The scope of EVEN

Evidence from Mandarin Chinese

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One of the issues in the study of EVEN is concerned with the ambiguous scope interpretations contributed by the focus adverb *even*. There have been two main camps: the lexical approach and the scope approach. Unlike English, which does not have distinct lexical items for *even*, Mandarin Chinese (Chinese hereafter) utilizes two constructions to express the notion of EVEN: (1) The *lian … dou* 'including … all' construction; and (2) focus adverbs, such as *shenzhi*. This paper aims to demonstrate that the *lian … dou* construction expresses the typical implicatures in EVEN sentences predicted by scope theory. The seemingly deviant cases that have been argued for ~~by Rooth for a lexical NPI *even*,~~ however, either are not construed in *lian … dou* sentences or are possibly rendered in *shenzhi* sentences provided by the pragmatic accommodation of existential presuppositions. In particular, *dou* syntactically marks focus scope and quantifies over a focus domain consisting of the focused phrase and its alternatives in presupposition. The results of this study thus shed further light on the general discussion of EVEN in the sense that: on the one hand, the scope theory can make the right predictions, as evidenced by *lian … dou*; and, on the other hand, pragmatic scalar inference of the existential implicatures should be taken into consideration. Ultimately the expression of EVEN manifests interfaces of syntax, semantics, and pragmatics.

Keywords: EVEN, scope theory, lexical theory, negative polarity item, scalar implicature, presupposition

1. Introduction

It has been reported that languages make lexical distinctions between regular EVEN and negative polarity item (NPI) EVEN; e.g. German regular EVEN *sogar* and NPI EVEN *einmal*, which has to be in the scope of negation (König 1991; von Stechow 1991; Hoeksema & Rullmann 2001; Rullmann 2003, etc.), and three Greek EVEN-related lexical items: positive polarity *akomi ke*, negative polarity *oute*, and 'flexible scale' *even esto* in Giannakidou (2006; 2007). While there is no lexical

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distinction in English *even,* Rooth (1985) has proposed that English *even* is lexically ambiguous between positive and negative polarity interpretations, coded as *even*$_{\mathrm{p}}$ and *even*$_n$, respectively. Specifically, Rooth's arguments are drawn mainly from the embedded negative polarity *even*-DP (determiner phrase) interpretation in the non-finite complement clause, the rendition of which however is argued not to be obtained in Karttunen & Peters' (1979) scope theory of EVEN in certain contexts. Nevertheless, in her defense of the scope theory, Wilkinson (1996) has managed to derive the felicitous interpretation parallel to that of Rooth's *even*$_n$ without recourse to lexical distinction. In addition, Rooth's assumption of VP (verb phrase)-*even* fixed scope has been challenged by Wilkinson (1996), and by Nakanishi's (2012) antecedent-contained deletion (ACD) cases and the QP (quantifier phrase)-*mo* '-also/-all' quantifier scope variations in Japanese.

In response to the debate, this paper aims to provide further evidence from Mandarin Chinese (Chinese hereafter) *lian … dou* sentences in support of the scope theory. Particularly the *lian … dou* 'including … all' construction uniformly expresses the canonical implicatures in EVEN sentences predicted by the scope theory. By contrast, the seemingly deviant cases that have been argued for by Rooth for his NPI-*even* either are not construed in *lian … dou* sentences or are possibly rendered in *shenzhi* sentences provided by the pragmatic accommodation of existential presuppositions in context. The results of this study thus shed further light on the general discussion of EVEN in the sense that the *lian … dou* sentences attest the observations predicted by the scope theory, and the controversial *even* cases are ascribed to the pragmatic inference of the existential implicatures, and they are expressed by Chinese *shenzhi.*

This paper is organized as follows. Section 2 reviews the main debate of lexical theory and scope theory with an emphasis on *even*-DP occurring in the non-finite complement clause under the downward entailing context. In Section 3, the two constructions of EVEN in Chinese are introduced: *lian … dou* and the focus adverb *shenzhi*. A more detailed discussion of *lian … dou* is presented in Section 4 with respect to the scope marking of *dou* (Section 4.1), in downward entailing context (Section 4.2), and in non-finite complement clauses (Section 4.3). Section 5 further illustrates how the difference in existential presuppositions invoked by *lian … dou* and *shenzhi* in the debates in the literature are accounted for. Section 6 summarizes this study.

2. Ambiguity in *even* sentences

Before turning to a discussion of Chinese EVEN, let us first review the ambiguity in English EVEN sentences. In line with focus semantics (Kratzer 1991, et al.), Rooth (1985; 1996) has articulated the focus semantics of *even* which makes available two semantic values: the ordinary semantic value (represented as $[[\alpha]]^0$), and the focus semantic value ($[[\alpha]]^f$); and focus evokes a set of possible alternatives to the ordinary semantic value. Thus, the ordinary semantic value of (1) with the F marked focus phrase, is represented as the intentional (^) proposition 'that John read Syntactic Structures (ss)' in (2a), and its focus semantic value (as represented as $[[\ ]]^f$) is the set of alternatives (existing (∃) a set of p which contain variables x) to the asserted *reading* ss in a context (C) as in (2b).

(1) John read even [Syntactic Structures]$_F$.

(2) a. [[John read [Syntactic Structures]$_F$]] = ˆread(john, ss)
b. $[[$John read [Syntactic Structures]$_F$ $]]^f$ = {p: ∃x [p=ˆread(john, x)]}

Moreover, it has been widely held that *even* contributes to conventional implicatures (Horn 1969; Karttunen & Peters 1979; Kay 1990; Krifka 1991; Francescotti 1995) rather than affecting the truth-condition of the sentence (vs. Lycan 1991). As first discussed in Karttunen & Peters (1979) and echoed by Rooth (1985), Wilkinson (1996), Lahiri (1998), Nakanishi (2012) among many others, *even* sentences as in (1) evoke two conventional implicatures: an existential implicature as in (3a) and a scalar implicature as in (3b).[1]

(3) a. John read something other than Syntactic Structures.
b. Syntactic Structures is the least likely thing for John to read.

Following Karttunen & Peters (1979), Rooth (1985) formulates the existential implicature as in (4a), which states that there exists a set of propositions p in C, alternatives to the asserted proposition, and (∧) a contextual variable that serves as a domain of quantification for *even* (the extention of p). The scalar implicature represented in (4b) further says that for all propositions in p (∀p), the likelihood of p exceeds the likelihood of $[[\alpha]]^0$.[2]

(4) a. $\exists p\ [p\ C \wedge {}^{\vee}p\ \&\ p \neq [[\alpha]]^0]$ --Existential implicature
b. $\forall p\ [[p\ C \wedge p \neq [[\alpha]]^0]$
→ exceed' (likelihood' (p), likelihood' $[[\alpha]]^0$] --Scalar implicature

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[1] As for different types of scales related to EVEN, see Giannakidou (2006; 2007), whose positive EVEN may be relevant to Chinese *hai* 'still'. We shall not further discuss this issue.

[2] The implicatures for sentence (1) are shown in (i): the likelihood of John's reading other things exceeding that of John's reading ss.

(i) a. ∃p [∃x [p = ˆread(john, x) ∧ ˇp & p ≠ ˆread(john, ss)] --Existential implicature
b. ∀p [∃x [[p = ˆread(john, x) ∧ p ≠ ˆread(john, ss)]
→ exceed' (likelihood' (ˆread(john, x)), likelihood' (ˆread(john, ss))]
--Scalar implicature

omplication arises when the *even* clause is embedded in a downward entailing (DE) context, as shown in (5). As first noted by Karttunen & Peters (1979), sentence (5) is ambiguous between the narrow scope reading as in (6), and the wide scope reading as in (7), and their respective implicatures in (a) and (b) ("e" in (6) representing an empty category).

(5) It is hard for me to believe that Bill understands [even Syntactic Structures].

(6) *Narrow scope interpretation:*
It is hard for me to believe that [even Syntactic Structures] Bill understands e.
a. There is something other than Syntactic Structures that Bill understands.
b. Syntactic Structures is the least likely thing for Bill to understand.

(7) *Wide scope interpretation:*
[Even Syntactic Structures] it's hard for me to believe that Bill understands e.
a. There is something other than Syntactic Structures that it is hard for me to believe that Bill understands.
b. Syntactic Structures is the least likely thing that it is hard for me to believe that Bill understands. (i.e. SS should be easy for Bill to understand.)

The different scope readings give rise to the opposite scalar presuppositions. The *even* in sentences expressing narrow scope (as in (6)) maintains its canonical scalar implicature, whereas when *even* sentences interpreted as a wide scope it reverses the likelihood of the scalar implicature, rendering *Syntactic Structures* being the most likely book for Bill to understand.

2.1 The lexical theory

However, the above ambiguity in (5) is treated by Rooth (1985) as a result of lexically ambiguous *even*'s: a normal *even* (*even*$_p$) and a negative polarity NPI-*even* (*even*$_n$). The implicatures of NPI-*even* are illustrated in (8): (8a) says that some relevant proposition distinct from $[[\alpha]]^0$ is false, and (8b) says that $[[\alpha]]^0$ is the most likely of the relevant propositions.

(8) a. $\exists p\ [p\ C \wedge \text{not}(^{\vee}p)\ \&\ p \neq [[\alpha]]^0]$
b. $\forall p\ [[p\ C \wedge p \neq [[\alpha]]^0]$
$\rightarrow \text{exceed'}\ (\text{likelihood'}\ [[\alpha]]^0, \text{likelihood'}\ (p)]$

Consequently, the ambiguity of (5) is ascribed by Rooth to the ambiguous lexical *even*'s in (9) and (10), and their respective existential (in (b)'s) and scalar implicatures as in (c)'s.

(9) a. Normal *even*: [John even$_{\text{P}}$ understands [Syntactic Structures]
b. There is something other than Syntactic Structures that Bill understands.
c. The likelihood of Bill's understanding other things exceeds that of Bill's understanding SS.

(10) a. NPI-*even*: [John even$_{\text{n}}$ understands [Syntactic Structures]
b. There is something other than Syntactic Structures that Bill does ***not*** understand.
c. The likelihood of Bill's understanding SS exceeds that of Bill's understanding other things.

Comparing these two approaches, we do not see much difference in accounting for (5): the normal *even*$_{\text{p}}$ reading in (9) parallel with the narrow scope reading in (6), and the NPI *even*$_{\text{n}}$ interpretation in (10) with the wide scope reading as in (7). Complication arises when *even*-DP occurs in the non-finite complement clause under a matrix downward entailing (DE) environment. According to Rooth, this kind of sentence may give rise to three-way ambiguity: *even*$_{\text{p}}$ ((i) wide, and (ii) narrow scope readings) and *even*$_{\text{n}}$ ((iii) negative polarity reading). Specifically, Rooth argues that the lexical theory fares better because the possible (iii) NPI reading may not be predicted by the scope theory in a case like (12). He argues that the felicitous implicature in (13) in the context of (11) is predicted only by his negative polarity *even*$_{\text{n}}$.[3]

(11) Because they had been stolen from the library, John couldn't read "The Logical Structure of Linguistic Theory" or "Cartesian Linguistics". Because it was always checked out, he didn't read "Current Issues in Linguistic Theory".

(12) The censorship committee kept John from reading even Syntactic Structures.
(Rooth 1985: 157–158)

(13) a. There is something other than Syntactic Structures that John did not read.
b. Syntactic Structures is the most likely thing for John to read.

In addition, Rooth contends that the wide scope interpretation of (12) as in (14), though predicted by Karttunen & Peters (1979), yet is not available in the context of (11). The problem comes from the implicatures, which state that *the censorship committee* kept John from reading other things; this, nevertheless, is not meant in such a situation.

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[3] As noted in Wilkinson (1996), the narrow scope reading of (12), *John read something other than SS, and that SS is the least likely thing for him to read*, does not seem to be available in such a context either.

(14) a. There is something other than Syntactic Structures that the censorship committee kept John from reading. --Existential implicature
b. Syntactic Structures is the least likely thing for the censorship committee to keep John from reading. --Scalar implicature

2.2 The scope theory reinvented

To argue against Rooth's theory, Wilkinson (1996), however, claims that the scopes of *even* can correctly derive the appropriate readings while keeping *even* intact. In response to the scope interpretations of (12) in the context of (11), she observes the additional focus effect of the subject *the censorship committee*; thus, she introduces a lambda operator to abstract the subject and leaves a variable bound by the focus operator in the implicature. This focus carries the existential implicature that is introduced to the existential and scalar implicatures. She then rewrites the implicatures as repeated in (16), in which the intended wide scope is rendered: Syntactic Structures is the least likely thing for *someone* to keep John from reading.[4]

(15) [The censorship committee]$_F$ kept John from reading [[even Syntactic Structure]]$_F$.

(16) Wilkinson's implicatures (with wide scope for *even*):[5]
a. There is something other than Syntactic Structures that John was kept from reading (by someone).
b. Syntactic Structures is the least likely thing for someone (or something) to keep John from reading. (Wilkinson 1996: 204)

In the following section, I shall first present the notion of EVEN expressed by Chinese *lian … dou* 'including … all', and focus adverb *shenzhi*. It will be shown that the *lian … dou* construction evokes a set of propositions containing alternatives to the asserted *lian*-phrase forming a union set of quantification domain in the presupposition, whereas *shenzhi* triggers a scalar pragmatic inference in which the

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[4] Wilkinson also demonstrates that some problems of the scope theory under Rooth's attack can be solved by reconsidering the presuppositions in the existential implicatures, such as *even* in sentences with *sorry* and *glad* factive predicates, and the absence of *even* VP fixing scope, to be detailed in § 5.

[5] Wilkinson's (1996: 204) formulae of the wide scope *even* are repeated below.

(i) a. $\exists p[\exists y[p = \exists x({}^{\wedge}\text{kept-John-from-reading}'(x, y)\ \&\ {}^{\vee}p\ \&\ p \neq \exists x({}^{\wedge}\text{kept-John-from-reading}'(x, s)]]$
b. $\forall p[\exists p[[p = \exists x({}^{\wedge}\text{kept-John-from-reading}'(x, y)\ \&\ p \neq \exists x({}^{\wedge}\text{kept- John-from-reading}'(x, s)]$
$\rightarrow \text{exceed}'(\text{likelihood}'(p), \text{likelihood}'(\exists x({}^{\wedge}\text{kept-John-from-reading}'(x, s))))]]$

asserted proposition is considered as highly "informative" or surprising, leaving the scalar informativeness relation contextually determined. It turns out that the interpretations predicted by the scope theory are evidenced in *lian … dou* sentences. In addition, the relatively flexible existential presuppositions in *shenzhi* sentences account for the controversial cases.

3. Chinese *lian … dou* and *shenzhi*

Before turning to the discussion, let us first briefly introduce Chinese sentences expressing EVEN. There are generally two ways of so doing: by employing the *lian … dou* 'including … all' construction or focus adverbs, such as *shenzhi* (Shyu 2004; Xiang 2008; Liao 2016).[6] There are basically two types of *shenzhi*: functioning as a focus adverb, or as a conjunctor. For the former type, *shenzhi* has to occur preverbally, either preceding the verb (17), or occurring sentence initially (18).

(17) a. *Zhangsan shenzhi du-le Syntactic Structures.*
Zhangsan SHENZHI read-ASP SS
'Zhangsan even read *Syntactic Structure*.'
b. **Zhangsan du-le shenzhi Syntactic Structures.*
Zhangsan read-ASP SHENZHI SS.

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[6] There are other adverbs meaning 'surprisingly' or 'unexpectedly', such as *jingran, juran* (Xiang 2008; Liao 2016). In this paper, I shall only discuss *shenzhi* and shall not compare these lexical items, which will be left for future study.

Shenzhi in contemporary Chinese has developed from separate lexical items: *shen* 'much' as a predicative adjective and *zhi* 'reach', a verb, dating back to Qin, Han Dynasties (third century B.C.) (Liu 2009). In the example below, the predicate *shen* describes an amount of snow and conjoins with the following VP, reaching to one's knees.

(i) *Du Bin yise yi gong, er xue shen zhi xi.*
only Bin compassion more polite, soon snow much reach knee
'Only Bin had very polite attitude. Soon the snow fell much, and reached to knees.'
(*Taiping Guangji* [*Extensive Records of the Taiping Era*], Song Dynasty, around 10th A.D.)

In Liu's (2009) diachronic study, these two unrelated lexical items occurring in conjunction structure underwent subjectivization, expressing speaker's attitude, and thus formed a fixed lexical item as a conjunctor introducing the last conjunct as an unexpected element in a scale (in Song and Yuan Dynasties). The conjunctor use of *shenzhi* later was grammaticalized to a clause-medial adverb in the early twentieth century. Whether in conjunctor use or the later adverb use, *shenzhi* expresses a scalar reading, its following element being considered highly unexpected in a contextually determined scale (Yuan 2008).

(18) (*Gongtong jijin shengou menkan yue lai yue di.*) *Shenzhi*
mutual fund application threshold more low SHENZHI
meige yue zhiyao 3,000 dao 5,000 yuan, jiu keyi chengwei
each.month only 3,000 to 5,000 dollar, then able become
touzi xingui. ❡[7]
investor
'(The application threshold for mutual funds is getting lower and lower.) It is even the case that one just pays 3,000~5,000 dollars, they can become investors.'

Shenzhi as an adverb "emphasizes prominent situations" (Lü 1999: 486).

(19) *Zhangsan pan duo le. Shenzhi youde ren shuo ta bian*
Zhangsan fat more PART SHENZHI some man say he become
pang le.
fat PART
'Zhangsan has gained weight; some even said he became fat.' (Lü 1999: 486)

In addition to the adverb function, the latter use of conjunctor *shenzhi* may conjoin ~~dps, aps~~ (adjective phrase), ~~vps, pps~~ (preposition phrase), or clauses (Lü 1999; Yuan 2008; Liu 2009); consequently, its following conjunct usually appears at last to emphasize the highest degree of a contextually determined scale (e.g. Fauconnier 1975a, b). The occurrence of *shenzhi* expresses a piece of highly surprising, informative or unexpected information (Shyu 2004; Yuan 2008; Liu 2009, etc.). In sentence (20a), there are two genitive ~~dps~~: feudalism system and slavery system, which modify the head noun *bondage* and are connected by *shenzhi*, indicating that *slavery system* is presupposed to be very unexpected in a scalar continuum possibly ranging from social systems including feudalism system and the highly unexpected slavery system. Similarly, *shenzhi* in (20b) juxtaposes two clauses: *letting humans lose the ability to resist pathogen*, and *(letting humans) lose lives*, the latter of which apparently is considered by the speaker to be more surprising and terrifying. The same effect is applied to (20c), in which *shenzhi* connects two ~~vps~~ in a conditional clause.

(20) a. *Tamen hai shuo-zhe fengjian zhidu shenzhi nuli zhidu*
they still suffer-EXP feudalism system SHENZHI slavery system
de shufu.
DE bondage
'At that time, they were still suffering from the bondage of feudalism, even the slavery system.' (Lü 1999: 486)

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[7] This ❡ character indicates that the example is drawn from Academia Sinica Balanced Corpus of Modern Chinese.

b. *Zhezhong bingdu hui shi renlei shiqu dikang*
this virus (AIDS) will cause mankind lose resist
bingyuanti de nengli, shenzhi sangshi shengming.[8]
pathogen POSS ability SHENZHI lose life
'This virus will cause mankind to lose the ability to resist pathogens, even lose life.'

c. *Ruguo haizi shichang wan diannao , shenzhi banye*
if kid often play computer.game SHENZHI midnight
hui toutou paqilai wan, zheyang suanshi wanglu
will stealthily get.up play, this.way count internet
chengyin ma?[9]
addiction Q
'If kids often play computer games, even get up at midnight stealthily to play, would this be counted as internet addiction?'

The other means of expressing EVEN is through *lian … dou* 'including … all' structure, in which *dou* 'all' and the focused constituent after *lian* (e.g. the subject in (21) or the object in (22)) have to occur preverbally, vs. (22c) (Paris 1979; Tsao 1994; Shyu 1995; 2014; Hole 2004; Badan 2008; Badan & Del Gobbo 2015, etc.).[10] Note that *lian*-object here occurs either in the clause-medial (22a) or sentence-initial position (22b).

(21) *Lian [Zhangsan] dou kan-guo zhe-ben shu.*
LIAN Zhangsan DOU read-EXP this-CL book
'Even Zhangsan read this book.'

(22) a. *Zhangsan [lian zhe-ben shu] dou kan-guo.*
Zhangsan LIAN this-CL book DOU read-EXP

b. *[Lian zhe-ben shu] Zhangsan dou kan-guo.*
LIAN this-CL book Zhangsan DOU read-EXP
'Zhangsan has read even this book.'

c. **Zhangsan dou kan-guo [lian zhe-ben shu].*
Zhangsan DOU read-EXP LIAN this-CL book

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[8] http://www2.nsysu.edu.tw/valkyrie/AIDS.htm

[9] http://iaptc.asia.edu.tw/tw/faq/detail/2

[10] Although *ye* 'also' also co-occurs with *lian* and is often interchangeable with *dou* (Paris 1979), Hole (2004) notes that *dou* functions as universally quantifying over alternatives (all alternatives are true), and *ye* existentially quantifying over alternatives (some alternatives are true). This paper focuses on *lian … dou* and will not further discuss the distinction between *dou* and *ye*; see Ma (1982), Hole (2004) for further discussion.

has been generally agreed upon that *lian … dou* evokes a set of alternatives to the *lian*-XP (cross-categorial phrase XP in the sense of X-bar syntax, including ~~DP, PP,~~ V(P), and complement phrase (~~CP~~)) and the asserted *lian*-XP is placed at the lower end of a scale about expectedness or likelihood in context (e.g. pragmatic scale in Fauconnier 1975a, b; *lian … dou* in Paris 1979; Tsai 2004).[11] Like the additivity property (quantificational use) and scalar use for English *even* (Altmann 1976), *lian … dou* syntactically encodes the compositionality of additivity and scalarity.[12] *Lian* is treated as a focus particle (Gao 1994; Shyu 1995; Badan 2008; Cheng & Vicente 2013; Badan & Del Gobbo 2015) that gives the "additivity" effect (Badan 2008; Cheng & Vicente 2013; Liao 2016), and *dou* is considered as a maximality operator (Giannakidou & Cheng 2006; Constant & Gu 2010) giving the "scalarity" meaning (Badan 2008). Although Xiang (2008) also treats *dou* as a maximality operator, she maintains that *lian* provides scalarity by introducing a scale about unexpectedness (also in Shyu 2016), and *dou* "picks out the maximal degree on this scale." In line with Xiang's (2008) and adopting Shyu's (2016) formulation based on Karttunen & Peters' (1979) and Rooth's (1985), the cross-categorial use of *lian* can be generalized as follows in (23), in which X represents a cross-categorial X(P) (including DP, PP, V(P), CP). It is also assumed that *lian* syntactically can behave like a preposition or a conjunctor,[13] but semantically expressing conjunction contributed by its literal lexical meaning *including*. However, there is a twist in *lian*. While regular connective *and* conjoins two denoted propositions (e.g. P & Q), nevertheless the first conjunct in *lian … dou* sentences (C(*P*) contextual alternatives) is not syntactically construed; rather, it is implicated in the presupposition, namely the alternatives which are conjoined with the intention of the asserted proposition P, as in (23ii). In (23i), the assertion Q is the extention of proposition P containing a *lian*-focused cross-categorial phrase X. In (23iv), the lambda abstracted proposition P and lambda abstracted entity X, for all alternative propositions containing Y in

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[11] As a focus, the *lian*-XP receives accent (Sybesma 1996; Badan 2008, etc.), or contrastive stress (Tsao 1994; Xu & Liu 2007).

[12] Rejecting *lian*'s function as a "focalizer", Paris (1979: 55) calls *lian* as a "quasi-quantifier" without further elaborating on the property. She has also pointed out the quantificational value of *dou*, as an operator "predicated of propositions", and its "unexpectedness" modal value. Recently, Jiang & Pan (2013) further show that when bare scalar quantifier *dou*2 quantifies over to its left element, it overlaps with that in *lian … dou*, while *lian … dou* and *dou*2 differ in that the latter may quantify over its right element. I shall leave the detailed discussion aside due to space limitations.

[13] Following Lü (1946/1990) and Shyu (2016), I assume that *lian* is syntactically represented as a preposition, having been grammaticalized from a lexical verb meaning *connect, include* into a functional category; see references cited in Pai (2013). In addition, it is assumed that the focused V(P) behaves like a gerund, an issue being left for future study.

C, the likelihood of the propositions containing Y exceeds that containing X. In addition, *dou* universally quantifies over a union set ‘Z’ comprising of the alternatives in C and the asserted focus X.

(23) i. Assertion: $Q = {}^{\vee}P(X)$
ii. $\exists P\ [\mathrm{C}(P)\ \&\ {}^{\wedge}P \neq Q]$ --Existential implicature
iii. $\forall P\ [[[\mathrm{C}(P)\ \&\ {}^{\wedge}P \neq Q]]$
$\rightarrow$ exceed’ (likelihood’ $({}^{\wedge}P)$, likelihood’ $(Q))]$ --Scalar implicature of *lian*
iv. $\lambda P.\lambda X.\forall Y\ [Y \in \mathrm{C}\ \&\ Y \neq X\ \&$ exceed’ (likelihood’$({}^{\wedge}P(Y))$, likelihood’$({}^{\vee}P(\mathrm{X}))$
$\rightarrow \forall \mathrm{Z}[Z \in \mathrm{C} \cup \{\mathrm{X}\} \rightarrow {}^{\wedge}P(Z)]]$ --Implicature of *lian … dou*

(23i–iii) do not differ much from English *even* semantics in (8), (i.e. the asserted proposition *Q* is the least likely in comparison to its alternatives *P* in C). However, (23iv) is added (e.g. in Shyu 2016) to spell out the function of *dou,* which universally quantifies over the variables (labeled as *Z*), the union set containing the alternative set C and the focused X having the characteristic function of *P*, contributed by the above-mentioned historically residual meaning of *lian.* In (23iv), *dou* is treated as a universal quantifier on a par with its regular adverb of universal quantification (Lee 1986; Cheng 1995 among many others). However, unlike *dou* in canonical sentences quantifying over plural entities, *dou* in *lian … dou* quantifies over elements in the presupposition union set consisting of the focused phrase and its contextually relevant alternatives evoked by *lian*. This naturally explains why *lian*-focused ~~DP~~ can be singular.[14] It is also due to *dou*’s quantification domain requirement that *lian … dou* sentences cannot be felicitous without conventionally implicating a quantification domain. We shall turn to this point in § 5.2.

Despite *lian … dou* often being synonymous with *shenzhi*, the quantification domain is not conventionally encoded in *shenzhi* sentences. We can apply Kay’s (1990) informativeness principle for *shenzhi* sentences. Informativeness is defined as a “relation holding between two propositions relative to a scalar model (SM), in which the more informative one unilaterally entails the less informative one in SM”; also see Fauconnier (1975a, b), Fillmore et al. (1988), Kay (2006). We may adopt Kay’s pragmatic interpretation of English *even* by treating Chinese *shenzhi* as a scalar operator evoking a superior informativeness relation between the "proposition expressed (termed as 'tp')" and "one taken to be already in the context (termed as 'cp')" (Kay 1990: 69). This relation is established when the background assumptions are shared or accommodated by interlocutors at the time of utterance.

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[14] There has been rich literature on the study of *dou* (Lee 1986; Cheng 1995; Huang 1996; Lin 1998, among many others). Recently more attention has been drawn to the scalar quantification and the quantification directionality of *dou* (Yuan 2005; Xiang 2008; Jiang & Pan 2013, etc.), e.g. *dou*2 in Jiang & Pan (2013), in contrast with the plural nominal quantification of *dou*1. The current study concerns the *dou* in *lian … dou*, and assumes its universal quantification force, on a par with regular *dou*1, but the former being operative in the pragmatic presupposition in *lian … dou* rather than syntactically in canonical sentences, rather than treating *dou* as a maximal operator (e.g. the iota maximality operator in Giannakidou & Cheng 2006; Xiang 2008). Due to space limitations, I shall leave detailed discussion for the future.

The pragmatic informativeness of *shenzhi* plus the conventionally evoked presupposition quantification domain in *lian … dou* facilitate their co-occurrence, as shown in (24).[15] When they co-occur, *shenzhi* always precedes *lian … dou*, as indicated in the contrast between (24) and (25).

(24) *Lisi shenzhi lian Jufa Jiegou dou du-le.*
Lisi SHENZHI LIAN Syntactic Structures DOU read-ASP
'Lisi read even Syntactic Structures.'

(25) a. ??*Lisi lian Jufa Jiegou shenzhi dou du-le.*
Lisi LIAN Syntactic Structures SHENZHI DOU read-ASP
b. ??*Lisi lian Jufa Jiegou dou shenzhi du-le.*
Lisi LIAN Syntactic Structures DOU SHENZHI read-ASP

The following section will demonstrate how the scope interpretations predicted by the scope theory are evidenced by the position of *dou* in *lian … dou* sentences.

4. The syntactic scope of *lian … dou*

4.1 Scope marking of *dou*

It has been noted that *lian*-phrases can occur in sentence-initial position while *dou* may stay either in the embedded clause or in the matrix clause (Shyu 1995; 2014; Badan 2008; Cheng & Vicente 2013), as shown in (26) and (27). Shyu (1995) has argued that *lian Mali* in (26) undergoes long-distance movement but is interpreted as in the embedded clause at LF (logical form), evidenced by the embedded *dou*, equivalent to the schema in (28a), coindexed (subscript *i*) with its trace *t*.[16] By contrast, she holds that when *dou* occurs in the matrix clause as in (27), the *lian*-phrase is interpreted as in the sentence-initial position, corresponding to (28b), coindexed with the empty category (*e*) in the canonical object position.[17]

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[15] One of the anonymous reviewers raises a question as to whether the co-occurrence causes a semantic redundancy or they cancel each other out. I agree with his/her suggestion that the co-occurrence expresses "stronger in intensity that the one with either of them" [sic].

[16] There have been debates on the movement (Shyu 1995; 2014; Badan 2008; Constant & Gu 2010; Badan & Del Gobbo 2015) and the base-generation (Paris 1979) approaches. For the movement approach, it has been proposed that *dou* heads a functional projection (FocusP in Shyu 1995; MaxP in Constant & Gu 2010; *Dou*P in Badan & Del Gobbo 2015, Shyu 2016, etc.) and *lian*-XP moves to the specifier position of this functional projection; see the detailed movement tests in Shyu (1995). By contrast, Cheng & Vicente (2013) suggest that *dou*, as a maximality

(26) *Lian Mali$_i$ Zhangsan renwei* [$_{\text{CP}}$ *Lisi* ***dou*** *hen taoyan t*$_i$].
LIAN Mali Zhangsan think Lisi all very dislike
'Even Mali, Zhangsan thinks that Lisi also doesn't like *e*.'

(27) *Lian Mali$_i$ Zhangsan* ***dou*** *renwei* [$_{\text{CP}}$ *Lisi hen taoyan e$_i$/ta*$_i$].
LIAN Mali Zhangsan all think Lisi very dislike (her)
'Lit. Even Mali, Zhangsan also thinks that Lisi doesn't like her.'

(28) a. [$_{\text{CP}}$ *Lian*-DP$_i$ Subject … [$_{\text{CP}}$ Subject t'_i ***dou*** V t_i]
b. [$_{\text{CP}}$ *Lian*-DP$_i$ Subject ***dou***-V… [$_{\text{CP}}$ Subject V e_i]

In addition, the scope marking of *dou* is evidenced in its interaction with negation. When *dou* has scope over negation, the sentence denotes total negation (∀¬), as in (29a). On the contrary, when the negation has scope over *dou*, (29b) denotes partial negation (¬∀).

(29) a. *Zhangsan zhexieshu* ***dou meiyou*** *duwan.* (dou > Neg; ∀¬)
Zhangsan these.book DOU not.have read.finish
'Zhangsan hasn't finished reading all the books.'
b. *Zhangsan zhexieshu* ***meiyou dou*** *duwan.* (Neg > dou; ¬∀)
Zhangsan these.book not.have DOU read.finish
'Not all of books Zhangsan has finished reading.'

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operator, is adjoined to *v*P. In addition, sentence-initial *lian*-XP may be derived from further movement to the left peripheral position (Shyu 1995; Contrastive Topic in Shyu 2014; Badan & Del Gobbo 2015). Without further discussing these issues, I refer readers to the references for further details.

[17] According to Shyu (1995), *lian*-Mali in (26) is interpreted as in the embedded clause evidenced by the position of *dou*; see her syntactic tests. This observation seems to be aligned with the property of *dou*, which serves as a scope marker (Huang 1982; 1983). *Dou* in (ia) inside the relative clause quantifies over the embedded *every professor*, but *dou* in (ib) quantifies over the whole complex DP.

(i) a. [$_{\text{DP}}$[$_{\text{CP}}$ mei-ge-jiaoshou *(dou) tuijian e$_i$] de shu$_i$] zhide du
every-CL-professor all recommend COMP book worth read
'Books which every professor recommends are worth reading.' (narrow scope)
b. [$_{\text{DP}}$[$_{\text{CP}}$ mei-ge-jiaoshou tuijian e$_i$] de shu$_i$] *(dou) zhide du
every-CL-professor recommend COMP book all worth read
'For every professor x, there are books y which x recommends, such that y are worth reading.'

Consequently, when *lian*-minimizer (*yi.*CL-N (noun) 'one N', or *yidian*-N 'a bit-N') occurs with *dou*, in order to derive the total-negation (all > not, negative polarity) reading, *dou* has to scope over/precede the negation, as shown in (30).

(30) a. *Ta (lian) yiju hua dou mei-you/*meiyou dou shuo.*
he LIAN one.CL word DOU not.have/not.have DOU say
'He didn't say even a word.'
b. *Ta (lian) yiben shu dou mei-you/*meiyou dou du.*
he LIAN one.CL book DOU not.have/not.have DOU read
'He didn't read even a book.'

The intended total-negation reading in *lian … dou* sentences as in (30) is derived by *lian*-DP and *dou* syntactically scoping over the negation, as well as *lian*-plural DPs, as shown in (31).

(31) *Ta (lian) zhexie shu dou mei du.*
he LIAN these book DOU not.have read
'Even these books, he didn't read (them).'

This syntactic scope of *dou* over negation in deriving total-negation follows the syntactic isomorphism discussed in Huang (1982; 1983) in the sense that the syntactic scope mimics the semantic interpretation of the sentence. The discussion here thus illustrates that *dou* syntactically marks the focus scope.

4.2 *Lian … dou* in downward entailing context

Turning to the ambiguous sentences of (5), Shyu (1995: 227–228) has reported their Chinese counterparts. In sentence (32a), *lian*-DP and *dou* stay in the embedded clause. Even when the *lian*-DP is preposed to the sentence-initial position as in (32b), *dou* remains in the embedded clause, as schematized in (28a). *Lian*-DP is narrowly interpreted, e.g. the reconstruction effects at LF discussed in Shyu (1995). The implicatures are stated in (33), parallel with the narrow scope reading as in Karttunen & Peters (1979), and Rooth's narrow scope regular even$_p$ reading, in which *lian*-DP expresses its canonical implicature, i.e. *Hong-Lou-Meng* being the least likely thing that Zhangsan understands.

(32) a. *Wo hen nan xiangxin [Zhangsan* ***lian*** *[Hong-Lou-Meng]*
I very hard believe Zhangsan LIAN Red-Chamber-Dream
dou *du-de-dong].*
DOU read-able-understand
'It's hard for me to believe that Zhangsan understands even *Dream of the Red Chamber.*'

b. ***Lian*** *[Hong-Lou-Meng]* *wo hen nan xiangxin [Zhangsan*
LIAN Red-Chamber-Dream I very hard believe Zhangsan
dou *du-de-dong*].
DOU read-able-understand

(33) a. There is something other than *Hong-Lou-Meng* that Zhangsan understands.
b. *Hong-Lou-Meng* is the least likely thing that Zhangsan understands.

In addition, as discussed in (28b) and Shyu (1995), there is another type of S(entence)-initial *lian*-DP that co-occurs with *dou* in the matrix clause. In sentence (34), *lian Er-Mama* is interpreted as having scope over the downward entailing (negative) predicate. This is Karttunen & Peters (1979)'s wide scope and Rooth's negative polarity reading, in which the degree of the likelihood scale is reversed, turning the *lian*-DP to the most likely thing that I think Zhangsan would understand, as illustrated by the existential implicature in (34a) and scalar implicature in (34b).

(34) ***Lian*** *[Er-Mama]* *Wo* ***dou*** *hen nan xiangxin*
LIAN Goose Mother I DOU hardly believe
[Zhangsan du-de-dong].
Zhangsan read-able-understand
a. There is something other than *Mother Goose* that it is hard for me to believe that Zhangsan understands.
b. *Mother Goose* is the least likely thing that it is hard for me to believe that Zhangsan understands. (i.e. *Mother Goose* is easy for Zhangsan to understand.)

The above discussion aims to demonstrate that the ambiguous scope readings mentioned by Karttunen & Peters (1979) are syntactically attested in Chinese *lian … dou* sentences, particularly by the position of *dou*. Consequently, the scope of *lian*-DP is determined by the syntactic position of *dou* with which it is in relation.

Before leaving this section and questioning the lexical theory, let us mention the so-called negative polarity item (NPI) of the *lian*-DP denoting minimal amounts (Hole 2004: § 4.3.3). In (35) even the smallest amount is negated; hence no larger quantities are involved.

(35) a. *Zhangsan (lian) yiju hua dou shuo-bu-chu-lai.*
Zhangsan LIAN one.CL word DOU not.be.able.to.speak
'Zhangsan couldn't even say A WORD.'
b. *Zhangsan (lian) yidian jiu dou mei he.*
Zhangsan LIAN one.CL wine DOU not drink
'Zhangsan hasn't (even) had A DROP of wine.'
'Zhangsan hasn't had ANY wine AT ALL.' (Paris 1994; Hole 2004: 198)

If *lian*-DP denoting minimal amounts were a lexical NPI on a par with *renhe* 'any' (e.g. assumed in Hole 2004), we would have predicted that they have parallel NPI licensing conditions (e.g. Ladusaw 1996), contrary to fact. Shyu (2016) has argued that such *lian*-DPS with minimal amounts are not lexical NPI's in contrast with the lexical NPI *renhe*-N in Chinese. Unlike *renhe* 'any', which has to be in the scope of negation as in (36) (Wang & Hsieh 1996; Kuo 2003~~,~~ et al.), *lian*-DP cannot stay in the scope of negation, but has to be over the negation, as mentioned above in (30).[18]

(36) *Zhangsan mei kan renhe shu.*
Zhangsan not.have read RENHE book
'Zhangsan didn't read any book.'

(37) **Zhangsan mei kan lian yiben shu.*
Zhangsan not.have read LIAN one.CL book
'Zhangsan didn't read even a book.'

Shyu (2016) further notes a clause-mate restriction between *dou* and negation in the *lian* … *dou* sentences. Unlike the negation in the matrix clause that can license the embedded NPI-*renhe* as in (38) (Wang & Hsieh 1996; Kuo 2003, etc.), the matrix negation in (39) cannot be construed with the embedded *lian* … *dou* to express the intended total negation; rather, *dou* and *bu* have to be in the same clause as in (40).

(38) *Zhangsan *(bu) xiwang [renhe ren lai zhao ta].*
Zhangsan not hope any people come look.for he
'Zhangsan *(doesn't) hope(s) anyone will come to look for him.'
(Kuo 2003: 224)

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[18] Whether the regular plural ~~DPs~~ scopes over or under negation depends on the scope of *dou* in relation with negation, as shown in (i).

(i) a. *Zhangsan zhexieshu* ***dou mei you*** *duwan.* (dou > Neg; ∀¬)
Zhangsan these.book DOU not.have read.finish
'Zhangsan hasn't finished reading all the books.'

b. *Zhangsan zhexieshu* ***meiyou dou*** *duwan.* (Neg > dou; ¬∀)
Zhangsan these.book not.have DOU read.finish
'Not all of books, Zhangsan has finished reading.'

By contrast, *dou* has to scope over negation in *lian* … *dou* sentences, as in (ii).

(ii) **Zhangsan lian yiben/zhexie shu* ***mei dou*** *kan.*
Zhangsan LIAN one.CL/these book not.have DOU read
'Zhangsan didn't read even a book/these books.'

(39) **Zhangsan* ***bu*** *xiwang haizi (lian) yiju hua* ***dou*** *yao shuo.*[19]
Zhangsan not hope kid LIAN one.CL word DOU want say
'*Intended: Zhangsan doesn't hope the kids would say even a word.'
'Zhangsan doesn't hope that the kids want to say even one word.'

(40) *Zhangsan xiwang haizi (lian) yiju hua* ***dou bu*** *yao shuo.*
Zhangsan hope kid LIAN one.CL word DOU not want say
'Zhangsan doesn't hope the kids would say even a word.'

The point made here that *lian*-DPs denoting minimal amounts are not lexical NPI's lends further support to the syntactic scope of *lian … dou* without recourse to lexical theory.

This point is further backed up by (41), in which the embedded *lian Er-Mama* 'Mother Goose' maintains the regular *lian* implicature: the least likely thing for Zhangsan to understand. A possible context of (41) could be that Zhangsan is illiterate and his managing to understand *Mother Goose* is unexpected or surprising. If the NPI *even*$_n$ were to be the only possibility here (i.e. *Mother Goose* as an easy book), the above rendition could not have been derived, contrary to fact.

(41) *Wo hen nan xiangxin* [*Zhangsan* ***lian*** [*Er-Mama*]
I very hard believe Zhangsan LIAN Mother Goose
dou *du-de-dong*].
DOU read-able-understand
'It's hard for me to believe that Zhangsan understands even *Mother Goose.*'

The above examples clearly show that the scope of *lian … dou* is syntactically determined, evidenced by the syntactic position of *dou*. The immediate question arises as to how Rooth's narrow scope NPI-*even* is rendered in Chinese counterparts.

4.3 *Even*-DP in non-finite complement clause

Rooth's main argument comes from cases when *even* occurs in non-finite complement clauses. As discussed in § 2, given the context of (11), he argues that his proposed *even*$_n$ (12′) can trigger the appropriate implicatures; namely, the inversed degree of the likelihood of the focused DP (*the most likely* reading) comes from the negative polarity reading, and the implicatures do not include the matrix clause, as in (13) repeated below.

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[19] The S-initial *lian yijuhua* counterpart of (39) is equally impossible as shown in (i).

(i) **Lian yiju hua Zhangsan* ***bu*** *xiwang [haizi* ***dou*** *yao shuo].*
LIAN one.CL word Zhangsan not hope kid DOU want say
'*Intended: Zhangsan doesn't hope the kids would say even a word.'

(12′) The censorship committee kept John from reading **even**$_n$ Syntactic Structure.

(13) a. There is something other than Syntactic Structures that John did not read.
b. Syntactic Structures is the most likely thing for John to read.

As discussed above, the implicatures in (13) have been reconsidered by Wilkinson (1996) as being attributed to the additional matrix subject focus effect as in (15); thus in her revision as in (16) the subject focus is lambda abstracted and leaves a variable bound by the focus operator in the implicature, resulting in the felicitous implicatures without recourse to the lexical ambiguity of *even*$_n$.

(15) [The censorship committee]$_F$ kept John from reading [[even Syntactic Structure]]$_F$.

(16) a. There is something other than Syntactic Structures that John was kept from reading (by someone).
b. Syntactic Structures is the least likely thing for someone (or something) to keep John from reading.

The scope theory maintains that the ambiguities of EVEN in both finite and non-finite complement clauses subcategorized by either canonical or downward entailing matrix predicates can be obtained by allowing *even* to have either wide or narrow scope at LF without recourse to polysemous *even*'s.

This view can be further syntactically attested in Chinese *lian … dou*. The wide scope interpretation is obtained when *dou* occurs in the matrix clause, as illustrated in (42), which is felicitous in Rooth's context of (11). Note that the subject in (42) is the agent *Zhangsan* who is kept from reading the book without specifying the *censorship committee* as the agent that keeps him from reading it. This interpretation is parallel with Wilkinson (1996)~~’s~~ implicatures in (16), which downplay the additional matrix subject focus effect in Rooth's original sentence (13).[20]

(42) *Lian Jufa Jiegou, Zhangsan* ***dou*** *bu.neng/bei.jingzhi du.*
LIAN SS Zhangsan DOU not.able/BE.prohibit read
'Zhangsan is forbidden to read even *Syntactic Structures*.'

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[20] By contrast, when the matrix subject *the censorship committee* is specified as in (i), the implicatures will include the agent that keeps Zhangsan from reading the book, on a par with those in (14). Though this is not meant in Rooth's original (13), it shows that the reading is logically possible and its felicity may be determined by context.

(i) *Lian Jufa Jiegou, shencha weiyuan* ***dou*** *jinzhi Zhangsan du.*
LIAN SS censorship committee DOU forbid Zhangsan read
'The censorship committee even forbade John from reading *Syntactic Structures*.'

Rooth does not present the narrow scope *even*$_p$ reading in this case, and Wilkinson (1996) notes that the narrow scope reading is not likely to render here. However, when we check *lian … dou* in non-finite embedded clause, we might come up an example like (43). While native speakers tend to frown upon hearing it uttered out of the blue, some might accept it but with the canonical embedded implicature: *Jufa Jiegou* '*Syntactic Structures*' being presupposed to be the least likely thing for Zhangsan to read, instead of Rooth's NPI-*even* reading.

(43) ?*Shencha weiyuan buzhun/jinzhi Zhangsan lian Jufa Jiegou*
censorship committee not.allow/forbid Zhangsan LIAN SS
dou *du.*
DOU read
'The review committee doesn't allow Zhangsan read even *Syntactic Structures*.'

While (43) is grammatical, it is unnatural in normal situations. As mentioned in the previous section, when *lian*-DP denoting minimum amounts with a negative predicate, the intended negative polarity (total negation) reading is constrained by the clause-mate relation between *dou* and the negation, sentence (40) repeated below. When the negation and *dou* do not appear in the same clause as in (39), the intended total negation reading is not guaranteed.

(40) *Zhangsan xiwang haizi (lian) yiju hua* ***dou bu*** *yao shuo.*
Zhangsan hope kid LIAN one.CL word DOU not want say
'Zhangsan doesn't hope the kids would say even a word.'

(39) **Zhangsan* ***bu*** *xiwang haizi (lian) yiju hua* ***dou*** *yao shuo.*
Zhangsan not hope kid LIAN one.CL word DOU want say
'*Intended: Zhangsan doesn't hope the kids would say even a word.'
'Zhangsan doesn't hope that the kids want to say even one word.'

Compared with (43), when we change *lian Syntactic Structures* to minimizer *lian yiben shu* 'one book' as in (44), the intended total negation becomes very impossible, as the embedded *dou* is not in the same clause with the negation, the same problem in (39).

(44) ??*Zhangsan buzhun/jinzhi Lisi lian yiben shu* ***dou*** *du.*
Zhangsan not.allow/forbid Lisi LIAN one.CL book DOU read
'Intended: ??Zhangsan doesn't allow Lisi to read even a book.'
'Rendered: Lisi's reading a book (the least likely thing), Zhangsan does not allow it.'

Hence, the unnaturalness of (43) may be due to the fact that the matrix downward entailing predicate tends to be construed with the embedded *lian … dou*; however, it is not syntactically available. Consequently, because of the occurrence of *dou* in the embedded clause, the canonical scalar implicature is forced. The above discussion amounts to saying that both in finite and non-finite complement clause, *dou* marks the focus scope that the asserted *lian*-phrase makes reference to.

Table 1 below summarizes the sentence types (*even*-DPs) and their corresponding scope interpretations discussed above.

Table 1. EVEN in complement clauses of downward entailing (DE) matrix predicates

***even*-DP**	**Narrow scope (n.s.)**	**Wide scope (w.s.)**
Finite complement clause	Karttunen & Peters' (6) Rooth's *even*$_p$ (9)	Karttunen & Peters' (7) Rooth's *even*$_n$ in (10)
lian … dou	(32a) $[_{CP}$ S DE* $[_{CP}$ S *lian*-DP$_i$ *dou* V e_i] (32b) $[_{CP}$ *Lian*-DP$_i$ S DE $[_{CP}$ S *dou* V e_i]	(34) $[_{CP}$ *Lian*-DP$_i$ S *dou* DE* $[_{CP}$ SV e_i]
Non-finite complement clause in the context of (11)	Rooth's *even*$_p$ $(^{??})$ Wilkinson $(^{??})$	Rooth's *even*$_n$ in (13) $(14)^{??}$ → Wilkinson's (16) √
lian … dou	(43) $[_{CP}$ *Lian*-DP$_i$ S DE* [S *dou* V e_i]	(42) $[_{CP}$ *Lian*-DP$_i$ S *dou* DE* V [V e_i]

* Downward entailing context

5. A discussion of existential presupposition

5.1 *Even*-VP fixed scope?

Rooth (1985) further distinguishes the scope of *even*-DP from that of *even*-VP by adopting the scope difference between *only*-DP and *only*-VP discussed in Taglicht (1984), e.g. the ambiguous free *only*-DP scope vs. fixed *only*-VP scope in (45a) and (45b), respectively.

(45) a. They were advised to learn *only* [Spanish]$_F$.
    i. They were advised not to learn any language other than Spanish. (ns)
    ii. There was no language other than Spanish that they were advised to learn. (w.s.)
  b. They were advised to *only* learn [Spanish]$_F$.
    i. OK.
    ii. *

Consequently, Rooth (1985) claims that *even* preceding VP is scopally fixed. Thus, unlike the scope ambiguity in *even*-DP as that in (5), sentence (46) is unambiguous with only the embedded interpretation (narrow scope): *Syntactic Structures is the least likely thing for Bill to understand.*

(5) It is hard for me to believe that Bill understands [even Syntactic Structures].

(46) It is hard for me to believe that Bill *even* understands [Syntactic Structures]$_F$.

However, Wilkinson provides evidence to show that the *even*-VP fixed scope is not general. Take (47) for example; she argues that the narrow scope scalar implicature, as repeated in (48b), is not pragmatically sensible in this context.

(47) I am sorry I even [$_F$ opened] the book. (Wilkinson 1996: 199)

(48) Implicatures with narrow scope ("normal") *even*$_p$:
  a. There is something other than opening it that I did with that book.
  b. Opening it is the least likely thing for me to do with that book. (Wilkinson 1996: 199)

She further states that the negative polarity lexical *even*$_n$ does not predict the right implicatures either, as shown in (49).

(49) Implicatures with negative polarity *even*$_n$:
  a. There is something other than opening it that I did **not** do with that book.
  b. Opening it is the least likely thing for me to **not** to do with that book. (Wilkinson 1996: 200)

On the contrary, she concludes that the wide scope interpretation can derive the felicitous interpretation as repeated below.

(50) Wide scope interpretation:
  a. There is something other than opening it that I am sorry I did with that book.
  b. Opening it is the least likely thing for me to be sorry that I did with that book. (Wilkinson 1996: 200)

However, questions remain with regards to the status of the existential presupposition. Rullmann (1997) points out a felicitous situation of (47) in which the only thing I did with the book was to open it. This is thus not predicted by the existential implicature in (50). One may wonder if existential presupposition can be cancelled in *even* sentences. This issue is raised in von Stechow's (1991) example repeated in (51), which cannot mean that Bill danced with others in the existential implicature due to *only*.

(51) Bill even danced only with [$_F$ Sue]. (Krifka 1991; von Stechow 1991)

Consequently, von Stechow (1991) suggested that the existential presupposition either is not part of the meaning of *even* or can get cancelled. However, Rullmann (1997) hesitates to take this strong view, as the cancellation of the existential presupposition is not possible in his examples shown below.

(52) a. #We even invited [$_F$ Bill], although we didn't invite anyone else.
  b. #We didn't even invited [$_F$ Bill], but we invited everyone else. (Rullmann 1997: #50)

The previous debates about the scope of EVEN largely are concerned about what alternative propositions are implicated in the existential presupposition. In the following I shall show how Chinese *lian … dou* and *shenzhi* help clarify the issues at stake. *Lian … dou* syntactically encodes the implicatures of a presupposition quantification domain, i.e. a union set of propositions containing the focus itself and its alternatives. By contrast, *shenzhi* relaxes this requirement, but is felicitously interpreted when a pragmatic scalar informativeness relation can be inferred or accommodated. Hence English (51) is only possible with *shenzhi* as in (53), but impossible with a *lian … dou* sentence as in (54), in the former of which *only dancing with Sue* is considered as very informative and unexpected in relation to other contextually relevant propositions, such as Bill's regular behaviors.

(53) *Bill* ***shenzhi*** *zhi he Sue tiaowu.* ~(51)
Bill SHENZHI only with Sue dance
'Bill even danced only with Sue.'

(54) **Bill* ***lian*** *he Sue* ***dou*** *zhi tiaowu.*
Bill LIAN with Sue DOU only dance

In the section below, I discuss further asymmetries between *lian … dou* and *shenzhi*. Eventually *lian … dou* supports the scope theory, and adverb *shenzhi* is on a par with *even* in allowing pragmatic scalar inference.

5.2 *Lian … dou vs. shenzhi*

In this section, I further demonstrate that *lian … dou* and *shenzhi* may differ in existential presuppositions. As mentioned in § 3, the utterance of *lian … dou* requires a quantification domain (a union set) in the presupposition that consists of the focused phrase and the contextually relevant alternatives that are with the same syntactic category as that of the *lian*-focused constituent. In addition, *dou* in *lian … dou* universally quantifies over the elements in this union set (the quantification domain). It follows that in order for *lian … dou* sentences to be felicitous, a quantification domain should be contextually satisfied or accommodated between interlocutors. For example, in sentence (55), the quantification domain consists of the focused object *Mary*, and a set of alternatives (other people that Zhangsan has invited); and the scalar implicature says that Mary is the least likely person that Zhangsan would invite.

(55) *Zhangsan lian Mali* ***dou*** *yaoqing le.*
Zhangsan LIAN Mary DOU invite PART
'Zhangsan invited even Mary.'

(56) *Zhangsan shenzhi yaoqing le Mali.*
Zhangsan SHENZHI invite ASP Mary
'Zhangsan even invited Mary.'

While the existential presupposition in (56) with *shenzhi* is perfectly parallel with that in (55) with *lian … dou* as mentioned above, the requirement of a quantification domain in (56) with *shenzhi* is relaxed; e.g. Zhangsan's inviting Mary is just simply very surprising from speaker's perspective, or based on speaker's previous understanding about Zhangsan. For example, he recently has become very cranky, getting drunk, day-dreaming, etc., and inviting Mary, a behavior that he normally would never do. Thus, the utterance of (56) does not implicate that he also invited others as implicated in (55). This contrast indicates that it is not that *shenzhi* lacks existential presuppositions. Rather, it is that the presuppositions conveyed in *shenzhi* context can be pragmatically inferred.

On the one hand, the observation of *shenzhi* seems to side with Rullmann's (1997: 59) rejection to discard the existential presupposition in *even* sentences, in the sense that he maintains the scalar inference as one of pragmatic entailments (Fauconnier 1975a, b; Kay 1990); "we may not even need a special condition on the use of *even* to derive the existential presupposition, because the very nature of the scalar presupposition the asserted proposition will always pragmatically entail at least one alternative proposition". On the other hand, we do see that Chinese *lian … dou* requires conventional existential presupposition whose scope is determined by the position of *dou,* and the syntactic category of the members in the alternative set is on a par with that of the *lian*-focused phrases. The interpretation of *lian … dou* sentence is thus predicted by the scope theory.

In the following, I shall present further cases that are compatible with *shenzhi* but not with *lian … dou* to illustrate their differences in existential presuppositions. Sentence (57a) may just express that Lisi's leaving the post office is surprising in speaker's presupposition, or very "informative" in the sense of Kay (1990) in some pragmatically appropriate contexts, rather than contrasting the leaving event with other alternative activities. With this reading, it is impossible to be construed with *lian … dou* as shown in (58a). Likewise, in a situation where Lisi had been late for school but he still walked slowly, the use of *shenzhi* in (57b) expresses speaker's surprise or reprimand. The speaker presupposes that under normal situations when people are late, *walking slowly* is highly undesirable. Thus s/he does not presuppose that *for other ways of walking that how Lisi moves*, *Lisi's walking slowly* is the least likely. This explains why *lian … dou* (58b) cannot be possible here.

(57) a. *Lisi shenzhi likai le youju.*
Lisi SHENZHI leave ASP post office
'Lisi even left the post office.'
b. *(Yijing chidao le.) Lisi shenzhi hai manmande zou.*
Already late PART Lisi even still very slowly walk
'(We're/He's already late.) Lisi even still walks slowly.'

(58) a. **Lisi lian likai dou youju.*
Lisi LIAN leave DOU post office
b. **Lisi lian manmande dou zuo le.*
Lisi LIAN slowly DOU walk ASP

The unavailability of specifying a presupposition domain provides a natural account for the ungrammatical *lian … dou* sentences in (58), in response to Paris' (1979: 56) observation: "[l]ian cannot precede VPs [(59a)], nor manner or reason adverbials (60a–61a)". Nevertheless, *shenzhi* is compatible with them, as indicated by the grammatical (b) sentences.

(59) a. **Bide lian qu-le youju.*
Peter LIAN go-ASP post office
b. *Bide shenzhi qu-le youju.*
Peter SHENZHI go-ASP post office
'Peter even went to the post office.'

(60) a. **Lisi lian hen xiaoxin dou fan-le sanci cuowu.*
Lisi LIAN very careful DOU make.ASP 3.CL mistake
b. *Lisi shenzhi hen xiaoxin hai fan-le sanci cuowu.*
Lisi SHENZHI very careful still make.ASP 3.CL mistake
'Even Lisi was careful, he still made three mistakes.'

(61) a. **Ta lian zuo feiji ye lai kan ni.*
he LIAN take airplane also come see you
b. *Ta shenzhi zuo feiji lai kan ni.*
he SHENZHI take airplane come see you
'He even took airplane to see you.'

When *shenzhi* functions as a conjunctor appearing at the last one of parallel conjuncts, sometimes it may not be easily interchangeable with *lian … dou*. For example, in (62), *tuixiu zhidu* 'retirement system', added to the list of considerations of planning a sound industry, is treated as a relatively salient item to be considered in the planning.

(62) *Zheyang tuanti, yihou ke chao guihua fuli-zhi, jiangjin-zhi,*
this.kind group later can face plan welfare system award system
shenzhi/*lian *tuixiujin zhidu deng, jianli yige jianquande*
SHENZHI/LIAN retirement system etc. establish one.CL sound
hangye fangxiang qu nuli.¶
industry direction go work.hard
'This committee can work hard toward the direction of planning the welfare system, award system, even the retirement pension system to establish a sound and reasonable industry.'

The existential presupposition difference is further illustrated by the contrast between (19), repeated below, and (63). The use of *shenzhi* in (19) expresses a sentence focus; the speaker expresses his surprise about others' comments on Zhangsan's shape as being fat. It is not necessarily presupposed that there are some people other than the subject *youde ren* 'some man' that says that Zhangsan becomes fat, or some people say things other than that Zhangsan becomes fat, i.e. his becoming rich, etc. As these two interpretations are not felicitous in this context, their respective *lian … dou* counterparts fail to deliver the intended readings of (19), as illustrated by the *lian*-subject focus in (63a), and the *lian*-VP focus in (63b).

(19) *(Zhangsan pan duo le.)* ***Shenzhi*** *youde ren (dou) shuo ta*
Zhangsan fat more PART SHENZHI some man DOU say he
bian pang le.
become fat PART
'(Zhangsan has gained weight.) It's even the case that some said he became fat.'

(63) a. *(Zhangsan pan duo le.)* ***#Lian*** *youde ren dou shuo ta*
Zhangsan fat more PART LIAN some man DOU say he
bian pang le.
become fat PART
'(Zhangsan has gained weight.) Even some said he became fat.'
b. #*… Youde ren* ***lian*** *ta bian pang le* ***dou*** *shuo-guo.*
some man LIAN he become fat PART DOU say-EXP
'…Some even said he became fat.'

Sentence (63a) renders the subject *youde ren* 'some man' as the least likely people in the alternative set that says that Zhangsan becomes fat, implicating that there are other people that also say so and *youde ren* being the least likely person to say so. Sentence (63b) intends a complement focus interpretation, *some man says things other than the statement that Zhangsan becomes fat*, which is not intended in (19) either.

The *before*-clause (Berckmans 1993) is another case that has been used for the debate of the (non-) existence of existential presupposition.[21] It has been shown that *even* in *before* clause does not express clear implication of a quantification domain (Bennett 1982; Kay 1990). Francescotti (1995: 159) even states that it is unnatural that in (64) *even* quantifies over a set of "all of the personal-relation-establishing events that you would reasonably expect to be preceded by Evans' kissing Mary were preceded, plus his learning her name was preceded".

(64) Evans kissed Mary even before he knew her name.

The parallel situation with *shenzhi* has been discussed in Shyu (2004), who observes that *shenzhi* in (65a) does not necessarily trigger a set of alternative propositions that Evans has done. It is still felicitous because in regular situations kissing someone before knowing one's name is considered to be unlikely or unexpected. Due to the lack of explicit quantification domain, (65a) is hard to find its *lian … dou* equivalent, as indicated in (65b).

(65) a.

Evans	***shenzhi***	*zai*	*zhi-dao*	*Mary de*	*mingzi*	*yiqian*	*qin-le*	*ta.*
Evans	SHENZHI	at	know	Mary's	name	before	kiss-ASP	her

b.

#Evans	***lian***	*zai*	*zhi-dao*	*Mary de*	*mingzi*	*yiqian*	***dou***	*qin-le*	*ta.*
Evans	LIAN	at	know	Mary's	name	before	DOU	kiss-ASP	her

'Evans kissed her even before he knew Mary's name.'

(Shyu 2004: #41–43)

We have seen that while both *shenzhi* and *lian … dou* express unexpectedness, there exhibit differences in the existential presuppositions and syntactic behaviors. It has also been demonstrated that *shenzhi* is compatible with *lian … dou* when the alternatives in the existential presupposition can be conventionally rendered and syntactically specified. *Shenzhi,* which serves the scalar inference expressing informativeness and surprise, allows more flexibility in the existential presupposition that can be pragmatically and contextually inferred.

5.2.1 *Quantifier scope*

In this section, I shall compare the quantifier scope in Japanese EVEN (QP-*mo* 'also, even') in negative sentences discussed in Nakanishi (2012) and their Chinese counterparts. It will be demonstrated that Chinese *lian … dou* maintains the canonical

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[21] Berckmans (1993: 609), however, argues for the existential quantification of *even*, as repeated in (i).

Evans kissed Mary at some surprisingly early time, namely the time before he knew her name.

scope interpretation (total-negation, negative polarity reading), whereas *shenzhi* allows ambiguity.

In English (66), 'Fred has three children' is the least likely among the alternatives that 'Fred has n children' evoked by the scalar presupposition of *even*, thus implicating that three is a "large" quantity here. Likewise, in Japanese (67) 'Al read five books' is the least likely thing among the alternatives that 'Al read n books' (namely the "large" quantity reading), contributed by the scalar presupposition of -*mo* 'even' morpheme attached to the numeral phrase.

(66) Ed has two children and Fred even has [three]$_F$. (Rullmann 1997: 45)

(67) *Al-ga hon-o [go-satu]$_F$-mo yon-da.*
Al-NOM book-ACC [five-CL]-MO read-PAST
'Al even read five books.'

Ambiguity arises when the numeral-*mo* phrase occurs in negative sentences as in (68). Nakanishi claims that the scope theory predicts both narrow and wide scope readings, which however is not predicted by the lexical theory.

(68) *Al-ga hon-o [go-satu]$_F$-mo yoma-nak-atta.*
Al-NOM book-ACC [five-CL]-MO read-NEG-PAST
'Lit. Al didn't even read five books.' (Nakanishi 2012: 133)

According to her, the small quantity is obtained as -*mo* scopes over negation at LF, as illustrated in (69). Wide scope of -*mo* combines with the negative proposition C 'that Al didn't read five books', and evokes the "ScalarP(resupposition)" implicating that 'that Al didn't read five books' is the least likely among the alternatives 'that Al didn't read n books', rendering that Al's reading five books is the most likely among the alternatives. Consequently, *five* is implicated as the smallest among the alternatives.

(69) LF: [$_{IP}$ -mo C [$_{IP}$ not [$_{IP}$ Al read [$_{NP}$ [five]$_F$ books]]]] --"small" quantity reading (Nakanishi 2012: 133)

Nakanishi further argues that the other "large" quantity reading of (68) can be predicted by the scope theory rather than lexical theory. The LF of this reading is given in (70), in which *five books* undergoes quantifier raising (QR), and -*mo* must do so too in order to c (constituent)-command its focused phrase. This reading triggers the scalar presupposition that 'there are five books that Al didn't read' is the least likely thing among the alternatives. She thus concludes that -*mo,* which scopes over the negation, cannot be an NPI, thus disfavoring the lexical theory.

(70) LF: [$_{IP}$ -mo C [$_{IP}$ [$_{NP}$ [five]$_F$ books]$_1$ [$_{IP}$ not [$_{IP}$ Al read e$_1$]]]] --"large" quantity reading

Let us first consider Chinese affirmative sentences: (71a) with *shenzhi* and (71b) with *lian … dou* both express that *that Zhangsan reviewed five lessons* is very unlikely among the alternatives of *that Zhangsan reviewed n readings*, rendering the quantity of five being comparatively large.

(71) a. *Zhangsan shenzhi fuxi.le wuke kewen.*
Zhangsan SHENZHI review.ASP five.CL lesson
'Zhangsan reviewed even five lessons.'
b. *Zhangsan [lian wuke kewen] dou fuxi.le.*
Zhangsan LIAN five.CL lesson DOU review.ASP
'Zhangsan reviewed even five lessons.' --"large" quantity reading

When the numeral DP appears in negative sentences as in *lian … dou* (72) and the scalar presupposition of the numeral phrase is reversed. Thus, 'that Zhangsan didn't review five lessons' is the least likely among the alternatives of the form 'that Zhangsan didn't review n lessons', implicating that *five lessons* is the smallest quantity for Zhangsan to review.

(72) a. *Zhangsan [lian wuke kewen] dou mei.you fuxi.*
Zhangsan LIAN five.CL lesson DOU not.have review
b. *[Lian wuke kewen] Zhangsan dou mei.you fuxi.*
LIAN five.CL lesson Zhangsan DOU not.have review
'Zhangsan didn't review even five lessons.' --"small" quantity

While the small quantity scalar implicature is clear in *lian … dou,* the *shenzhi* counterpart is not that straightforward. It seems that *shenzhi* (73) allows ambiguity, implicating *five lessons* to be either a small or large quantity for Zhangsan to review, although the canonical wide scope is more readily obtained.

(73) *Zhangsan shenzhi mei.you fuxi wu.ke kewen.*
Zhangsan SHENZHI not.have review five.CL lesson
'Zhangsan didn't even review five lessons.'

Despite this uncertainty, we still can manoeuver a *shenzhi* case like (74) to accommodate the "large" quantity interpretation. In this bi-clausal (74), *shenzhi* precedes the existential verb *you* 'have' that is followed by the numeral DP. *Shenzhi you wuke kewen* 'even have five lessons' functions as a topic phrase, commented by the main predicate *Zhangsan meiyou fuxi* 'Zhangsan didn't review', as indicated in the translation. Note that *shenzhi* is not construed with the negation in the comment clause.

(74) *Shenzhi you wuke kewen Zhangsan mei.you fuxi.*
SHENZHI exist five.CL lesson Zhangsan not.have review
'There are even five lessons that Zhangsan didn't review (them).'

The contrast between Chinese (72) and (73) maintains the claim that *lian … dou* expresses the canonical EVEN scope, whereas *shenzhi* asserts a contextually informative proposition, of which existential presupposition can be contextually inferred. Moreover, Chinese (74) with the topic-comment structure syntactically mimics the LF raised DP-*mo* in Japanese (70), in the former of which *shenzhi* is not construed with the negation in the same comment clause, whereas -*mo* is not in the scope of negation in Japanese.[22]

5.3 A residual issue on EVEN in non-finite complement clause

In § 4, we have seen that when *dou* occurs in matrix and embedded (both finite and non-finite) clauses, it renders different scope interpretations predicted by the scope theory. We also have seen that *shenzhi* allows more flexible existential presuppositions than those in *lian … dou*. In this section, we further examine *shenzhi* in complement clauses. In (75), the embedded pre-verbal *shenzhi* may be associated with the subject, the object, the verb or the VP foci, in line with the association with focus (Jackendoff 1972; Rooth 1985, 1996). Moreover, it is also possible that Lisi's disliking Mary is just highly unexpected and salient in context. Similarly, when *shenzhi* occurs in the matrix clause as in (76), the focus scope ranges over the whole sentence; see § 5.4 for the focus range of EVEN.

(75) *Zhangsan bu xiangxin* [$_{\text{CP}}$ *Lisi* ***shenzhi*** *hen taoyan Mali*].
Zhangsan not believe Lisi SHENZHI very dislike Mali
'Zhangsan doesn't believe that Lisi even dislikes Mary.'

(76) *Zhangsan* ***shenzhi*** *bu xiangxin* [$_{\text{CP}}$ *Lisi hen taoyan Mali*].
Zhangsan SHENZHI not believe Lisi very dislike Mali
'Zhangsan even doesn't believe that Lisi dislikes Mary.'

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[22] While Nakanishi treats the scope ambiguity in Japanese DP-*mo* occurring at LF, it may be also due to scrambling in the SOV language feeding DP-*mo* structurally higher than the negative predicate. As Hasegawa (1991) and Miyagawa (2010: 137) have noted that DP-*mo* is interpreted outside the scope of negation when occurring with sentential negation.

(i) *John-ga hon-mo kaw-anakat-ta.*
John-NOM book-MO buy-NEG-PAST
'A book is one of things that John did not buy.'

In addition, Sells (2011) also reports that Korean *hana-to* 'one thing-*even*' and *han salam-to* 'one person-*even*' (references cited therein) has claimed that the minimizers, suffixed with EVEN particle – *to*, scope out of the negation as in (ii).

(ii) *Han salam-to o-ci anh-ass-ta.* (Sells 2011: 335)
one person-even come-COMP NEG-PAST-DECL
'Not a single person came.'

I shall leave the comparison aside for future study.

The previously discussed debate of the lexical vs. scope theory mainly comes from *even* sentences in non-finite complement clauses. While *shenzhi* may occur in embedded finite clauses, it is not clear if it generally acceptable in non-finite clauses. As Chinese does not inflectionally mark tense, whether there exists finite vs. non-finite complementation distinction remains a controversy; see Hu et al.'s (2001) arguments against the finite/non-finite distinction that is widely agreed upon in Li (1985; 1990), Huang (1987; 1989), C. Tang (1990); T. Tang (2000), Grano (2013), Zhang (2016) and Ussery et al. (2016). Although it is not the current intention to argue for or against the finite/non-finite distinction, we do see *shenzhi* does not favor appearing in some so-called non-finite clauses, such as *quan* 'persuade', *bi* 'force', *xihuan* 'like', *shefa* 'try', etc. As shown by the contrast between (a) and (b) sentences below, (a) sentences with *shenzhi* in the embedded clauses are at least less acceptable than in the matrix clause, if not ungrammatical.

(77) a. ??*Zhangsan quan/bi ta* ***shenzhi*** *likai.*
Zhangsan persuade/force he SHENZHI leave
'Zhangsan persuaded/forced him to even leave.'
b. *Zhangsan* ***shenzhi*** *quan ta likai.*
Zhangsan SHENZHI persuade he leave
'Zhangsan even persuaded/forced him to leave.'

(78) a. **Zhangsan xihuan/shefa* ***shenzhi*** *wan Baokemeng.*
Zhangsan like/try SHENZHI play Pokemon
'Zhangsan likes/tries even to play Pokemon.'
b. *Zhangsan* ***shenzhi*** *xihuan/shefa wan Baokemeng.*
Zhangsan SHENZHI like/try play Pokemon
'Zhangsan even likes /tries to play Pokemon.'

When the matrix predicate is negated, it seems to be even less possible that *shenzhi* stay in the embedded clause, as illustrated by the unacceptable (79a) and (80a) in contrast with their respective grammatical counterpart in (79b) and (80b). By contrast, the matrix negative predicate does not affect *shenzhi* or *lian … dou* in the embedded finite clauses, such as in (75) and (32).

(79) a. **Zhangsan meiyou quan/bi ta* ***shenzhi*** *(yao) likai.*
Zhangsan not.have persuade/force he SHENZHI will leave
'Zhangsan didn't persuade/force him to even leave.'
b. *Zhangsan* ***shenzhi*** *meiyou quan ta likai.*
Zhangsan SHENZHI not.have persuade he leave
'Zhangsan even didn't persuade/force him to leave.'

(80) a. ?**Laoshi bu-zhun Lisi* ***shenzhi*** *du zheben shu.*
teacher not.allow Lisi SHENZHI read this.CL book
'Teacher doesn't allow Lisi even read this book.'

b. *Laoshi* ***shenzhi*** *bu-zhun Lisi du zheben shu.*
teacher SHENZHI not.allow Lisi read this.CL book
'Teacher even doesn't allow Lisi to read this book.'

It seems that *lian … dou* generally disfavors occurring in the non-finite complement embedded in the negative matrix clause as well.

(81) a. ??*Zhangsan bu-zhun Lisi* ***lian*** *zheben shu dou du.*
Zhangsan not.allow Lisi LIAN this.CL book DOU read
'Zhangsan does not allow Lisi to read even this book.'
b. ****Lian*** *zheben shu Zhangsan bu-zhun Lisi* ***dou*** *du.*
LIAN this.CL book Zhangsan not.allow Lisi DOU read
'Even this book, Zhangsan does not allow Lisi to read (it).'

As discussed in (28b), embedded *lian*-object can appear in the sentence-initial position and *dou* in the matrix clause, repeated below and (82a). Moreover, the *lian*-object cannot stay in medial position immediately preceding the matrix *dou*; see the ungrammaticality of (82b).

(28) b. [$_{CP}$ *Lian*-DP$_i$ Subj ***dou***-V… [$_{CP}$ S V *e*$_i$]
(82) a. [*Lian zheben shu*$_i$] *Zhangsan* ***dou*** *xiangxin* [*Lisi*
LIAN this.CL book Zhangsan DOU believe Lisi
du-de-dong *e*$_i$]. ~(28b)
read-able-understand
'Lit. Even this book, Zhangsan also thinks that Lisi can understand (it).'
b. **Zhangsan* [*lian zheben shu*$_i$] ***dou*** *xiangxin*
Zhangsan LIAN this.CL book DOU believe
[*Lisi du-de-dong* *e*$_i$].
Lisi read-able-understand

On the contrary, the embedded *lian*-object can appear either in the S-initial position (83a) or matrix medial position as in (83b) when *dou* precedes the matrix predicate that subcategorizes for a non-finite complement clause.

(83) a. [*Lian zheben shu*$_i$] *Zhangsan* ***dou*** *bu-zhun/bi Lisi du* *e*$_{i.}$
LIAN this.CL book Zhangsan DOU not.allow/force Lisi read
'Lit. Even this book, Zhangsan didn't allow/force Lisi to read (it).'
b. *Zhangsan* [*lian zheben shu*$_i$] ***dou*** *bu-zhun/bi Lisi du* *e*$_{i.}$
Zhangsan LIAN this.CL book DOU not.allow/force Lisi read

We thus see a contrast between *xiangxin* 'believe' verb and *zhun* 'allow', *bi* 'force' verbs, the latter of which seem to allow the so-called "restructuring" or "clause union" effect in non-finite complementation (Grano 2013, and references cited therein), whereas the former of which does not. Although we do not intend to side with the finite/non-finite distinction in complement clauses, the above data suggest that *shenzhi* and *lian … dou* do not favor occurring in the embedded non-finite clause in contrast with their occurrence in the finite counterparts. Liao (2016) ascribes the phenomenon to the speech act property of *shenzhi*, which is claimed to be projected in the left peripheral Evaluative Phrase and observes main clause phenomena. Due to its speech act evaluative function, it is not likely to occur in the embedded contexts. However, it is not clear if this account can be carried over to explain *shenzhi* in finite complement clauses. I shall leave the issue open for future research.

In short, Chinese *lian … dou* syntactically represents focus scope (via *dou*) and the focus constituent (*lian*-phrase), which evokes relevant alternatives in the implicature. By contrast, the alternatives in the presupposition evoked by *shenzhi* may be flexible and contextually determined. Due to this contrast, in addition to the interpretations that can be both derived in *shenzhi* and *lian … dou* sentences as discussed above, previously discussed interpretations that are not fully predicted by the scope theory are due to the possible pragmatic scalar inference, as evidenced by *shenzhi* examples. This amounts to a conclusion that *shenzhi* may be parallel with English *even* than *lian … dou* is (as suggested by one of the anonymous reviewers), despite that in general *shenzhi* in the non-finite embedded clause is less natural than the English counterparts discussed in the literature, an issue to be explored in the future.

5.4 Focus range of *shenzhi*

A question raised by one of the anonymous reviewers concerns the scope of *shenzhi*, given that the scope of *lian … dou* is specified by the position of *dou*. Before answering this question, let us first consider Jackendoff's (1972: § 6.5) definition for the range of English *even*, as repeated in (84).

(84) (Range of *even*) If *even* is directly dominated by a node X, X and all nodes dominated by X are in the range of *even*. (Jackendoff 1972: 249)

Assuming that *even* in (85) is dominated by S, Jackendoff observes that it is ambiguous as *even* can associate with the focus in its range, including *a new bicycle,* the VP, and the entire S, etc. When the element in the range is focused, *even* must go with it, as indicated in (86). He also notes that when *even* occurs before a DP, no ambiguity surfaces.

(85) John even gave his daughter a new bicycle.

(86) JOHN even gave his daughter a new bicycle.
John even gave his DAUGHTER a new bicycle.
John even gave HIS daughter a new bicycle.
John even gave his daughter a NEW bicycle.
John even gave his daughter a new BICYCLE.
John even GAVE his daughter a new bicycle.

may adopt this view and treat the range of adverb *shenzhi* as its adjoined maximal projection node and elements dominated by this node. Consequently, elements within the clause can be associated with it to express focus. This accounts for its flexible existential presuppositions discussed above. For instance, (17a), repeated below, is intended to express object focus in § 3, on a par with *lian*-object focus. However, (17a) can also express a sentence focus in the sense that the proposition of Zhangsan's having read Syntactic Structures is surprising. In this case, *shenzhi* is stressed.

(17) a. *Zhangsan shenzhi du-le Syntactic Structures.*
Zhangsan SHENZHI read-ASP SS.
'Zhangsan even read *Syntactic Structures*.'

ilarly, sentences (57) are ambiguous in expressing sentence focus, subject, verb, adjunct, VP, or object focus with corresponding respective prosodic prominence depending on the contexts of utterances.

(57) a. *Lisi shenzhi likai le youju.*
Lisi SHENZHI leave Perf post office
'Lisi even left the post office.'
b. *(Yijing chidao le.) Lisi shenzhi hai manmande zou.*
Already late PART Lisi even still very slowly walk
'(We're/He's already late.) Lisi even still walks slowly.'

ort, on account of the range of *shenzhi* and pragmatic scalar inference, we can naturally explain its flexible existential presupposition. By contrast, in *lian … dou* sentences the implicature quantification domain of *dou* is restricted to the propositions containing the elements with the same syntactic category of *lian*-phrase. If our observations are on the right track, we may suggest that the scope of *even*-DP can still be predicted by the scope theory, on a par with that of *lian … dou*. The apparently presupposition relaxed cases of *even* and *shenzhi* may be attributed to the wider range of focus association of the focus adverbs and their pragmatic inferences. In this case, the interpretations of EVEN result from the syntactic structures of elements expressing EVEN, the trigger of conventional implicatures, and the pragmatic scalar inference, the consideration of which are not predicted by the lexical theory of English *even*$_p$ and *even*$_n$.

6. Conclusion

Although the study of EVEN has been widely documented cross-linguistically, less attention has been paid to the (a)symetrical *lian … dou* and the focus adverb *shenzhi* in Chinese (Shyu 2004; Liao 2016), particularly in response to the debate of lexical vs. scope theory. The current study apparently has filled this gap. It has been demonstrated that the *lian … dou* construction syntactically manifests the scope interpretations of EVEN predicted by the scope theory (Karttunen & Peters 1979; Wilkinson 1996), particularly evidenced by the syntactic position of *dou* and the syntactic categories of *lian*-phrases. Moreover, embedded *lian … dou* maintains the canonical implicatures without being affected by the matrix negation. By contrast, the seemingly deviant cases that have been argued by Rooth for his NPI-*even* either are not construed in *lian … dou* sentences or are possibly rendered in *shenzhi* sentences provided by pragmatic accommodation of existential presuppositions in relevant contexts. The results of this study thus shed further light on the general discussion of EVEN in the sense that the scope theory predicts the canonical scope interpretations, as attested in *lian … dou*, whereas the murky *even* cases are ascribed to the scalar inference of the existential implicatures pragmatically determined in context (e.g. Kay 1990), as expressed by certain cases with *shenzhi*. As stated in § 5.4, this is made possible because adverb *shenzhi* has a clause focus range; thus elements in its range are able to be focus associated with it. This flexibility matches with the existential presuppositions that can be contextually inferred. On the one hand, the current *lian … dou* and *shenzhi* constructions help articulate the multifarious interpretations of EVEN. On the other hand, the study suggests that it be unnecessary to have recourse to having polysemy of $even_n$ and $even_p$, because the interfaces of syntax, semantics, and pragmatics can derive the right interpretations, presumably easing the burden of language acquisition.

There are two issues that remain to be further explored. The first one is related to the issue of finite/non-finite complement distinction in Chinese and the unfavorable occurrences of *shenzhi, lian … dou* in the so-called non-finite complement clauses. It is not clear if this is language-specific or pertains to a more general phenomenon; thus more research is needed to examine cross-linguistic data. Consequently, it bears on the issue of whether the non-finite embedded EVEN tends to be construed in the matrix clause (Kay 1990; Liao 2016) and if it is the case why. Secondly, more cross-linguistic comparisons are needed to verify whether languages that utilize lexical distinctions of EVEN (e.g. German, Greek) would manifest distinct EVEN scope interpretations as predicted by the lexical theory. If that is the case, it suggests that EVEN interpretations be rendered by either means cross-linguistically. Eventually, the syntactic manifestation of EVEN scope interpretations (*lian … dou*) and the pragmatic scalar inferences contributed by *shenzhi* address the interfaces of syntax, semantics, and pragmatics (Kay 2006).

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Abbreviations

$[[\alpha]]^0$	ordinary semantic value
$[[\alpha]]^f$	focus semantic value
ACC	accusative
ACD	antecedent-contained deletion
AP	adjective phrase
ASP	aspect
C	context
c-command	constituent-command
CL	classifier
COMP	complementizer
CP	complement phrase
DE	downward entailing
DECL	declarative
DP	determiner phrase
e	empty category
EXP	experiential aspect
$_F$	F marked focus phrase
IP	inflection phrase
LF	logical form
$_n$	negative polarity
N	noun
Neg (NEG)	negation
NOM	nominative
NPI	negative polarity item
n.s.	narrow scope
$_P$	positive (normal) polarity
PART	particle
POSS	possession
PP	preposition phrase
Q	question particle/marker

QP	quantifier phrase
QR	quantifier raising
S	sentence
SM	scalar model
SS	Syntactic Structures
V	verb
VP	verb phrase
W.S.	wide scope
∀¬	total negation
¬∀	partial negation
∃	existing
^	intention operator
∧	contextual variable
ˇ	extention operator

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