

(17) appears to be a counterexample to the conclusion just reached: *Xuduo xuesheng* (many students) can be quantified by *dou* (17a) as well as appear in an existential construction (17b).

(17) a. xuduo xuesheng dou chuxi-le huiyi.
many student all attend meeting
Many of the students have attended the meeting.

b. fangjianli you xuduo xuesheng.
in room exist many student
There are many students in the room

I argue that such an NP is ambiguous: it can be interpreted as partitive or as existential. (17a) is acceptable only under the partitive interpretation, that is, the speaker takes the number of students attending the meeting in proportion to a discourse-fixed set of students. If 6 out of 10 counts as many, and if this discourse-fixed set of students contains 20 members, then for (17a) to be true there must be 12 or more students attending the meeting. Construed this way, *xuduo xuesheng* is equivalent to English *many of the students*, i.e., they are both partitive. (17b), by contrast, is acceptable only under the existential interpretation, namely, there is no discourse-fixed set of students for its truth evaluation. It is equivalent to English *many students*, i.e., it is existential.

⁴It must be pointed out that (15a) is acceptable if the subject is interpreted as definite. Note that a numeral quantifier in Chinese is ambiguous, and can be interpreted as indefinite or as definite depending on context.

That the partitive reading is strong while the existential reading is weak can be demonstrated by the following English examples where *many of the students* cannot appear in an existential construction, but *many students* can.

- (18) a. *There are many of the students in the room.
b. There are many students in the room.

Now we can conclude that a strong NP is *dou*-quantifiable and a weak NP is not, which, as we will see, is crucial for the proposal to be outlined in the next section.

5.4. A Minimalist Proposal

This section outlines a Minimalist analysis of *dou*-quantification based on the observations made in the previous sections. The proposed analysis is shown to derive the above facts in a principled way.

5.4.1. *Dou* as the Head of DistP

I propose that *dou* is a functional head projecting to Distributional Phrase. This projection sits between AgrsP and VP. I assume the following clause structure for Chinese.

- (19) [TopP [AgrsP [DistP [Dist' *dou* [VP]]]]]

There are four related claims to this proposal.

- (20) a. *Dou* hosts the strong Q-feature and for the derivation to converge the feature must be checked before Spell-Out.
b. For Q-feature checking a checker and a checkee must agree not only in their feature but also in their feature strength.
c. The Q-feature can be checked either by Move or by Merge.
d. The quantificational relation between *dou* and its associate can be established as long as the associate passes through SpecDistP at some point in the derivation.

Now let us look at how this proposal derives the above facts. First, the Leftness Quantification follows directly without any further assumption. Let us illustrate this with example (1a). The following is its derivation at the point of Spell-Out.

- (21) [DistP zhexie xuesheng_i [Dist' *dou* [VP t_i [V' xihuan wo]]]]
these student all like me

The subject *zhexie xuesheng* is base-generated in SpecVP and then moved to SpecDistP headed by *dou* to check the feature of *dou*. This checking must be done in overt syntax due to its feature strength, hence *zhexie xuesheng* ends up to the left of *dou*.

The ungrammaticality of (1b) can be explained in a straightforward way: (1b) is one step short of (1a) in that the subject does not move out of the VP-shell, as shown by (22)

- (22) [DistP [Dist' *dou* [VP zhexie xuesheng [V' xihuan wo]]]]
all these student like me

(22) does not converge because the strong Q-feature of *dou* remains unchecked at the point of Spell-Out (without anything in its Spec). What is crucial here is that the strong Q-feature must be checked before Spell-Out; otherwise, we would not be able to rule out (22) because if the subject could raise at LF for feature checking, the sentence would then converge, an undesirable result.

This proposed analysis also derives the contrast as shown in (2) that an object must move out of its theta position to the left of *dou* in order for *dou*-quantification to take place.

The following is the convergent derivation of (2a) where the object *zhexie shu* raises to SpecDistP and the subject *Zhangsan* then raises to SpecAgrsP. This way, we derive the word order, as desired.

(23) $[_{AgrsP} \text{Zhangsan}_j [_{DistP} \text{zhexie shu}_i [_{Dist'} \text{dou} [_{VP} t_j [_{V'} \text{kan-le } t_i]]]]]$
 Zhangsan these books all read

(2b) where the object stays put does not converge simply because the feature of *dou* remains unchecked at the point of Spell-Out. (Note that the subject *Zhangsan* cannot check this feature for a semantic reason.)

By assuming that a checker and checkee must agree in their feature strength, we can give a very natural explanation for the unacceptability of the sentences in (6, 8, 15) where the NPs preceding *dou* are all weak. I assume the following derivation for (6) at the point where *dou* is introduced.

(24) $[_{DistP} \text{yixie xuesheng}_i [_{Dist'} \text{dou} [_{VP} t_i [_{V'} \text{chuxi-le huiyi}]]]]$
 some students all attend meeting

The subject raises out of the VP to SpecDistP for feature checking. Since the subject is quantificationally weak and a weak NP is not able to check the strong Q-feature of *dou* due to the mismatch of feature strength, this operation cancels the derivation.

It is interesting to point out that if the weak subject in (24) stays inside the VP, thereby leaving the feature of *dou* unchecked as shown in (25), the resulting sentence is even worse.

(25) ***dou yixie xuesheng chuxi-le huiyi.*
 all some students attend meeting

This seems to suggest that the derivation in which the strong feature remains unchecked induces a more severe grammatical violation than the one in which the strong feature is checked by a weak element (feature strength mismatch).

5.4.2. Locality Explained

The locality condition of *dou*-quantification observed above falls out from this proposal in a very principled way. Take sentence (3b) for example. The following is its derivation.

(26) $[_{IP} \text{zhexie xuesheng} [_{VP} \text{zhidao} [_{IP} \text{wo} [_{DistP} \text{dou} [_{VP} \text{xihuan Zhangsan}]]]]]]$
 these student know I all like Zhangsan

In (26) *dou* heads the DistP in the embedded Infl. The matrix subject *zhexie xuesheng*, base-generated in SpecVP of the matrix clause, cannot lower to the SpecDistP in the embedded Infl to check the feature of *dou* and then move up to SpecAgrsP in the matrix without violating cyclicity.

For (3a) where the intervening subject does not block *dou*-quantification of the topic, I assume the following derivation.

(27) a. $[_{DistP} \text{zhexie xuesheng}_i [_{Dist'} \text{dou} [_{VP} \text{wo xihuan } t_i]]]$
 these students all I like

b. $[_{AgrsP} \text{wo}_j [_{DistP} \text{zhexie xuesheng}_i [_{Dist'} \text{dou} [_{VP} t_j \text{xihuan } t_i]]]]]$
 I these students all like

c. $[_{TopP} \text{zhexie xuesheng}_i [_{AgrsP} \text{wo}_j [_{DistP} t_i [_{Dist'} \text{dou} [_{VP} t_j \text{xihuan } t_i]]]]]]]$
 these students I all like

The explanation is straightforward: The topic base-generated in object position moves to SpecDistP for feature checking (27a), and then the subject moves directly to SpecAgrsP (27b), and finally the topic raises further to SpecTopP to check the topic-feature (27c). *Dou* can legitimately quantify the topic on the assumption that the relation between *dou* and its associate can be established as long as the associate passes through SpecDistP at some point in the derivation.

Finally, let us consider the contrast in (4). Recall what happens in (4) is that a topic can be associated with *dou* over clausal boundaries, but on the condition that they must be base-generated in the same clause. The following is the partial derivation of (4a) where the embedded DistP is built and the object *zhexie xuesheng* moves to SpecDistP for feature checking.

(28) $[_{\text{DistP}} \text{zhexie xuesheng}_i [_{\text{Dist}'} \text{dou} [_{\text{VP}} \text{Lisi xihuan } t_i]]]$
 these students all Lisi like

We then merge the matrix VP into the tree to yield (29a). Finally, *zhexie xuesheng* moves out of the DistP to SpecTopP in the matrix for feature checking (29b).⁵

(29) a. $[_{\text{VP}} \text{wo xiangxin} [_{\text{DistP}} \text{zhexie xuesheng}_i [_{\text{Dist}'} \text{dou} [_{\text{VP}} \text{Lisi xihuan } t_i]]]]]$
 I believe these students all Lisi like

b. $[_{\text{TopP}} \text{zhexie xuesheng}_i [_{\text{VP}} \text{wo xiangxin} [_{\text{DistP}} t_i [_{\text{Dist}'} \text{dou} [_{\text{VP}} \text{Lisi xihuan } t_i]]]]]]$
 these students I believe all Lisi like

As shown, the relation between the topic *zhexie xuesheng* and *dou* is legitimately established at some point in the derivation.

This sort of derivational association, however, cannot be set up in (4b). Note that in (4b) the DistP headed by *dou* resides in the matrix IP. At the point where *dou* is merged we have already built up both the embedded VP and the matrix VP, as shown by (30).

(30) $[_{\text{DistP}} [_{\text{Dist}'} \text{dou} [_{\text{VP}} \text{wo xiangxin} [[_{\text{VP}} \text{Lisi xihuan zhexie xuesheng}]]]]]]$
 all I believe Lisi like these students

At this point the topic *zhexie xuesheng* is still sitting in the embedded object position. For an NP to be quantified by *dou*, it must be in SpecDistP for feature checking. In order to do so, *zhexie xuesheng* would have to move across the finite Infl. This operation, however, is not permitted because the feature checking in question is an instance of A-movement. This explains the unacceptability of (4b).

5.5. Blocking Effects: Epiphenomenon of Derivational Timing

The observed blocking effects are in fact an epiphenomenon of derivational timing. In this section I first take a look at the typical data concerning the blocking effects and make some brief comments on Cheng's analysis of them. I then provide more data to show that the blocking has to do with derivational timing.

5.5.1. Who Blocks and Who does not?

First, let us consider the typical blocking effect exhibited by a *ba*-phrase.

(31) a. Zhangsan ba neixie shu dou mai-le
 Zhangsan BA those book all sell

⁵ For ease of illustration, I skip subject raising in both the embedded and the matrix clauses.

Zhangsan sold all those books.

- b. *tamen ba nei-ben shu dou mai-le
 they BA that CL book all sell
 All of them sold that book.

What (31) shows is that when *dou* is preceded by a *ba*-phrase it must quantify the NP within that *ba*-phrase: In (31a) this quantification is possible because the *ba*-NP *neixie shu* (those books) is plural, but in (31b) the same quantification is not possible because the *ba*-NP *neiben shu* (that book) is singular and the event of buying cannot be distributed over each and every page of a single book.

Given the fact that *dou* can quantify a topic over the intervening subject as shown by (3a), the question concerning us is why *dou* in (31b) cannot reach the potentially *dou*-quantifiable subject over the intervening *ba*-phrase.

What makes the blocking effect a bit messy is that a prepositional phrase in the same position does not seem to block *dou*-quantification of a subject.

- (32) a. zhexie xuesheng [gen Zhangsan] dou hen shu.
 these student with Zhangsan all very familiar
 All of these students are familiar with Zhangsan.

- b. Zhangsan [gen zhexie xuesheng] dou hen shu.
 Zhangsan with these student all very familiar.
 Zhangsan is familiar with all of these students.

Gen Zhangsan (with Zhangsan) in (32a) intervenes between *zhexie xuesheng* (these people) and *dou*, but does not block the latter from quantifying the former. Note that *dou* can also quantify the NP within a prepositional phrase, as shown in (32b).

5.5.2. Cheng's (1995) Analysis

Cheng (1995) gives an economy account for the blocking effects. She assumes that *dou* LF-moves to adjoin its associated NP to satisfy its own quantificational requirement and this movement has to obey the Principle of Economy (i.e. making the shortest move). The NP within a *ba*-phrase c-commands *dou* and thus accessible to it. To obey the Principle of Economy, *dou* must adjoin the *ba*-NP, instead of the subject, since the former is closer.

The assumption that *dou* undergoes LF-movement is dubious and it is called into question by the following example (to which I will come back when discussing *dou*-binding of adverbs).

- (33) *zhexie xuesheng ouer dou qu jiaotang.
 these student occasionally all go church
 All of these students occasionally go to church.

In (33) *dou* cannot quantify the subject over the intervening adverb: it cannot mean what is intended by the English translation. On Cheng's analysis it is not clear why this is so. If *dou* could move at LF to adjoin the subject, it should be able to quantify the subject, contrary to fact.

Cheng attributes the lack of a blocking effect shown in (32) to the so-called dual status of a preposition in Chinese, that is, a preposition can be either a dummy case marker which does not project to an XP projection or a real preposition having a maximal PP projection. For (32a), where *dou*-quantification of the subject over the intervening PP is possible, she claims that the preposition projects to a full PP projection, thereby rendering the NP within it inaccessible to *dou*. Thus, *dou* can move over the PP to adjoin to the subject without inducing an economy violation. For (32b), where *dou* quantifies the NP within the PP, she claims that the same preposition is a dummy case marker, not projecting to a PP projection. Thus, the contained NP is accessible to *dou*, and to make the shortest move, *dou* must LF-adjoin it rather than the subject farther away.

Again, the assumption that a preposition has a dual status is dubious. As a matter of fact, some prepositional phrases are always opaque. For example, (34) cannot mean what is intended by the English translation, namely, *dou* cannot quantify the subject over the intervening PP.

- (34) *zhexie xuesheng yong kuaizi dou chifan.
 these student with chopsticks all eat
 All of these students eat with chopsticks.

On Cheng's analysis, we are forced to say that an instrumental prepositional phrase always have a full PP projection. The question then is why some prepositions project, some don't.

Cheng's analysis, as shown, invokes a number of dubious assumptions, thus lacking an explanatory force.

5.5.3. Derivational Timing

Before we proceed to give an account, let us consider some more data of this sort. The contrast in (35) shows that a temporal adverb, if it does not have a quantificational force, does not interfere with *dou*-quantification (35a), but a manner adverb does (35b).

- (35) a. zhexie xuesheng zuotian dou qu jiaotang le.
 these students yesterday all go church
 All of these students went to church yesterday.

- b. *zhexie xuesheng jingjing-de dou zuo zai jiaoshili.
 these student quietly all sit in classroom
 All of these students are quietly sitting in the classroom.

This distinction prompts me to rethink the problem. As generally assumed, a temporal adverb is IP-adjoined while a manner adverb is VP-adjoined. Given the clause structure postulated in (19) what this means, from the derivational point of view, is that a temporal adverb can be merged into the tree after DistP has been built, but a manner adverb must be

merged into the tree prior to the construction of DistP. Consider the derivation of (35a): when *dou* is merged with the structure to project to DistP the temporal adverb is still sitting in the numeration as shown in (36a). At this point we can raise the subject to SpecDistP for feature checking and then merge the adverb (by perhaps adjoining to DistP) as shown in (36b).

Finally we raise the subject further to SpecTopP (36c).

(36) a. [_{DistP} [_{Dist'} dou [_{VP} zhexie xuesheng [_v qu jiaotang le]]]]
 all these students go church

b. [_{DistP} zuotian [_{DistP} zhexie xuesheng_i [_{Dist'} dou [_{VP} t_i [_v qu jiaotang le]]]]]
 yesterday these students all go church

c. [_{DistP} zuotian [_{DistP} zhexie xuesheng_i [_{Dist'} dou [_{VP} t_i [_v qu jiaotang le]]]]]
 yesterday these students all go church

However, for a sentence like (35b) the manner adverb has already been merged with the VP prior to the building of DistP. The reason (35b) is unacceptable is that the manner adverb having no Q-feature to check has wrongly raised to SpecDistP for feature checking.

One might ask why we cannot derive the sentence in (35b) by first moving the subject to SpecDistP for feature checking (37a) and then raising the manner adverb to adjoin DistP (37b) and finally raising the subject further to SpecTopP (37c).

(37) a. [_{DistP} zhexie xuesheng_i dou [_{VP} jingjing-de [_{VP} t_i zuo zai jiaoshi li]]]
 these students all quietly sit in classroom

b. [_{DistP} jingjing-de_j [_{DistP} zhexie xuesheng_i dou [_{VP} t_j [_{VP} t_i zuo zai jiaoshili]]]]
 quietly they all sit in classroom

c. [_{TopP} zhexie xuesheng_i [_{DistP} jingjing-de_j [_{DistP} t_i dou [_{VP} t_j [_{VP} t_i zuo zai jiaoshili]]]]]]
 these students quietly all sit in classroom

The reason this derivation is not permitted is that on the Minimalist assumption any movement is triggered by feature checking, but in (37b) the movement of the manner adverb to adjoin DistP does not check any feature and therefore is not legal. So given the clause structure postulated in (19) the only way to get a manner adverb to the left of *dou* is by moving it there for feature checking. Since a manner adverb is not able to check the feature of *dou*, doing so would cancel the derivation.

With this in mind, let us look at how we derive the facts discussed in section 5.5.1. First let us consider why a *ba*-phrase acts as a blocker. I assume that a *ba*-phrase is base-generated within the VP-projection.⁶ Take (31a) for example. The following is the relevant step of the derivation.

⁶ Assuming Larson's VP-shell I would say that a *ba*-phrase is merged into the higher VP responsible for its causative meaning. It is also possible to think of a *ba*-phrase as being formed by moving from the postverbal object position to SpecAgroP to check Accusative Case. Either analysis is compatible with the fact that a *ba*-phrase must be base-generated below DistP. This fact can be evidenced by the following example where the *ba*-phrase follows *dou* and *dou* quantifies the subject.

- (i) tamen dou ba nei-ben shu kan-le
 they all BA that CL book read
 All of them have read that book.

- (38) [_{DistP} [_{Dist'} *dou* [_{VP} Zhangsan [_{VP} *ba* neixie shu_i [_{V'} *mai-le* t_i]]]]]]
 all Zhangsan BA those books buy

At this point we can move either the subject or the *ba*-phrase to SpecDistP for feature checking, as they are equidistant from the target. Since moving the subject would cancel the derivation, we raise the *ba*-phrase instead, thereby deriving the word order, as desired.

What goes wrong in (31b) is that at the point where *dou* is merged we move the *ba*-phrase, instead of the subject, for feature checking. This operation cancels the derivation because the *ba*-phrase, for a semantic reason, is not able to check the feature of *dou*.

In short, given the clause structure postulated in (19) the only way to get a *ba*-phrase to the left of *dou* is by moving it there for feature checking. A *ba*-phrase in such position is either quantified by *dou* if their feature strength matches, as in (31a) or cancels the derivation if their feature strength does not match, as in (31b).

In a similar vein, I argue that an instrumental PP is base-generated within the VP-projection. For reasons not clear to me, an instrumental PP can never check the strong Q-feature of *dou*. So what happens in (34) is that the instrumental PP has wrongly moved to SpecDistP, thus canceling the derivation.

Now, let us focus our attention on the question of why the PP in (32) does not block *dou*-quantification. By going through a not long list of prepositions in Chinese, I find that there are only few prepositions that are transparent to *dou*-quantification. In addition to *gen* (comitative *with*), *dui* (relational *to*) and *bi* (comparative) are perhaps of this category.⁷

- (39) a. zhexie xuesheng dui wo dou hen hao.
 these student to me all very kind
 All of these students are kind to me.

- b. zhexie xuesheng bi wo dou gao.
 these student than me all tall
 All of these students are taller than me.

I assume that these PPs, if they are, are not theta-marked within the VP-projection. They are more like English *with*-phrase in the following sentence.

- (40) John went to the park with Mary.

I assume without further discussion that *with Mary*, as a comitative phrase, is not assigned a theta role by *go*. If this is correct, this type of PP is more on a par with a temporal adverb than with a manner adverb.

Given this assumption it becomes clear why this type of PP is transparent to *dou*-quantification: like a temporal adverb, it can be introduced into the derivation later than *dou*. Thus, we can derive the lack of blocking effects in (32) by assuming the following derivation for (32a).

- (41) a. [_{DistP} zhexie xuesheng_i [_{Dist'} *dou* [_{VP} t_i [_V hen shu]]]]
 these students all very familiar

⁷The category of preposition is not well-defined in Chinese. *Bi* (comparative) is more like a conjunctive than a preposition. *Gen* (with) is sometimes used to conjoin noun phrases. Perhaps, it is a mistake to treat *gen*-NP as a PP. If that is the case, then it is something else (rather than a PP) that is transparent to *dou*-quantification. For not knowing enough about the syntax of these phrases, I still refer to them as PPs for convenience.

b. [_{DistP} gen Zhangsan [_{DistP} zhexie xuesheng_i dou [_{VP} t_i [_V hen shu]]]]
 with Zhangsan these students all very familiar

c. [_{TopP} zhexie xuesheng_i [_{DistP} gen Zhangsan [_{DistP} t_i [_{Dist'} dou [_{VP} t_i [_V hen shu]]]]]
 these students with Zhangsan all very familiar

The subject first moves to SpecDistP for feature checking (41a) and then the PP merged to adjoin DistP (41b) and finally the subject raises further over the PP to SpecTopP.

(32b) has a slightly different derivation in that when *dou* is introduced, instead of raising the subject, we merge the PP into SpecDistP for feature checking, and then raise the subject directly to SpecTopP.

Summarizing, given the clause structure postulated in (19) where DistP is above VP, anything that must be merged within the VP-projection will block *dou*-quantification if it surfaces to the immediate left of *dou*; anything that can be merged after DistP has been built will be transparent to *dou*-quantification. A *ba*-phrase, instrumental PPs, manner adverbs are opaque as they are assumed to be generated within the VP-projection; domain adverbs, temporal adverbs and comitative phrases are transparent as they are generated outside the VP-projection.

5.6.1. *Dou*-Binding of Adverbs

In this section, I treat *dou*-binding of adverbs along the same lines, thereby showing that the proposed analysis has wider empirical coverage than others.

One important fact that has been ignored (for an obvious reason) is that *dou* can quantify a high frequency adverb to its left as shown by (42a) but not a low frequency one as shown by (42b).

(42) a. Zhangsan yizhi/changchang dou qu jiaotang.
 Zhangsan always often all go church
 Zhangsan always/often goes to church.

b. *Zhangsan youshi/ouer/dou qu jiaotang.
 Zhangsan sometimes/seldom all go church
 Zhangsan sometimes/seldom goes to church.

The question is why there is a cut like this. Along the line pursued for NPs, I argue that we can treat high frequency adverbs like *yizhi* (always), *changchang* (often) as a universal or a quasi-universal quantifier, low frequency ones like *youshi* (sometimes) or *ouer* (occasionally) as an existential quantifier, over events (Davidson 1967). Thus, Barwise and Cooper's strong/weak distinction can be extended to these adverbs, i.e., a high frequency one is strong, a low frequency one is weak. Given this extension, it is clear why (42a) are acceptable, (42b) are not: A strong adverb can check the feature of *dou*, a weak one cannot due the mismatch of feature strength. This contrast is exactly parallel to that of NPs discussed above.

I assume that a frequency adverb (F-adverb) is adjoined to VP, so for sentences like (42) the following is the partial derivation to the point where *dou* is merged into the structure.

(43) [_{DistP} [_{Dist'} dou [_{VP} F-adverb [_{VP} Zhangsan qu jiaotang]]]
 all F-adverb Zhangsan go church

The next step is to move an F-adverb to SpecDistP for feature checking. For (42a) this operation is successful because a high F-adverb presumably has the strong Q-feature and therefore matches the feature strength of *dou*. (The subject *Zhangsan* is subsequently moved to SpecAgrsP.) For (42b) the same operation cancels the derivation due to the mismatch of

feature strength: a low F-adverb is quantificationally weak and therefore is not able to check the feature of *dou*.

5.6.2. More on Blocking Effects

Given the minimalist assumption that movement is only triggered by feature checking and the assumption that an F-adverb is VP-adjoined, it is predicted that an F-adverb sitting between a subject and *dou* will block *dou*-quantification of the subject. This prediction is indeed borne out. Consider the following contrast.

- (44) a. zhexie xuesheng changchang dou qu jiaotang.
 these students often all go church
 These students often go to church (not somewhere else).
 b. zhexie xuesheng dou changchang qu jiaotang.
 these students all often go church
 All of these students often go to church.

In (44a) the F-adverb *changchang* intervenes between the subject and *dou*. (44a) means that these students often go to church, not somewhere else. Suppose there are 10 going-out events for consideration, for this sentence to be true, most of the 10 events must be going-to-church, that is, *dou* quantifies over events of going-to-church. This is because *dou* is associated with *changchang*, and *changchang* quantifies over event variable *e* (Davidson, 1967). What is crucial here is that *dou* cannot go over *changchang* and be associated with the subject *zhexie xuesheng*. That is, (44a) cannot mean what (44b) means. In (44b), where *changchang* is to the right of *dou* (VP-adjoined), *dou* must be associated with the subject *zhexie xuesheng*. (44b) says that all these students are church-goers. They may miss one or two church-going events, but they participate in majority of them. That is, *dou* in (44b) quantifies over the set of students.

This meaning difference is subtle but real, and it can be made clearer by what can follow the two sentences. For example, (45a) is a natural continuation of (44a), not of (44b), but (45b) is a natural continuation of (44b), but not (44a).

- (45) a. lian libaiyi ye qu
 event Monday also go
 (They) go to church even on Monday.
 b. lian Zhangsan ye qu le
 event Zhangsan also go ASP
 These church-goers even include Zhangsan.

Given the structure postulated in (19), the following is the structure common to both (44a) and (44b) at some point in the derivation.

- (46) [_{DistP} [_{Dist'} dou [_{VP} changchang [_{VP} zhexie xuesheng [_{V'} qu jiaotang]]]]
 all often these students go church

We can raise either the adverb or the subject to SpecDistP for feature checking since they are both qualified checkers and equidistant from the target. Raising the adverb (followed by the subject raising to SpecAgrsP) derives (44a); raising the subject to DistP for feature checking derives (44b).

Now consider the case where a weak F-adverb is in such intervening position.

- (47) *zhexie xuesheng ouer dou qu jiaotang.

these students occasionally all go church

All of these students occasionally go to church.

As expected, the intervening F-adverb blocks *dou*-quantification. And also, as expected, the sentence is unacceptable: An F-adverb is base-generated in a VP-adjoined position, i.e., below DistP in the tree. Given this, in order for *dou* to be associated with the subject, we must derive (47) by first moving the subject to SpecDistP and then raising the F-adverb to adjoin DistP and finally raising the subject further to SpecTopP. This derivation, however, cannot converge because raising of the F-adverb is not motivated by any feature checking. Another way to derive the surface order of (47) is by first raising the F-adverb to SpecDistP for feature checking and then raising the subject to SpecAgrsP, or SpecTopP. This is not permitted because the F-adverb *ouer* is weak, raising it to SpecDistP for feature checking cancels the derivation due to the mismatch of their feature strength.

It is worth pointing out that for sentences like (47) if a weak F-adverb stays in its VP-adjoined position and the subject raises to SpecDistP for feature checking, the resulting sentence is acceptable.

(48) zhexie xuesheng dou ouer qu jiaotang.
 these student all occasionally go church
 All of these students occasionally go to church.

Conversely, if a subject NP is weak but an F-adverb is strong, the subject can be left inside VP and the F-adverb is raised to SpecDistP for feature checking.

(49) changchang dou you yixie xuesheng qu jiaotang.
 often all there some student go church
 It is often the case that some students go to church.

5.7. *Dou* as a “Focus Marker”

There is another use of *dou* which has been alluded to in the previous discussion, that is, *dou* can act like a “focus marker” to yield a reading equivalent to English *even*. By showing that only a definite NP can be focused as such, I argue that we can extend the above analysis to this use as well, thereby providing a unified account for *dou*.

5.7.1. Definites Vs. Indefinites

Sentences like (50) (without *lian*) were judged as unacceptable because in (50a) the event of reading cannot be distributed over a single person and in (50b) the event of buying cannot be distributed over each and every page of a single book. However, both sentences are perfectly acceptable under the reading indicated by the English translation here.

(50) a. (lian) Zhangsan dou kan-le zhexie shu.
 even Zhangsan all read these book
 Even Zhangsan has read these books.

b. Zhangsan (lian) zhe-ben shu dou mai-le.
 Zhangsan even this CL book all buy
 Zhangsan has read even this book.

Two remarks are in order; First, *lian* (even) is optional, but the sentence with it is slightly better than the one without it. If not overtly there, *lian* can be thought of as being covertly realized. Second, I believe that *lian* is a real focus marker equivalent to English *even*, but unlike *even*, it has to rely on *dou*'s presence to perform its focusing function. Given this, it is inaccurate to say that *dou* in this use is a focus marker. And, as we will see in later discussion, it is crucial for us not to treat *dou* as a focus marker. But for ease of discussion I will still refer to this *dou* as a focus marker.

Now the question is whether this *dou* is the same as distributive *dou* we have been discussing throughout. In what follows I will argue that they are the same *dou*, i.e., the head of DistP.

As a first approximation, it looks like the property that distinguishes the NPs that are *dou*-quantifiable from those that are not is the very same property that determines what NP can be focused by *dou* and what NP cannot. Thus, though the sentences in (50) under the focus reading are acceptable, when the focused constituent is replaced by an indefinite, the resulting sentences are unacceptable.

- (51) a. *yige xuesheng dou kan-le zhexie shu.
 one student all read these book
 *Even one student has read these books.
- b. Zhangsan (lian) yi-ben shu dou mai-le.
 Zhangsan even one CL book all buy
 *Zhangsan bought even a book.

Recall that according to Barwise and Cooper's classification a definite is strong and an indefinite is weak. If we treat focus *dou* as the head of DistP whose feature must be checked by a strong NP, this restriction on weak NPs is not surprising at all.^{8 9}

For sentences like (50) and (51) the NP focused by *dou* is moved there (SpecDistP) for feature checking. This checking operation is successful in (50) because the moved NP is strong and therefore is able to check the feature of *dou*; the same operation in (51) cancels the derivation because the moved NP is weak, and does not match the feature strength of *dou*.

If focus *dou* is the head of DistP, namely, a distributor, and if in (50) the event of reading cannot be distributed over a single person and the event of buying cannot be distributed over each and every page of a single book, then the question is what focus *dou* distributes over, to which I turn in the next subsection.

5.7.2. Quantification over an Alternative Set

On Rooth's (1985, 1992) theory of focus interpretation there is a second mode of meaning in which focused and unfocused constituents differ. This second mode of meaning is what Rooth calls "P-set": the set of semantic alternatives to a given constituent. Consider the following pair.

- (52) a. John went to the party.
 b. Even JOHN went to the party.

For an unfocused constituent like John in (52a), the set of alternatives consists of the singleton set which has the denotation of John as a member. For a focused constituent like JOHN in (52b) which is associated with *even*, the P-set consists of all the denotations in the domain of the denotation of John. Put differently, sentence (52a) is true if and only if John went to the party, regardless of whether someone else went to the party; and for sentence (52b) to be true, however, we need to check if everyone in the domain went to the party. If everyone in the domain including John went to the party, the sentence is true; otherwise it is false. In Rooth's formalism the second mode of meaning of (52b) has the following form.

⁸ A universal or a quasi-universal quantifier, though strong, cannot be focused by *dou* for some independent reasons.

⁹ The following example appears to indicate that an indefinite can be focused by *dou*.

- (i) Zhangsan (lian) yi-ge pingguo dou yao.
 Zhangsan even one-CL apple all want
 Zhangsan wants even one apple.

A little reflection, however, reveals that this use of an indefinite has some peculiar property: it indicates the amount of the lowest value, not the existence of an apple. What this sentence means is something like Zhangsan wants things as worthless as an apple, let alone those of higher value. This use is more like a negative polarity item, which perhaps is why it can only be used to express an irrealis activity.

(53) [[Even JOHN went to the party]]^f = {P: P= x went to the party}

To evaluate its truth value, we substitute everything in the domain of the same semantic type as JOHN, namely, an e-type expression, for variable x in the P-set. Thus, (52b) is truth functionally equivalent to (54).

(54) Everyone, including John, went to the party.

By translating a focused sentence into a quantified one like this, we correctly capture its semantics.¹⁰

In light of Rooth's theory of focus, I propose that focus *dou* is a distributor, but distributing over Rooth's P-set. As said earlier, *dou* distributes the property of a predicate over an NP. If the NP is plural *dou* will distribute over the individual members; if the NP is singular, *dou* may distribute over every part of this single entity depending on whether the given property can be distributed or not. If both fail, then *dou* introduces Rooth's alternative P-set as the domain of universal quantification and distributes over every member in such a domain.

In this context, let us consider another interesting question: Why is *dou* compatible with focus marker *lian* (even), as shown in (50), but not with focus marker *zhiyou* (only), as shown in the following examples.

(55) a. **zhiyou* Zhangsan *dou* kan-le zhaxie shu
only Zhangsan all read these book
Only Zhangsan has read these books.

b. *Zhangsan *zhiyou* zhe-ben shu *dou* mai-le.
Zhangsan only this CL book all buy
Zhangsan has read only this book.

If we treat focus *dou* as a distributor, distributing over an alternative set to a focused constituent, the answer to this question is obvious. Let us first consider how Rooth analyzes focus sentence like (56).

(56) Only JOHN went to the party.

For (56) to be true we need to verify if there is anyone else other than John in the domain who went to the party. If there is none, the sentence is true; otherwise it is false. In Rooth's formalism the second mode of meaning of (56) has the following form.

(57) [[Only JOHN went to the party]]^f = {P: P= x went to the party}

To evaluate its truth value, we substitute everything in the domain of the same semantic type as JOHN for variable x. But (57) differs from (53) in that for (53) to be true the predicate must be true of everyone in the domain including John; for (57) to be true the predicate must be true of no one except John. Thus, (57) is truth functionally equivalent to (58)

(58) No one, except John, went to the party.

Given Rooth's semantics of *only*, we are now in a position to see why *dou* is incompatible with *zhiyou* (only). *Zhiyou*, like *lian*, invokes an alternative P-set, but unlike *lian*, it requires that the predicate be true of no member in this alternative P-set except the one that is being focused. But, focus *dou* as a distributor must distribute the property of a predicate over every member of this alternative set. So, in a sense, there is no way to reconcile the conflict of their semantic requirements, hence they are not compatible.

5.8. *Dou*-Quantification of Wh-NPs

This section attempts to show that the proposed analysis can be extended to account for *dou*-quantification of wh-NPs. Chinese wh-NPs are variables, with their quantificational force being determined by whatever operator that binds them. When appearing to the left of *dou*, a wh-NP is interpreted as a universal quantifier. I argue that a wh-NP in such a case likewise moves to

¹⁰It must be pointed out that *Even John went the party* presupposes that it was expected that John did not go the party, or that John occupies the end of a scale of relevant entities that are ordered with respect to the probability that they went to the party. Loosely speaking, the sentence says that among the people in the relevant set John was least likely to go to the party, and now even John went to the party, let alone all the other people in this set who were more likely than John to go to the party. So, the determination of the quantification domain is in part influenced by such a scale

SpecDistP for feature checking, with its universal interpretation being supplied by the binder *dou*--the head of DistP. There are some unique properties about *dou*-quantification of wh-NPs, however. For example, a wh-NP blocks anything that has checked the feature of *dou* from raising further, and also *dou* can quantify wh-NPs into an island. These properties are brought into line with the proposed analysis with minimal additional assumptions.

5.8.1. The Leftward Quantification Again

First, *dou*-quantification of a wh-NP obeys the Leftness Condition of the same sort:

- (59) a. shei dou lai-le.
 who all come
 Everybody has come.
- b. Zhangsan shenme_i dou chi t_i
 Zhangsan what all eat
 Zhangsan eats everything.

In both (59a, b) the wh-NP appears to the left of *dou*, and is interpreted as a universal quantifier. The sentences with a wh-NP appearing to the right of *dou* are not acceptable:

- (60) a. *dou shei lai le.
 all who come ASP
 Everybody has come.
- b. *Zhangsan dou chi shenme
 Zhangsan all eat what
 Zhangsan eats everything.

Precisely the same account can be given for (59) and (60): the wh-subject in (59a) is moved from the VP-internal subject position to SpecDistP to check the strong Q-feature. Similarly, the wh-object in (59b) is moved from the object position to SpecDistP. (60a, b) are ruled out because the strong of *dou* in neither case has been checked off before Spell Out. In (60a) there is nothing in SpecDistP for feature checking, hence the derivation crashes. In (60b) the subject Zhangsan is not able to check the feature of *dou*, again the derivation cannot converge.

5.8.2. Locality Again

The locality restriction of the same sort holds in *dou*-quantification of wh-NPs. Consider the following contrast.

- (61) a.* shei xiangxin [_{IP} ta dou lai le]
 who believe he all come ASP
 Everybody believes that he has come.
- b. shei dou xiangxin [_{IP} ta lai le]
 who all believe he come ASP
 Everybody believes that he has come

(61a) has the wh-subject in the matrix and *dou* in the embedded. The sentence cannot be interpreted as indicated by its English translation with *dou* being associated with the wh-subject. In order for an NP to be associated with *dou*, it must pass through SpecDistP at some point of the derivation. This is not possible for (61a) because the wh-NP is a matrix subject, base-generated within the matrix VP, and *dou* heads the embedded DistP, and for them to be

related the *wh*-subject would have to lower to the embedded IP to check the feature of *dou*, and then raise up to the matrix subject position. This violates cyclicity, however. (61b) is good because both the *wh*-subject and *dou* are in the matrix Infl. The *wh*-subject base-generated within the matrix VP can move to SpecDistP for feature checking.

The same analysis adopted earlier carries over to the following contrast.

(62) a. *shei_i wo xiangxin [_{IP} Lisi dou hen xihuan t_i]*
 who I believe Lisi all very like
 Everyone, I believe Lisi likes.

b. **shei_i wo dou xiangxin [_{IP} Lisi hen xihuan t_i]*
 who I all believe Lisi very like
 Everyone, I believe Lisi likes.

The contrast here is parallel to that in (5). For both (62a, b) the *wh*-object is base-generated in the embedded clause. (62a) is good for the same reason that (5a) is good, that is, the *wh*-object can move to SpecDistP in the embedded Infl to check the feature of *dou* and then raise further to its final position by topicalization. (62b) is bad for the same reason that (5b) is bad, that is, the *wh*-object in the embedded clause cannot move to SpecDistP in the matrix Infl, because this movement is clause bounded. As such the feature of *dou* remains unchecked before Spell Out, hence the derivation crashes.

5.8.3. Divergence

Though *wh*-NPs and ordinary NPs enjoy striking similarity with respect to *dou*-quantification, they diverge in the following two aspects. First, when there are two *wh*-NPs to the left of *dou*, it is the one to its immediate left that gets universally quantified. This, however, is not true for the case of ordinary NPs where either one can get quantified. Second, *dou* appears to be able to quantify a *wh*-NP, but not an ordinary one, into an island.

5.8.3.1. No Crossed Linking

Dou-quantification of *wh*-NPs seems to observe the “Minimal Link Condition.” Consider (63).

(63) *shenme shei dou chi*
 what who all eat
 (i) What does everybody eat?
 (ii) *Everybody eats everything
 (iii) *Who eat everything?

In (63) both the *wh*-NPs are to the left of *dou*. The only available reading is in (i) where *shei* is interpreted as non-interrogative (*dou*-bound), *shenme* as interrogative (Q-bound). The reading in (ii) where both the *wh*-NPs are *dou*-bound is not possible. For this we can simply say that the feature of *dou* cannot be doubly checked. This prevents *dou* from multiply linking to more than one NP. Of concern to us is the reading in (iii) where *shenme* is *dou*-bound and *shei* Q-bound is not permitted. This is unexpected given the fact that in (64) *dou* can be associated with either the subject or the object to its left.

(64) *zhexie shu tamen dou du le.*
 these book they all read ASP
 (i) All of these books they have read

(ii) These books, all of them have read.

(i) indicates the reading where *dou* quantifies the object *zhexie shu* across the subject *tamen*. This reading can be derived by first moving *zhexie shu* to SpecDistP, then *tamen* to SpecAgrsP, finally *zhexie shu* further to SpecTopP. (ii) indicates the reading where *dou* quantifies the subject *tamen*. This can be derived by first moving *tamen* to SpecAgrsP, then *zhexie shu* all the way up to SpecTopP.¹¹

The question is why one of the two derivations that generate the two readings in (64), respectively, is not possible for (63), namely, why the following derivation is out.

(65) a. [_{DistP} shenme_i dou [_{VP} shei chi t_i]]
 what all who eat

b. [_{AgrsP} shei_j [_{DistP} shenme_i dou [_{VP} t_j chi t_i]]]
 who what all eat

c. [_{TopP} shenme_i [_{AgrsP} shei_j [_{DistP} t_i dou [_{VP} t_j chi t_i]]]
 what who all eat

In (65) the wh-object first moves to SpecDistP (65a), and the wh-subject raises to SpecAgrsP (65b), and finally the wh-object moves further across the wh-subject to SpecTopP (65c).

There is nothing wrong with moving the wh-NP further after having checked the feature of *dou*. (66) is just such a derivation. As illustrated in (67), the wh-object makes a midway stop in SpecDistP for feature checking before it moves further to SpecTopP.

¹¹Zhang (1997) claims that *dou* can be multiply linked to NPs. He cites the following example as evidence.

- (a) tamen gei haizimen dou mai-le wanju
 they for children all buy-ASP toy
 (i) They (together) bought toys for each of the children
 (ii) Each of them bought toys for each of the children

In the first reading *dou* links to the benefactive only, while in the second reading *dou* links to both the benefactive and the agent. Whether the second reading exists or not is very hard to judge. To tease it apart we can use what I call *shenzhi* (even) test, which in fact forces the discourse-relevant set, of which the focused constituent is a member, to be distributive. (a) can be felicitously continued by (b) or (c). This means that in (a) either the benefactive set or the agent set can be distributed over. (Zhang (1997) does not address the latter reading where *dou* links to the agent only.) Importantly, the benefactive and the agent cannot be focused by *shenzhi* simultaneously, as illustrated in (d). I take this to suggest that Zhang's second reading does not exist.

- (b) shenzhi gei Wangwu ye mai -le
 even for Wangwu also buy ASP
 (They bought a toy even for Wangwu.)
- (c) shenzhi Zhangsan ye mai -le
 even Zhangsan also buy ASP
 Even Zhangsan bought toys for the children
- (d) shenzhi Zhangsan shenzhi gei Wangwu ye mai -le
 even Zhangsan even for Wangwu also buy ASP
 Even Zhangsan bought a toy for even Wangwu.

- (66) shenme Zhangsan dou chi
 what Zhangsan all eat
 Zhangsan eats everything.
- (67) a. [_{DistP} shenme_i dou [_{VP} Zhangsan chi t_i]]
 what all Zhangsan eat
- b. [_{AgrSP} Zhangsan_j [_{DistP} shenme_i dou [_{VP} t_j chi t_i]]]
 Zhangsan what all eat
- c. [_{TopP} shenme_i [_{AgrSP} Zhangsan_j [_{DistP} t_i dou [_{VP} t_j chi t_i]]]
 what Zhangsan all eat

The derivation in (67) and that in (65) are exactly the same except that the subject in (65) is a wh-NP and that in (67) is an ordinary NP

As a first approximation, a wh-NP cannot move across another wh-NP after having checked the feature of *dou*. In fact this restriction is more general than this: Anything that has checked the feature of *dou* cannot move further across a wh-NP. This is illustrated by (68)

- (68) zhexie shu shei dou xihuan
 these book who all like
 (i) These books, everyone likes.
 (ii) *all of these books who likes.

In (68) *dou* cannot link to *zhexie shu*, i.e., the reading indicated in (ii) is not possible. In order to obtain such a reading the object *zhexie shu* would have to move to SpecDistP for feature checking, (followed by the wh-subject raising to SpecAgrSP), and then raise further across the wh-subject to SpecTopP. This derivation is not permitted.

Thus, the following generalization can be reached.

- (69) Anything that has checked the feature of *dou* in SpecDistP cannot raise further across a wh-NP.

Where does this restriction come from? I will argue that there is nothing wrong with the derivation in which an NP, after having checked the feature of *dou* in SpecDistP, moves further across a wh-NP. Such a derivation does converge, but it does not meet the interpretive requirement formulated in (70)

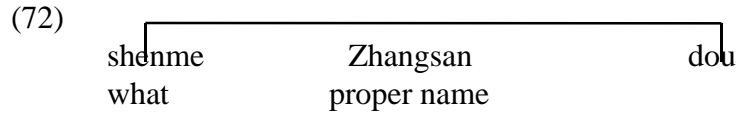
- (70) No Crossed Linking at LF

Remember that a wh-NP needs to link to the LF-inserted Q-operator at matrix CP. Take (63) for example, repeated here for convenience. To get the impossible reading in (iii) we would have to have a crossed linking as illustrated in (71). This linking violates the prohibition against crossing, hence it is thrown out as uninterpretable. The same is true for (68).

- (63) shenme shei dou chi
 what who all eat
 (i) What does everybody eat?
 (ii) *Everybody eats everything
 (iii) *Who eat everything?

- (71) *
-
- Q shenme shei dou
 what who

(66) is not problematic because the intervening NP is a referential one that does not need to be bound by anything. Thus, as illustrated in (72), there is only one chain that crosses over Zhangsan.



5.8.3.2. *Dou*-Quantification of a Wh-NP into an Island

It appears that *dou* is able to quantify a wh-NP into an island. In (73a) the wh-NP *nali* is embedded in the sentential subject, but bound by *dou* and interpreted as a universal quantifier. In (73b) *nali* is embedded in the relative clause, but again can be bound by *dou*, and interpreted as a universal quantifier.

(73) a. [_{AgrSP} [_{SS} Zhangsan zai nali shui] dou keyi]
 Zhangsan at where sleep all will-do
 For every x, x is a place, it will do if Zhangsan sleeps at x.

b. [_{TopP} [_{NP} [_{RC} Zhangsan zai nali xie t_i] de shu]_i] wo dou ai du t_i]
 Zhangsan at where write DE book I all like read
 For every x, x is a place, I likes any book that Zhangsan wrote at x.

Importantly, *dou* can quantify a wh-NP into an island, but not an ordinary NP. Thus, (73a) would be unacceptable if *nali* (where) were replaced by, say, *naxie difang* (those places), as shown in (74).¹²

(74) * [_{AgrSP} [_{SS} Zhangsan zai naxie difang shui] dou keyi]
 Zhangsan at those place sleep all will-do
 It will do if Zhangsan sleeps at all those places.

Now, the question is how the wh-NP trapped an island checks the feature of *dou*. The wh-NP in such a position cannot move out and then back into the island for feature checking. Neither can it move at LF because the feature of DistP is strong and must be checked before Spell-out. If such a wh-NP does not pass through SpecDistP during the derivation, how can it be *dou*-bound and interpreted as a universal quantifier?

¹² For the relative clause case it looks like the substitution of a non-wh-NP for the wh-one is fine.

(a) [_{TopP} [_{NP} [_{RC} Zhangsan zai naxie difang xie t_i] de shu]_i] wo dou ai du t_i]
 Zhangsan at those place write DE book I all like read
 I like all the books that Zhangsan wrote at those places.

There is some difference between (73b) and (a) in terms of what *dou* quantifiers. In (a), I believe, *dou* in fact quantifies the relative head *shu* (books) rather than the plural NP *naxie difang* within the relative clause. The diagnostic is that if *naxie difang* is replaced by a singular NP like *nage difang* (that place), the resulting sentence is still fine, as illustrated in (b). But if the relative head *shu* is overtly marked for singularity, the resulting sentence is bad, as illustrated in (c).

(b) [_{TopP} [_{NP} [_{RC} Zhangsan zai nage difang xie t_i] de shu]_i] wo dou ai du t_i]
 Zhangsan at that place write DE book I all like read
 I likes all the books that Zhangsan wrote at that place.

(c) * [_{TopP} [_{NP} [_{RC} Zhangsan zai naxie difang xie t_i] de na ben shu]_i] wo dou ai du t_i]
 Zhangsan at those place write DE that book I all like read
 I like the book that Zhangsan wrote at all those places.

There is a way out of this problem, however. Cheng and Huang (1994) argues that in sentences like (73) the island clauses are embedded questions of some sort. A question is a set of propositions (Karttunen, 1977). Based on this, Cheng and Huang argues that *dou* in such cases in fact quantifies over the set of propositions. If this view is correct, the proposed analysis can carry over without further assumptions.

I assume that the sentential subject is base-generated in the VP-internal subject position and then moved to SpecDistP for feature checking, as illustrated below. Thus, the sentence is derived correctly.

(75) a. [_{DistP} dou [_{VP} [_{SS} Zhangsan zai nali shui] keyi]
all Zhangsan at where sleep will-do

b. [_{DistP} [_{SS} Zhangsan zai nali shui]_i dou [_{VP} t_i keyi]
Zhangsan at where sleep all will-do

This analysis proves to be attractive in dealing with examples like (76) where the sentential subject and *dou* are separated by an IP, but *dou* is still able to bind the wh-NP in the sentential subject.

(76) [_{SS} Zhangsan zai nali shui] wo xiangxin dou keyi
Zhangsan at where sleep I believe all will-do

For every x, x is a place, I believe that it will do if Zhangsan sleeps at x.

On the present analysis, the derivation of (76) is exactly the same as (62a), repeated here for convenience, except that in (62a) it is the wh-NP that moves, but in (76) it is the entire subject clause. As illustrated in (77), the sentential subject is base-generated in the VP-internal subject position of the embedded clause and moved to SpecDistP in the embedded Infl and finally topicalized to its surface position.

(62a) shei_i wo xiangxin [_{IP} Lisi t_i dou hen xihuan t_i]
who I believe Lisi all very like
Everyone, I believe Lisi likes.

(77) a. [_{DistP} [_{SS} Zhangsan zai nali shui]_i dou [_{VP} t_i [_V keyi]]]
Zhangsan at where sleep all will-do

b. [_{IP} wo xiangxin [_{DistP} [_{SS} Zhangsan zai nali shui]_i dou [_{VP} t_i [_V keyi]]]
I believe Zhangsan at where sleep all will-do

c. [_{TopP} [_{SS} Zhangsan zai nali shui]_i [_{IP} wo [_{VP} xiangxin [_{DistP} t_i dou [_{VP} t_i [_V keyi]]]]]
Zhangsan at where sleep I believe all will-do

The same analysis applies to (73b) where the relative clause base-generated in the object position is first moved to SpecDistP for feature checking, and then moved over the subject by topicalization.

(78) a. [_{AgSP} wo_k [_{DistP} [_{NP} [_{RC} Zhangsan zai nali xie t_i] de shu]_i] dou [_{VP} t_k ai du t_j]]]
I Zhangsan at where write DE book all like read

b. [_{TopP} [_{NP} [_{RC} Zhangsan zai nali xie t_i] de shu]_i] [_{AgSP} wo_k [_{DistP} t_j dou [_{VP} t_k ai du t_j]]]]]
Zhangsan at where write DE book I all like read

5.8.3.3. *Dou*-Conditionals

Another case I want to bring to the same analysis is *dou*-conditionals. Consider the following example.

- (79) ni jiao shei jin lai, wo dou jian
 you ask who come in, I all see
 For every x, x is a person, if you ask x to come in, I will see x.

In (79) *dou* and the wh-NP that *dou* binds are in separate clauses, but the binding relation can be established.

In line with the present proposal, I argue that the antecedent clause is base-generated in the object position of the consequent clause and then moved to SpecDistP, and finally across the subject to its surface position, as illustrated in (80).

- (80) a. [_{DistP} [_{ante-clause} ni jiao shei jinlai]_i dou [_{VP} wo jian t_i]]]
 you ask who come in all I see
- b. [_{AgRP} wo_j [_{DistP} [_{ante-clause} ni jiao shei jinlai]_i dou [_{VP} t_j jian t_i]]]]
 II you ask who come in all see
- c. [_{TopP} [_{ante-clause} ni jiao shei jinlai]_i [_{AgRP} wo_j [_{DistP} t_i dou [_{VP} t_j jian t_i]]]]]]
 you ask who come in I all see

There is some evidence to suggest that this might be the case. First, the object position of the consequent clause in (79) must be empty.

- (81) ni jiao shei jinlai we dou jian (*ta)
 you ask who come in I all see him/her

For every x, x is a person, if you ask x to come in, I will see x.

This becomes revealing because in the corresponding *ruguo*-conditional (82) the same object position must be filled by a pronoun which is anaphorically linked to the wh-NP in the antecedent clause.

- (82) ruguo ni jiao shei jinlai wo jiu jian *(ta)
 if you ask who come I then see him/her
 If you asks someone to come in, I will see him/her

If in *dou*-conditionals, but non in *ruguo*-conditionals, the antecedent clause is base-generated in the argument position of the consequent clause, and then moved up to SpecDistP for feature checking, then we can explain (81) by saying that the pronoun *ta* (him/her) cannot be employed to spell out the trace left by clause-movement.¹³

Second, the derivation in (80) actually can stop at the point indicated by (80b). That is, the antecedent clause can sit between the subject and the rest of the consequent, as shown in (83). The sentence thus formed has more or less the same interpretation as the one in (79) where the antecedent clause raises further across the subject to SpecTopP.

- (83) wo [ni jiao shei jinlai] dou jian
 I you ask who come in all see

For every x, x is a person, if you ask x to come in, I will see x.

Again, the antecedent clause in a *ruguo*-conditional cannot be sandwiched like this.¹⁴

¹³ Note that the object position cannot be filled by *ta* (it), either. This is because the third person neutral pronoun in Chinese can never be used to substitute for a clause.

¹⁴ Cheng and Huang (1994) treat *dou*-conditionals on a par with *ruguo*-conditionals, viz., both adopt the E-type strategy. If the analysis here is correct, it weakens their analysis to some extent. Further evidence to suggest that *dou*-conditionals, unlike *ruguo*-conditionals, don't involve the E-type pronoun strategy is that, unlike the latter, the pronoun in the consequent clause of a *dou*-conditional cannot be smoothly replaced by a definite description, hence the following contrast.

- (84) a. *wo [ruguo ni jiao shei jinlai] jiu jian ta
 I if you ask who come then see him/her
 If you asks someone to come in, I will see him.

On the present analysis, this is not something unexpected. The antecedent clause in a *dou*-conditional can be sandwiched because after checking the feature of *dou*, it does not have to move further if no feature is to be checked up in the tree.¹⁵ The antecedent clause in a *ruguo*-conditional cannot be sandwiched because it is not generated anywhere within the consequent clause in the first place and therefore there is no way for it to be there.

5.8.4. “Multiple Linking” and Wh-Topicalization

As noted above, *dou* cannot be multiply-linked. This explains why the example in (63), repeated here for convenience, cannot have the reading where both the wh-NPs are bound by *dou*, as illustrated by the reading in (ii). Also as pointed out above, if there are two wh-NPs to the left of *dou*, the one that is closer to *dou* gets bound. This explains why the reading in (iii) is impossible.

- (63) shenme shei dou chi
 what who all eat
 (i) What does everybody eat?
 (ii) *Everybody eats everything
 (iii) *Who eat everything?

(63) is derived by first moving *shei* to SpecDistP for feature checking and then moving *shenme* from object position to SpecTopP. The latter operation is an instance of wh-topicalization. (63) has the scope property that we attribute to wh-topicalization, i.e., it can only have an individual reading. For example, (63) cannot be responded by a list of answers such as John ate a sausage biscuit, Bill ate a fish sandwich and Mary ate a hash brown.

An interesting case to consider is whether *dou* can quantify an embedded multiple wh-question. The judgment here is not clear, but for sentence (84) where the embedded multiple wh-question is a sentential subject, it looks like among the three potential readings, most favorable is the one where the first wh-NP *shei* is Q-bound the second one *shenme ge dou*-bound, as illustrated by (i). The converse of (i), as shown in (ii), is definitely out, namely, *shenme ge*, that is closer to *dou* at least in terms of linear distance, must be *dou*-bound. Of interest to us is the fact that the reading in (iii) where both the wh-NPs are *dou*-bound is available, but not so readily.

- (84) [DistP [SS shei chang shenme ge] dou haoting]
 who sing what song all pleasant to ear
 (i) who is x, x is a person, for every y, y is a song such that y is pleasant to ear

-
- a. ruguo ni kandao shei, jiu jiao [ni kandao de ren] jinlai.
 if you see who then ask you see DE person come in
 If you see someone, ask the person you see to come in.
- b. *ni kandao shei, dou jiao [ni kandao de ren] jinlai.
 you see who all ask you see De person come in
 No matter who you see, ask the person you see to come in.

¹⁵It has to be pointed out that (83) is not as smooth as (79). I guess that there might be some heaviness effect at work, viz., the antecedent clause is too heavy and better be shifted to the left periphery, analogous to the Heavy NP Shift in English.

when x sings y.

(ii) *what is x, x is a song, for every y, y is a person such that x is pleasant to ear when y sings x

(iii) ?for every x, x is a person, for everyone y, y is a song such that y is pleasant to ear when x sings y.

Two questions need to be addressed. First, why is the reading in (ii) is no good, but the reading in (iii) is? Second why is the reading in (iii) available but not so readily? Let me answer the second question first.

If we take a wh-question to denote a set of propositions (Karttunen, 1977), then it is natural to assume that a multiple wh-question denotes a set of sets of propositions. Recall that in the case of *dou*-quantification of a wh-NP into an island Cheng and Huang takes *dou* to quantify the set of propositions rather than the wh-NP in the island. To extend this idea a bit further we can say that in (84) *dou* quantifies the set of sets of propositions. On this view, the multiple-linking witnessed here is only apparent.

The question then is why this reading is not readily available. I believe that it has do with the semantic nature of distributive *dou*. Normally, *dou* should distribute down to each individual in a set. For example, in a simple *dou*-sentence like (85) *dou* requires that the property *buying a book* be true of each individual in the set denoted by *tamen* (they).

(85) tamen dou mai -le yi ben shu
 they all buy ASP one CL book
 They have all buy a book.

Suppose there are four persons in the *tamen*-set. If two of them each bought a book, and the remaining two bought a book together, (85) cannot be true of this state of affairs.

Given this and given the fact that a multiple wh-question denotes a set of sets of proposition, I suspect that the reason why the third reading is not readily available is that *dou* at first pass can only distribute down to each set rather than to each individual proposition. In order to distribute down to each individual proposition, another layer of distribution needs to be set up. This, I believe, is where interpretive difficulty lies.

Now, let us answer the first question. Recall that we employ the so-called “No Crossed Linking” condition to explain why in (63) it is the wh-NP closer to *dou* that gets *dou*-bound. We, however, cannot use the same explanation here because in (84) *dou* quantifies the sentential subject rather than the wh-NPs contained therein. What is really going in (84) is that *shei* is moved out of the sentential subject to SpecTopP for feature checking so that *dou* can no longer “bind” it, as illustrated below.¹⁶

(86) [_{TopP} shei_i [_{DistP} [_{SS} t_i chang shenme ge] dou haoting]]
 who sing what song all pleasant to ear
 who is x, x is a person, for every y, y is a song such that y is pleasant to ear when x sings y.

¹⁶A question may arise as to how an element can overtly move out of a subject island. In fact, a subject island in Chinese, for reasons not clear to me, is always porous. For example, (a) is perfectly acceptable though the wh-object has moved out of the subject island by topicalization.

(a) shenme ge_i [_{SS} Zhangsan chang t_i] zui haoting
 what song Zhangsan sing most pleasant to ear
 What is x, x is a song, such that it is most pleasant to ear if Zhangsan sings x.

If this analysis is correct, the *wh*-object should be able to undergo topicalization as well. This prediction is borne out. In (87) the *wh*-object *shenme ge* is moved out of the subject island by topicalization and the *wh*-subject *shei* stays in situ. As a result, *shenme ge* must be *Q*-bound and *shei dou*-bound. Hence the reading in (i).

- (87) [_{TopP} *shenme ge*_i [_{DistP} [_{SS} *shei chang t_i*] *dou haoting*]]
 what song who sing all pleasant to ear
 (i) what is *x*, *x* is a song, for every *y*, *y* is a person such that *x* is pleasant to ear when *y* sings *x*.
 (ii) *what is *x*, *x* is a song, who is *y*, *y* is a person such that *x* is pleasant to ear when *y* sings *x*
 (iii) *for every *x*, *x* is a song, who is *y*, *y* is a person such that *x* is pleasant to ear when *y* sings *x*.

Unlike (86) where topic-movement is string vacuous, there is no question that in (87) topic-movement does take place, for the *wh*-object overtly appears at the front of the sentence. As such, (87), unlike (84), cannot have the reading in (iii) where both the *wh*-NPs are *dou*-bound, no matter how it is forced. This is a welcome result, since after moving out of the sentential subject the *wh*-object can no longer be “bound” by *dou*.¹⁷

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¹⁷ There is phonological evidence to the claim that *wh*-topicalization is involved in (86) and (87). A natural intonation for such sentences is that there is a pause between the first *wh*-NP and the rest of the sentence. This is one of the phonological correlates of topic sentences.

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