A semantic account of quantifier-induced intervention effects in Chinese why-questions

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Abstract This paper revisits intervention effects in Mandarin Chinese *why*-questions. I present a novel empirical generalization, in which it is shown that the ability for quantifiers to induce intervention hinges upon their monotonicity and their ability to be interpreted as topics. I then propose a semantic account of intervention that correlates topicality with the monotone properties of intervening operators. A crucial assumption in this account is that *why*-questions in Chinese are idiosyncratic, in that the Chinese equivalent of *why* directly merges at a high scope position that stays above a propositional argument. Combining the semantic idiosyncrasies of *why*-questions with the theory of topicality, I conclude that a wide range of intervention phenomena can be explained in terms of interpretation failure.

Keywords: Intervention effects; *why*-questions; illocutionary acts; wide-scope indefinites; Mandarin Chinese

1   Introduction

This paper presents a semantic account of the quantifier-induced intervention effects in Chinese *why*-questions.[1] Intervention effects refer to the unacceptability that arises when scope-taking elements c-command an interrogative phrase. (1) schematizes the intervention induced in *in situ wh*-questions when an *in situ wh*-phrase is c-commanded by a quantifier.

(1)   #[$_Q$ [*Quant wh*]]

The central argument in this study is based on a novel empirical generalization of the pattern of intervention in Chinese *why*-questions.[2] Following Soh (2005),

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1 Virtually all the Chinese examples in this paper are Mandarin, except for a few places where data from other Sinitic languages are presented. In the following, I use the term 'Chinese' to refer to Mandarin, and the terms 'Shanghainese', 'Cantonese', etc. to refer to other Sinitic languages where relevant examples show up.

2 In Chinese, non-*why in situ* constituent questions only induce intervention effects in the presence of focus-sensitive expressions such as *only*-NPs and *even*-NPs, demonstrated in (i). Quantifiers do not give rise to intervention.

Yang (2011) observes that when *weishenme* 'why' is c-commanded by a monotone decreasing quantificational DP, oddness ensues. Yang's data are given in (2).[3]

(2)   #{Meiyou ren   /henshao ren}   weishenme   yao   cizhi?
         {no   person /few   person} why   want.to resign
         'Why do {nobody/few people} want to resign?'

The traditional, syntactic explanation of the quantifier-induced intervention posits that questions as in (2) violate a syntactic constraint of locality that prohibits LF movement across scope-taking elements (Beck 1996; Pesetsky 2000). However, I show that (3) is still acceptable, in contrast with (2).

(3)   Suoyoude ren   weishenme dou yao   cizhi?
         all   person why   DOU want.to resign
         'Why does everyone want to resign?'

To maintain the LF movement approach in view of this, it is conceivable to posit a fine grained distinction of quantifier types. This presumably allows non-decreasing quantifiers to establish a link with its trace position via a non-movement mechanism that is not subject to locality (cf. Rizzi 1990).

Yet, such mechanism would be difficult to pin down given that a subset of non-monotone decreasing quantifiers induce mild intervention, giving rise to a three-way distinction of intervention by quantifier type. Furthermore, the mild degradedness associated with certain quantifiers can be significantly ameliorated in embedded

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(i)   a.   #Zhiyou Lisi chi-le   shenme?
                only   Lisi eat-PRF what
                'What has only Lisi eaten?'
         b.   #Lian Lisi ye   chi-le   shenme?
                even Lisi PRT eat-PRF what
                'What has even Lisi eaten?'

At present, I assume that the intervention induced in non-*why* questions is distinct from that in *why*-questions, and these two phenomena are not characterized by a uniform mechanism. In Section 5, I provide a brief overview of past explanations for the non-intervener status of quantifiers in Chinese non-*why* questions. Since focus expressions are the core set of interveners in that environment, it is possible that the alternative-based semantic approach to intervention (the gist being that the focus operator and the Q-operator make use of the same *wh*-alternatives), represented by Beck (2006), can be invoked to account for the intervention in non-*why* questions. In contrast, my current proposal is crucially dependent upon the syntax and semantics of the *why*-adjunct. Therefore, it should not be viewed as an alternative to a Beck-style approach, but rather as a supplement to it.

3 Glossing in this paper follows the Leipzig Glossing Rules (LGR). The list of abbreviations is given as follows:
ACC: accusative; CLF: classifier; COP: copula; DEM: demonstrative; INT: intensifier; IPFV: imperfective; NEG: negative, negation; NOM: nominative; LOC: locative; PASS: passive; PL: plural; POSS: possessive; PRF: perfect; PRS: present; PRT: particle; PST: past; Q: question particle; REL: relativizer; RES: resultative; TOP: topic marker

contexts, and there is a difference among question-embedding verbs with respect to the amelioration effects.

Ko (2005) has argued that the sensitivity to quantifier type follows from the fact that some quantifiers can be topics whereas others must stay in their scope position. Assuming a high initial merge position of *why*, the latter type of quantifiers induces degradedness because their scope position is under the scope of *why*. This paper proposes that this idea can explain the complexity of the intervention pattern in Chinese *why*-questions. I assume with Ko that Chinese *weishenme* must be initially merged at the high scope position of [Spec, CP]. When quantifiers are interpreted as scoping out of [Spec, CP], we obtain coherent interpretations. On the other hand, intervention arises when certain types of quantifiers are unable to be interpreted at such high scope. Hence, this account of intervention effects in *why*-questions does not involve 'real' intervention, in the sense that no blocking mechanism is assumed. Rather, my central claim in this paper is that the unacceptability we are dealing with here is not syntactic ill-formedness, but interpretational failure, i.e., a native speaker cannot assign an interpretation to a *why*-question in certain scopal relations.

Consequently, I choose to put a # sign before unacceptable Chinese *why*-question sentences as well as their English translations to indicate that the examples are odd because the readings they generate are semantically anomalous. This being said, I still consistently use the term 'intervention effects' to refer to the type of phenomena discussed above, in accordance with the well-established tradition, without taking the term in its literal sense.

The rest of this paper is structured as follows. Section 2 provides a full picture of the quantifier-induced intervention effects in Chinese *why*-questions. Section 3 summarizes Ko's (2005) previous syntactic treatment of *why*, which proposes that East Asian *why*s are base-generated at [Spec, CP]. Additional evidence is presented to show that *why* is special. Section 4 develops a semantic account that crucially draws on *why*'s syntactic and semantic idiosyncrasies, in which I provide evidence that the intervention patterns of quantifiers correlate with quantifier topicality. Section 5 presents a critical review of previous syntactic theories of Chinese intervention effects in *why*-questions. Section 6 concludes the paper.

2   A novel empirical generalization

The main aim of this section is to show that the pattern of intervention in Chinese *why*-questions is sensitive to the type of quantifier. As (4) shows, when *weishenme* 'why' is c-commanded by a monotone decreasing quantificational DP, oddness

ensues. Here the sentences with *nobody* and *few people* are modified from Yang (2011). I add my own data on *at most two people*.[4]

(4) #{Meiyou ren   /henshao ren   /zuiduo liang-ge ren}   weishenme
     {no   person /few   person /at.most two-CLF person} why

     yao   cizhi?
     want.to resign
     'Why do {nobody/few people/at most two people} want to resign?'

In contrast, a quantificational DP with a monotone increasing determiner, such as *most* or *every*, does not induce intervention effects (*every*'s pattern is first noticed in Ko 2005).[5]

(5) a. Daduoshu ren   weishenme yao   cizhi?
         most   person why   want.to resign
         'Why do most people want to resign?'

     b. {Suoyoude ren/mei-(yi)-ge   ren}   weishenme dou yao
         {all   person/every-(one)-CLF person} why   DOU want.to

         cizhi?
         resign
         'Why does everyone want to resign?'

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4 Since the Mandarin-speaking community has a large population size and considerable internal linguistic and social diversity, a complex issue concerns the variation in sentence acceptability. The previous literature has (understandably) tended to abstract away from any such variation. While I won't be able to characterize the extent of variation, to the degree possible I have tried to minimize it by focusing on a specific dialect group: The Mandarin variety spoken in Beijing and the adjacent Dongbei provinces. All my consultants come from these two regions. My primary consultants are three female speakers in their twenties. Two male speakers in their thirties are recruited for a subset of the elicited data.

5 The *suoyoude*-NP/*mei*-NP in (5b) is a universal quantifier phrase. The morpheme *dou* has been treated in the literature as an adverb that encodes distributivity (Lin 1998; Feng 2014, in the sense of Link 1983 and Schwarzschild 1996), maximality (Giannakidou & Cheng 2006; Xiang 2008) or alternatively as a scalar item (covert *even* or covert *only*) that ranks alternative propositions (Xiang 2016; Liu 2017). In Chinese, *dou* must be present for universal quantification to be expressed. Furthermore, the absence of intervention in universal sentences is linked to the particular configuration in which *weishenme* precedes *dou*. By contrast, the configuration in which *dou* precedes *why* leads to degradedness (Yang 2011).

I propose that the degradedness is due to an independent syntactic reason: The morpheme *dou* is a VP-adjoined adverb (Cheng 2008) and is not part of the *every*-phrase. In general, the adverb *dou* cannot appear in a pre-*why* position. It independently fails to precede *why*, as it does not belong to the class of adverbs that are able to scope outside *why*. In footnote 19, section 4, I return to the syntactic position of *dou*. Note in passing that even in the absence of a universal nominal phrase, the contrast between [*dou* < *why*] and [*why* < *dou*] still remains (e.g. *dou* may license definite plural sentences. In that case, [*dou* < *why*] elicits degradedness, [*why* < *dou*] does not).

To make things more complex, one class of monotone increasing quantificational DPs induce weak intervention. Members of this class include modified numerals such as *at least three people*, *more than three people*, etc.. Non-monotonic bare numerals, such as *three people*, *a few people* and *several people*, also induce mild degradedness. An example is given in (6). When uttered out of the blue, members of this class often trigger rather low judgments for some speakers, while for other speakers the oddness is less severe than that which is induced in monotone decreasing contexts.

(6)   ?{Zhishao san-ge   ren/   chaoguo san-ge   ren/san-ge
          {at.least three-CLF person/ more.than three-CLF person/three-CLF

        ren/ji-ge   ren}   weishenme yao   cizhi?
        person/a.few-CLF person} why   want.to resign
        'Why do {at least three people/more than three people/three people/a few people} want to resign?'

In an embedded *why*-question, the *every* quantificational phrase and the *most*-phrase still induce no intervention, evidenced by the perfectly acceptable sentences in the following:

(7)   a.   Wo (yijing) zhidao-le daduoshu ren   weishenme yao   cizhi.
             I   (already) know-PRF most   person why   want.to resign
             'I (already) knew why most people wanted to resign.'
        b.   Wo yijing   zhidao-le suoyoude ren   weishenme dou yao
             I   (already) know-PRF all   person why   DOU want.to
             cizhi.
             resign
             'I (already) knew why everyone wanted to resign.'

More noteworthy is the fact that the weak intervention we witnessed in (6) disappears in embedded *why*-questions headed by responsive question-embedding predicates (*know*, *tell*, *be certain*, etc., cf. Ginzburg & Sag 2000; Lahiri 2002), facilitated by a special contrastive topic (CT) intonation contour associated with the numerals.[6] This is demonstrated by the acceptability of (8).[7]

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6 The numerals in example (8) bear an intonation contour pattern LHL that is associated with a CT function (Li & Thompson 1981; Xu & Liu 2007). The rising-fall contour is also accompanied by a pause/intonational break, and additionally allows for a *-ne* suffix that is analyzed as a CT marker (Constant 2014). Thus we have prosodic evidence the numerals in (8) are a contrastive topic. Here I assume with Constant (2014)'s analysis of English CT prosody (what is called the B-accent by Büring 2003, see also Jackendoff 1972) and posit that there is a direct mapping between CT contours and discourse functions.

7 According to Lahiri (2002), we can classify question-embedding predicates into a *know*-class (responsive in Lahiri's term) and a *wonder*-class (rogative in Lahiri's term). *Know*-class predicates

(8)   Xiao li (yijing) zhidao-le {san-ge   ren/zhishao   san-ge
       little Li (already) know-PRF {three-CLF person/at.least three-CLF
       ren/ji-ge   ren}   weishenme cizhi.
       person/a.few-CLF person} why   resign
       'Little Li (already) knew why {at least three/more than three/a few} people
       resigned.'

By comparison, intervention cannot be circumvented in embedded contexts for monotone decreasing quantifiers. As (9) illustrates, the unacceptability in an embedded *why*-question is as strong as it is in a matrix one (despite a CT intonation).

(9)   # Wo (yijing) zhidao-le {meiyou ren/henshao ren/budao   san-ge
       I   (already) know-PRF {no   person/few person/less.than three-CLF
       ren}   weishenme cizhi.
       person} why   resign
       'I (already) knew why {nobody/few people/less than three people} resigned.'

In sum, intervention effects in Chinese *why*-questions are sensitive to quantifier monotonicity. In addition, they are sensitive to whether *why*-questions occur in matrix or embedded contexts. The overall pattern is summarized in (10):

(10)   In matrix and embedded *why*-questions:
               i.Monotone decreasing quantifiers consistently induce intervention effects;
              ii.Monotone increasing quantifiers such as *most*-phrases and *every*-phrases do not induce intervention effects;
             iii.A subset of monotone increasing and non-monotonic quantifiers, such as modified numerals, bare numerals and other number-denoting quantifiers, induce weak intervention in matrix *why*-questions. This intervention is ameliorated when they appear in embedded questions with *know*-class predicates, receiving a contrastive topic intonation.

Apart from quantificational DPs, adverbs of quantification (Lewis 1975; Smith 1981; de Swart 1991; von Fintel 1994) exhibit similar patterns. (11) illustrates the

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include, in addition to *know*, Karttunen (1977)'s verbs of retaining and acquiring knowledge (*find out*, *remember*, *forget*, *be aware*, etc). *Wonder*-class predicates comprise inquisitive verbs such as *wonder* or *ask*. Amelioration does not occur when embedded *why*-questions are headed by *wonder*-class question-embedding predicates:

(i)   ?Wo xiangzhidao san-ge   ren   weishenme cizhi.
       I   wonder   three-CLF person why   resign.
       'I wonder why three people resigned.'

Adding a CT intonation also does not improve the acceptability.

failure for monotone decreasing quantificational adverbs to c-command *weishenme* 'why'.

(11)   #Ni   {congbu/henshao} weishenme juede kun?
            you {never/seldom}   why   feel   be.drowsy
            'Why did you feel drowsy {on no occasions/on few occasions}?'

Furthermore, this ban on c-commanding quantificational adverbs is lifted if the adverbs are monotone increasing or non-monotonic:

(12)   a.   Ni   {dabufen shijian/?zhishao liang-ci}   weishenme juede
                you {most   time/at.least   two-token} why   feel
                kun?
                be.drowsy
                '{For most of the occasions/?for at least two occasions}, why did you feel drowsy?'
        b.   Wo (yijing)   zhidao-le ta {dabufen shijian/zhishao liang-ci}
                I   (already) know-PRF he {most   time/at.least   two-token}
                weishenme bu-gan   zuo zhei-jian shi.
                why   NEG-dare.to do   DEM-CLF affair
                'I (already) knew, {for most of the occasions/for at least two occasions}, why he wouldn't dare to do that.'

3   The syntax and semantics of *weishenme* 'why'

The idea I pursue in this paper is that witnessable quantifiers (defined in terms of non-empty minimal witnesses) are able to circumvent intervention because they are plural indefinites. Plural indefinites have been known to exhibit exceptional wide scope. To go one step further, I propose to explain the exceptional wide scope of plural indefinites as a topic phenomenon (see also Endriss 2009). Precisely, I argue that topics are able to scope outside of a speech act (that is, their scope is outside the scope of the illocutionary operator of a sentence). As such, it follows that topics scope out of the high initial merge position of *weishenme* in a *weishenme*-question. The following sections are devoted to a proper motivation for this proposal. It deserves attention that once arguments for the scope of topics are established, an explanation of the intervention in *weishenme*-questions is readily available. The reasoning runs as follows. Witnessable quantifiers are topics. As quantificational topics, they take scope outside the speech act operator of a *weishenme*-question. By transitivity, they also scope out of *weishenme*, since the latter is at [Spec, CP] and scopes under the question operator. As a result, no intervention arises. Conversely, I assume that non-witnessable quantifiers cannot be construed as topical, and only a GQ interpretation is available for them. Since GQs take scope below [Spec,

CP], the scopal configuration [*quantifier* < *weishenme*] is uninterpretable, hence the intervention effects.

3.1   Syntax of *why*-in-situ: Ko's (2005) high merge approach

Ko (2005) has championed a direct merge approach, whose treatment of intervention effects crucially hinges upon the assumption that reason adverbs (the equivalents of *why*) in East Asian languages are base-generated at [Spec, CP] (in keeping with the earlier base-generation account of *why*-adjuncts in Rizzi 1990).[8] The focus of Ko's paper is on Japanese and Korean intervention effects, but Ko also presents a brief theory of intervention in Chinese *weishenme*-questions. She notices that intervention arises in examples such as (2), repeated below.

(13)   #{Meiyou ren   /henshao ren}   weishenme cizhi?
       {no   person /few   person} why   resign
        'Why did {nobody/few people} resign?'

Given the high merge position of *weishenme*, for quantifiers to c-command *weishenme*, they need to occupy a structural position that is higher than [Spec, CP], by undergoing what Ko calls 'long-distance topicalization' to one such structural position (either an adjunction site to CP, or a dedicated TopicP above CP). Ko (2005:885) formulates this hypothesis in terms of the following constraint:

(14)   Prediction about *weishenme*-questions:
       An XP may precede *weishenme* only when it may undergo A'-topicalization over [Spec, CP].

Crucially, Ko argues that *meiyou ren* 'nobody' and *henshao ren* 'few people' resist topicalization, and thereby the configuration in which they precede *weishenme* is illegitimate. One prediction of her theory is that if *meiyou ren/henshao ren* resides in their scope positions below [Spec, CP], no intervention will arise. Ko shows that this is exactly the case:

(15)   Weishenme {meiyou ren/henshao ren}   cizhi?
       why   {no   person/few   person} resign
        'Why did {nobody/few people} resign?'

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8 The first base-generation account of the *weishenme*-adjunct, which anticipates Ko's account, is to be found in Lin (1992). See also Stepanov & Tsai (2008), which cites Ko's account of *weishenme*'s intervention effects as evidence in motivating a distinction between the merge position of *weishenme* and other *wh*-phrases. Independent evidence that *weishenme* is base-generated will be presented in the next section.

The present paper is in effect a semantic implementation of Ko's high merge proposal.[9] In the following, I show that the previous philosophical and linguistic semantic research on *why*'s idiosyncratic meanings are compatible with Ko's proposal of a high merge position. By presenting evidence that a subset of quantifiers can denote type-e meaning, my theory amounts to a principled explanation of how intervention correlates with quantifier referentiality, and in turn quantifier topicality (when we further assume that referential wide-scope quantifiers are topics). Specifically, I draw upon Tomioka's (2007) tests on quantifiers' topic-marking ability and corroborate Ko's hypothesis that quantificational interveners are non-topicalizable. Finally, I propose that the ability for quantificational topics to c-command base-generated *why* results from topics being interpreted as taking exceptional wide scope: A topic resides in its own speech act domain and scopes out of the speech act projected by the CP domain of its corresponding comment.

3.2 The (idiosyncratic) semantics of *weishenme* 'why'

Observations that the *why*-adjunct behaves in a different way from other *wh*-phrases have been dispersed in the semantic and philosophical literature. The main goal of this section is to draw a broad connection and make an argument for the systematic

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9 The restricted set of quantificational interveners (i.e., only downward quantifiers are interveners) is reminiscent of the environment of negative islands. It thus evokes the possibility that the intervention phenomenon in Chinese *why*-questions is subsumed under negative island sensitivity. The connection between intervention effects and negative islands has not been explored in the Chinese literature, in part due to the general assumption that negative islands are associated with overt movement, whereas intervention effects only arise in *in situ* questions. In addition, *why*-adjuncts have been excluded from discussions of negative islands for being rather 'atypical' (Szabolcsi & Zwarts 1993; Abrusán 2011). Importantly, *why* differs from other *wh*-adjuncts such as *how many* and *how* in that its extraction is blocked in a wider range of environments than other *wh*-phrases, including non-quantificational items that bear no connection to negativity. In Section 3.2, I return to the distinctive behavior of *why*-adjuncts in detail.

On a separate note, the modal obviation effect, in which negative islands are circumvented when negation scopes over an existential modal operator (Kuno & Takami 1997; Fox & Hackl 2006; Abrusán 2011), is absent in Chinese *why*-questions. In (ia), I show that adding the existential modal *beiyunxu* 'be allowed to' circumvents the negative islands in a *how many*-question. In (ib), in contrast, I show that adding the same modal fails to improve a *why*-question.

(i)   a.   Zai zhongguo, meiyou ren   beiyunxu   sheng   duoshaoge haizi?
              LOC China,   no   person be.allowed.to give.birth.to how.many children
              'In China, how many children$_i$ is nobody allowed to give birth to t$_i$?'
    b.   #Zai zhongguo, meiyou ren   weishenme beiyunxu   mianshui?
              LOC China   no   person why   be.allowed.to exempt.taxation
              'In China, why$_i$ is nobody allowed to be exempt from taxation t$_i$?'

For these reasons, this paper assumes that intervention in Chinese *why*-questions and negative islands should be separated.

wide scope property of the *why*-adjunct. In an early account, Lawler (1971) claims that *why* is not associated with any variables in the clause that it attaches to. In (16), it is proposed that *why* does not bind a trace that links to the VP *leave* (see also Rizzi 1990).

(16)   Why did John leave early?

The no-trace property of *why* is seen more clearly in (17). As Lawler (1971) points out, only one reading is available in the following quantificational environment:

(17)   Why did three men leave?
        Reading A: 'Why is it the case that three men left?'
        Reading B: #'What reason$_i$ did three men have t$_i$ for leaving?'

A parallel reading constraint obtains for Chinese *weishenme* 'why' as follows.

(18)   Weishenme san-ge   ren   likai-le?
        why   three-CLF person leave-PRF?
        Reading A: 'Why is it the case that three men left?'
        Reading B: #'What reason$_i$ did three men have t$_i$ for leaving?'

In reading A, an event, *three men left*, is presupposed (facilitated by an accent on *san-ge ren* 'three men'). By wondering why this event occurs, we are committed to a situation in which the total number of people that left has to be three. In reading B, it is also the case that a group of three individuals left. Yet there is no requirement that, in this situation, *altogether* three people left. There could be other individuals who left, but for some reason the speaker is only concerned with a specific group of three people. When it happens that only three people left in the context, the two readings are not distinguishable. Crucially, however, when the context contains more than three individuals that have left, the *why*-question in (18) cannot be uttered, at least according to the speakers I consulted.

Furthermore, it has been observed that *why* often resists association with embedded clauses, and it normally has to be associated with matrix clauses (Cattell 1978; Iatridou & Kroch 1992; Oshima 2007). This is exemplified by the example in (19) (provided by Iatridou & Kroch 1992:fn #5). A parallel example in Chinese is listed in (20).

(19)   Why do you wish that the company would hire her?
        Reading A: 'What is the reason for you wishing that the company would hire her?'
        Reading B: #'What reason$_i$ do you wish that the company would have t$_i$ for hiring her?'

(20)   Weishenme ni   xiwang   gongsi (hui)   guyong ta?
        why   you desire/wish company (would) hire   her?

        Reading A: 'What is the reason for you wishing that the company (would)
        hire her?'

        Reading B: #'What reason$_i$ do you wish that the company (would) have t$_i$
        for hiring her?'

Importantly, this phenomenon cannot be simply analyzed as a general ban on the
association of an embedded scope, since other *wh*-phrases in English allow for an
embedded construal. As Iatridou & Kroch (1992) observes (drawing from Hegarty
1992), although *how* is preferably associated with the matrix clause, association with
the embedded clause is not impossible:[10]

(21)   How$_i$ does he insist [that they stack the boxes t$_i$]?

Echoing Iatridou & Kroch and Hegarty's observations, Chinese *how/by what
means* may either associate with the non-factive opinion main verb *are you sure* or
with the embedded clause in (22a). In contrast, Chinese *why* must modify the matrix
predicate, as (22b) demonstrates. It thus seems that the constraint against appearing
in embedded contexts is specifically about *why*.

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10 Note that the choice of predicate type is relevant for comparing *how* and *why*'s embedded construal
   here. As is observed in the literature, factive matrix predicates (e.g. *regret*) constitute factive islands
   that make it hard for the extraction of all *wh*-adjuncts (Rizzi 1990; Oshima 2007; Abrusán 2011). It
   is thus important that the contrast between (19) and (21) involves a non-factive verb.

   As a side issue, nevertheless, note that both Iatridou & Kroch (1992) and Oshima (2007) have
   drawn attention to a (mild) contrast between *why* and *how* even in factive contexts. As per Iatridou &
   Kroch (1992: fn #5), a difference in embedded construals could be detected in factive contexts as
   follows:

   (i)   a.   Why did you point out that he left?
           b.   How did you point out that he had stacked the boxes?

   In (ia), *why* must be construed with the matrix predicate, but (ib), like (21), is ambiguous (this
   judgment is subtle and not agreed upon by all native speakers). Similarly, Oshima (2007:149) has
   reported that there is a scale of extractability in embedded contexts for Japanese factives: '...The
   extraction of *how* appears to be somewhat easier in Japanese than in English...The extraction of *why*
   is, however, downright unacceptable in Japanese...'

   It thus seems that even in factive contexts *why*'s lack of association with embedded clauses
   sets itself apart from other *wh*-adjuncts, although admittedly this difference is not as robust as in
   non-factive contexts.

(22)   a.   ?{Zenmeyang/tongguo shenme qudao} ni   queding   ta
            {how/through   what   means} you be.certain she
            lianxishang-le shiguan?
            contact-PRF   embassy?
            '{How$_i$/through what means$_i$} are you sure that she contacted the
            embassy t$_i$?'
       b.   Weishenme ni   queding   ta   lianxishang-le shiguan?
            why   you be.certain she contact-PRF   embassy?
            #'Why$_i$ are you sure that she contacted the embassy t$_i$?'

Bromberger (1992) argues that this constraint on embedded construals would again follow if *why* merges directly at its scope position, and cannot be incorporated into the rest of the sentence by means of a trace. Bromberger points out a further piece of supporting evidence for the non-incorporational theory of *why*. In (23a-b) (a modified version of two examples from Bromberger 1992:160-161), *why* and other *wh*-phrases interact with scopal elements such as focus operators in different ways (here I use superscripts to indicate that *Adam* is a focused constituent):

(23)   a.   Why did [Adam]^F eat his apples?
       b.   When did [Adam]^F eat his apples?

While (23a) presupposes that ONLY Adam ate apples, (23b) is compatible with the reading in which every individual ate apples at different times, and the speaker is simply concerned with the time of Adam's eating event. Bromberger's contrast is applicable to Chinese as well, with a focus accent on *xiao zhang* 'little Zhang'.[11]

(24)   a.   Weishenme [xiao zhang]^F chi-le   ta de   pingguo?
            why   little Zhang   eat-PRF he POSS apple?

            'Why did [little Zhang]^F eat his apple(s)?'
       b.   Shenmeshihou [xiao zhang]^F chi-le   ta de   pingguo?
            when   little Zhang   eat-PRF he POSS apple?

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11 Alternative to prosodic salience, focus marking of *xiao zhang* may be encoded via a clefting strategy, in which the copula *shi* is added to the immediate left of *xiao zhang* (for some speakers consulted, clefting is preferred over stress as a focusing strategy). The contrast of presupposition is maintained in *shi*-clefts.

(i)   a.   Weishenme shi   xiao zhang chi-le   ta de   pingguo?
            why   COP little Zhang eat-PRF he POSS apples?
            'Why was it little Zhang who ate his apples?'
       b.   Shenmeshihou shi   xiao zhang chi-le   ta de   pingguo?
            when   COP little Zhang eat-PRF he POSS apples?
            'When$_i$ was it little Zhang who ate his apples t$_i$?'

'When$_i$ did [little Zhang]^F eat his apple(s) t$_i$?'

Bromberger (1992) argues that we can account for the reading in (23b) if we assume that *when* is base-generated in a position below the focus operator and that it binds a trace after it undergoes movement. This way, *when*'s trace is within the scope of the focus operator as the latter associates with *Adam*. Let's assume that the *when*-question projects an existential presupposition such that there exists a time in which only Adam ate his apples. The question utterance is compatible with a context where Adam, Bill and John ate apples at t_1, t_2 and t_3, respectively (t_1 is the true and exhaustive answer). In contrast, if *why* leaves behind no trace and directly merges above the scope of the focus operator, then the focus operator associates with *Adam* without taking a reason argument within its scope. As a result, a *why*-question presupposes that only Adam, out of all individuals, ate the apples (instead of an existential presupposition such that there exists a reason for which only Adam ate his apples). The question as such is not compatible with a context where Adam, Bill and John ate apples for reasons r_1, r_2 and r_3, respectively.

Related to Bromberger's observations, Tomioka (2009) demonstrates that Japanese *naze* 'why' triggers different existential presuppositions from other *wh*-phrases in downward entailing quantificational environments. The contrast between (25a) and (25b) is modified from Tomioka (2009).

(25)   a.   Naze daremo ko-nak-atta-no?
              why anyone come-NEG-PST-Q
              'Why did no one come?'
              Presupposition A: No one came.
              Presupposition B: #There is a reason that no one came for.
        b.   Nani-o   daremo yom-ana-katta-no?
              what-ACC anyone read-NEG-PST-Q
              'What$_i$ did no one read t$_i$?'
              Presupposition A: #No one read anything.
              Presupposition B: There is something such that no one read it.

Naze's presuppositional pattern is replicated in Chinese *weishenme* 'why'.

(26)   a.   Weishenme meiyouren lai?
              why   nobody   come?
              'Why did nobody come?'
              Presupposition A: No one came.
              Presupposition B: #There is a reason that no one came for.
        b.   Shenmedongxi meiyouren du?
              what   nobody   read?

'What did nobody read?'
Presupposition A: #No one read anything.
Presupposition B: There is something such that no one read it.

Similar in spirit to Bromberger, Tomioka takes (25a) as evidence that neither *why* nor its trace is interpreted within the quantificational force of a quantifier operator. He goes on to propose a general constraint for the interpretation of *why* (Tomioka 2009:263):[12]

(27)   Tomioka's constraint:
        In a *why*-question and only in a *why*-question, the proposition that corresponds to the non-*wh* portion of the question must be presupposed.

The no-trace property points to a high merge position of the *why*-adjunct, which Ko (2005) (as well as Lin 1992 and Stepanov & Tsai 2008) assumes to be [Spec, CP] (as opposed to other *wh*-phrases, which are assumed to move to [Spec, CP] from a lower initial merge position and leave behind traces). Ko's proposal is exclusively about the equivalents of *why* in East Asian languages such as Chinese, Japanese and Korean. Independently, Rizzi (2001) argues that *perché* 'why' in Italian merges directly at [Spec, IntP]. Given that there is no motivation for a structural distinction between [Spec, CP] and [Spec, IntP] in East Asian languages, we can essentially consider Rizzi's high attachment analysis of *perché* the same as Ko's proposal for

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12 Although the peculiar scope-taking abilities of *why* are not much researched as of yet, they most likely follow from the semantic idiosyncrasies of causal adjuncts in general that is independent of questions. As a matter of fact, non-interrogative causal adjuncts exhibit similar wide-scope behaviors. For example, experimental studies suggest that the preferred interpretation for the following type of sentence has narrow-scope negation, that is, the English *because*-clause is outside the scope of negation (Frazier & Clifton 1996):

(i)   a.   No one left because it's too late.
       b.   He didn't do it because he couldn't do it.

As Hirschberg & Avesani (2000) point out, (the preferred) narrow-scope negation reading is what we obtain when (ia) and (ib) are produced with default prosodic patterns, in which the intonation contours "usually exhibit major or minor prosodic phrase boundaries before the subordinate conjunction" and "usually were falling contours". A dispreferred reading, in which negation takes wide scope over the *because*-clause, arises with a special intonation contour that "rarely contains internal phrase boundaries" and "often ends in a 'continuation rise' which is generally perceived to be highly marked for English" (Hirschberg & Avesani 2000:87). Without this contour, the acceptability ratings for wide-scope negation readings are very poor, based on an experiment conducted by Kitagawa & Fodor (2006). It remains to be seen whether the interrogative *why* has a one-to-one correspondence with the *because*-clause in a narrow-scope negation reading (that is, *why* always scopes above negation), or whether *why* entertains both scope possibilities that correspond to the *because*-clauses in both the narrow-scope and the wide-scope negation readings, where the narrow-scope negation reading is simply the more salient one.

East Asian *why*s. Both authors, in particular Rizzi, believe in a crosslinguistic tendency for *why*-adjuncts to favor high merge, but they leave open the possibility that there is parametrization among *why*-adjuncts (see also Thornton 2008). This is because *why*-adjuncts in some languages (such as English) still participate in auxiliary inversion, which has often been assumed to be a diagnostic of movement (Italian *perché*/East Asian *why*s trigger no inversion). This paper makes no attempt at resolving the issue of parametric variation, hence I will content myself with a Chinese-specific base-generation analysis of *weishenme*. What is important for my purpose is that both [Spec, CP] and [Spec, IntP] are higher than the scope positions of the focus operator and quantifiers at the left periphery (according to a Rizzi-style configuration of the articulated CP). In the following section, I will show that by adopting a base-generation proposal in the spirit of Ko and Rizzi, we are able to capture the readings in (23) and (25).

4   A semantic account of how witnessable quantifiers avoid intervention

4.1   Quantifiers as plural indefinites

If Chinese *weishenme* 'why' directly merges at [Spec, CP], one consequence is that it does not take part in quantifier scope interactions, because it is directly interpreted at a scope position above quantifier scope. Moreover, Chinese is known to observe a scope isomorphism at the left periphery, such that scopal relations at LF are preserved at linear ordering (Huang 1982; Ernst 1994). Unlike Japanese or Korean, Chinese quantifiers cannot scramble across outscoping operators to create a mismatch between word order and scope order (Ko 2005). Therefore, we would expect that quantificational elements, when taking scope as generalized quantifiers, be c-commanded by *weishenme*.

　　The idea I pursue along this line of reasoning is that the reason non-decreasing quantifiers can c-command and hence outscope *weishenme* is because they are not GQ-denoting. Rather, I propose that these quantifiers are type e (individual)-denoting in such cases. Both Reinhart (1997) and Winter (1997) have independently proposed that a subclass of quantifier phrases such as *some people* or *many people* do not necessarily denote a relation between predicates, in the traditional sense of Barwise & Cooper (1981). Rather, they can be referential, by denoting plural indefinites. Following Chierchia (1993) and Reinhart (1997), a quantifier receives a plural indefinite reading if and only if it is witnessable, defined as follows.[13]

(28)　　A quantifier is *witnessable* iff it entails the existence of a minimal witness set.

Reinhart proposes that witnessable quantifiers are ambiguous between a referential reading and a generalized quantifier reading, an idea that dates back to at least Fodor & Sag (1982). Reinhart also employs choice functions to characterize the plural indefinite reading of quantifiers, given that a choice functional implementation conveniently captures the fact that plural indefinites are interpreted at an exceptional wide scope above other scope-taking elements. Reinhart's approach hence enables us to capture the outscoping behavior of the high-merge *weishenme*. Deviating from Reinhart's original assumptions that only a subset of indefinites are referential, I propose to broaden the range of quantifiers that allow for a referential interpretation. In Reinhart's initial classification, only a subset of non-decreasing quantifiers (such as the indefinites *a person*, *three people*, *some people* and *many people*) are witnessable. I consider all monotone increasing quantifiers and (non-monotonic) bare numerals to be witnessable. Thus, I also include quantifiers such as *most people*, *everyone*, *more than three people*, *at least three people*, etc.. In contrast, monotone decreasing quantifiers, such as *no/few people* and *less than three people*, are ruled out. We can verify that the minimal witness of a monotone decreasing quantifier is the empty set (Szabolcsi 1997). This, under the assumption that there is no null-individual, cannot be turned into an individual (however, see Bylinina & Nouwen 2017, 2018 for counterarguments). I argue that decreasing quantifiers are always GQ-denoting and non-referential.

As a witnessable quantifier, *most people* may denote a choice-functionally selected plurality. This can be done by letting the quantifier phrase contain a covert choice function variable as a determiner that returns pluralities (Reinhart 1997; Winter 1997; Kratzer 1998b). Therefore, *most people* syntactically takes a covert choice function variable at the determiner position (i.e., [$_D$ f$_1$ [$_{NP}$ *most people*]]). In the NP complement position, *most* serves to *modify a property* by adding cardinal information to it (Verkuyl 1981; Landman 2004; Constant 2013). This is represented in (29).

(29) $[\![most]\!] = \lambda P_{<e,t>}\lambda x_e[P(x) \wedge |\mathrm{Atoms}(x)| > 1/2|\{y : \mathrm{atom}(y) \wedge P(y)\}|]$ (where Atoms (x) returns the set of atomic elements of the plurality x: Atoms (x) = {y: atom (y), i.e., $y \leqslant x \wedge \forall z. [z \neq y \rightarrow z \not\leqslant y]$})

The covert choice function variable of type $<<e,t>, e>$ (adopting Reinhart's formulation) then takes the property (type $<e,t>$) denoted by *most people* as input and returns a plurality that has the property of its atomic parts being a majority of all the context-relevant atomic individuals. This is illustrated in the following:

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13 A set W is a witness set of *G* iff $W \in G$ and *W* is a subset of the smallest live-on set of *G*. Accordingly, a *minimal witness* set *M* is a set that is smallest among the witness sets of *G*, i.e. *M* is a witness set of $G \wedge \neg \exists M' [M' \in G \wedge M' \subset M]$

(30) $\llbracket most\ people \rrbracket^g = \llbracket [f_1\ [most\ people]] \rrbracket^g = g(1) \llbracket most\ people \rrbracket^g$
         $= g(1)(\lambda x_e[people(x) \land |\text{Atoms}(x)| > 1/2|\{y : atom(y) \land person(y)\}|])$

Here I assume with Kratzer (1998b) that f_1 receives its value from context (note that a choice function variable could alternatively be existentially bound as championed by Reinhart and Winter). The alternatives to '[f_1 [*most people*]]' are computed by substituting different choice function variable values. As a result, we produce contrasting pluralities of individuals, each of them containing a majority of all the context-relevant atomic individuals. Crucially, I assume that this choice function mechanism applies to witnessable quantifiers only. This assumption comes about via a stipulation (in keeping with Constant 2013), since a choice-functional (type-e) analysis in theory can be applied to any quantifier (with the possible exception of *no*). For example *few* could be given a property-modifying cardinality meaning parallel to (29), allowing the meaning of [NP *few people*] to combine with a covert choice function variable to produce a specific small plurality of people. For the moment, we will have to settle with the notion that in natural language downward quantifiers do not actually allow such choice-functional interpretations (allowing only a standard GQ meaning, to the effect that the composition of *few people* with a choice function variable fails due to a type mismtach). A deeper explanation for the demarcation of quantifiers along witnessability, however, awaits future research.[14]

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14 Constant (2013) observes that, for many speakers, decreasing quantifiers such as *few* favor a reading in which at least one individual satisfies their nuclear scope (Krifka 1999; Gajewski 2008). We often infer from the utterance *Few students arrived* that there is at least one student that arrived (see Horn 2006 for arguments that this non-empty reading arises from a scalar implicature). The non-empty implicature of decreasing quantifiers thus invites the question of why accommodation is not available for them when forced into a topic position. Presently I don't have a good answer for this, and my claim that decreasing quantifiers are always non-topical remains a stipulation.

Independently, experimental results show that, in processing tasks, subjects encounter more difficulties in verifying and comprehending a monotone decreasing quantifier's witness set (Geurts & van der Slik 2005; Bott et al. 2013), based on measurements of reaction time and error rates. This processing difference stems from the fact that one needs to consider two alternative pathways in processing a monotone decreasing quantifier, whereas only one pathway is needed for non-decreasing quantifiers. Take the verification process for illustration. To verify a quantified sentence containing *most* or *more than three*, one needs to find positive instances that members within the restrictor set satisfy the *most*-relation, the *more-than-three*-relation, etc.. In other words, one gathers positive information to verify the existence of a witness set. In contrast, for quantified sentences with *no*, *few*, or *less than three*, the verification procedure can take a different strategy, which involves drawing a negative inference based on the absence of positive instances (in which case one does not need to verify the witness set). Tentatively, the intuition is that it is not informative to use decreasing quantifiers to denote their witness sets.

4.2 Witnessable quantifiers and topicality

In the following, I provide three diagnostics validating the claim that monotone non-decreasing quantifiers can be referential. My diagnostics build upon Constant (2013, 2014) and Tomioka (2007), which are compatible with Reinhart's choice-functional approach to the referentiality of quantifiers. As my first diagnostic, I show in (31) that monotone increasing and non-monotonic quantifiers may serve as contrastive topics (CTs) in Chinese, whereas monotone decreasing quantifiers cannot. The contrastive topic status of quantificationl DPs can be diagnosed via the addition of the discourse particle *-ne*, which attaches to a topic in topic-comment structures and obligatorily marks that topic as a CT (see Constant 2014 and the references therein).

(31)　　A:　Boshi-men　　　　zhu zai　na'er?
　　　　　　doctoral.student-PL live LOC where?
　　　　　　'Where do the PhD students live?'
　　　　B:　[{Daduoshu boshi-ne/　　　　　wu-ge　　boshi-ne/
　　　　　　{most　　　　doctoral.student-NE/ five-CLF doctoral.student-NE/
　　　　　　#henshao boshi-ne/#budao　　　　　　san-ge
　　　　　　#few　　　doctoral.student-NE/#less.than three-CLF
　　　　　　boshi-ne}]^CT　　　　　zhu zai　[shanghai]^F.
　　　　　　doctoral.student-NE} live LOC Shanghai
　　　　　　'[{Most/five/#few/#less than three} PhD students]^CT live in [Shanghai]^F.'

If CT-marked quantifiers such as *most* only have a standard GQ reading, they would be construed as answering one of the subquestions of speaker A's. These subquestions would be the members in {*Where did most PhD students live*?, *Where did few PhD students live*?, *Where did no PhD students live*?, ...}, in which each question is determined by one of the contrasting GQs.[15] However, then it is mysterious why decreasing quantifiers such as *few* and *less than three* cannot form an answer to one of the subquestions. In contrast, if *most PhD students* denotes a specific plurality of individuals (i.e., a majority group of PhD students), then A's subquestions will be construed as contrasting alternatives that correspond to different pluralities. The reason why *few* is excluded as an answer is obvious, given that decreasing quantifiers cannot be choice functionally selected to denote a plurality. Therefore, a *few*-answer only has the standard GQ reading and cannot answer one of the subquestions. The idea that CTs range over contrasting individuals also accords with our intuition, since B's answer with *most* intuitively means that Shanghai is the place where B knows that a majority group of individuals live, as opposed to *the*

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15 See Büring (2003) and Rooth (2005), inter alia, for a discussion of how a contrastive topic-marked answer is answering a subquestion of a preceding overall question.

rest of the individuals about whom B has other information or does not know (i.e., a *most*-answer is answering one of the subquestions in {*Where did most of the PhD students live*?, *Where did the other PhD students live*?}).

Secondly, quantifiers differ in their ability to appear in equative copular constructions. Consider the following equative sentence in (32), in which the judgment patterns match well with the patterns we have seen in the contrastive topic diagnostic.[16]

(32)   [Kaoshang qinghua   beida   de ren]   shi
        admitted.to Tsinghua.University Peking.University REL person COP
        [{suoyoude/daduoshu/wu-ge/#henshao} wo jiaoguo de   xuesheng].
        {all/most/five-CLF/#few}   I   teach   REL student
        '[Those admitted into Tsinghua University and Peking University] are
        [{all/most/five/#few} of the students that I have taught].'

Here we have two nominal arguments that flank the Chinese copula verb *shi* 'be'. The referents of these two nominal arguments need to be the same for the equative sentence to be properly interpreted (Higgins 1979; Mikkelsen 2011). On the left side, the first argument of the copula is a referential plural DP of type e. Importantly, the right argument also needs to denote a type-e plurality for the identity relation between the two referents to go through. As such, (32) provides yet another way to diagnose which quantifier is type-e denoting.

The requirement for the two arguments that flank the copula *be* in equatives to be type-e denoting is well-established in the literature, because otherwise we arrive at an interpretation problem as to how the object composes with the rest of the sentence. There are several standard proposals for capturing the identity relation in equatives. In one proposal, the copula *be* is a predicate of identity, taking two referential arguments of type e and equating one with another, as follows (Geist 2008; Mikkelsen 2005, 2011):

(33) be_{Ident}: $\lambda x \lambda y$ [y = x]

Alternatively, we may posit a covert identity operator *ident* that has the denotation of $\lambda x \lambda y$ [y = x], following a suggestion by Partee (1987).[17] Suppose that the object in (32) is GQ-denoting (and not type-e denoting as I have proposed in (30)), then the GQ

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16 In (32), the universal nominal *suoyoude*-NP is interchangeable with the *most*-NP in the object position of equatives. Here it is not possible to add *dou*, as *dou* has been argued to be an adverb and hence does not form a constituent part of the universal phrase.

17 According to Partee, the identity operator (*ident*) shifts the type of the post-copular referential DP, converting it to a property (see ia). Next, Partee assumes that this property-denoting argument combines with a copula that serves as a link between a referential subject and a predicative phrase. The function of the copula is to indicate that the property denoted by the post-copular argument holds

object (of type $<<e,t>,t>$) cannot compose directly with either a copula of identity or an identity operator. In either case, we arrive at a type mismatch. Conceivably, we may attempt to resolve this type mismatch by resorting to quantifier raising, leaving a type-e trace below. However, as Constant (2013) points out, quantifier raising would lead us to another interpretation problem for increasing quantifiers. I will take the *most*-sentence in (32) for illustration. Under a QR mechanism, the quantifier *most of the students that I have taught* raises to c-command its scope *those admitted into Tsinghua University and Peking University are t_i*, leaving behind the trace t_i. Predicate abstraction applies to this scope to provide the *most*-phrase with its semantic argument.

(34) a. Syntax: [$_{DP}$ most of the students that I have taught] [$_{IP}$ λ_i [$_{DP}$ those admitted into Tsinghua University and Peking University] are t_i]
      b. Semantics: $|\{x:$ student $(x) \wedge \text{atom}(x)\} \cap \{x:$ those admitted are identical to $x \wedge \text{atom}(x)\}| \geqslant 1/2 |\{x:$ student $(x) \wedge \text{atom}(x)\}|$

Only atoms can be students. Therefore, if we assume the run-of-the-mill interpretation of *xuesheng* 'student' as denoting the atomic property of being a student, then for the GQ interpretation above to work, the truth condition has to be such that, of the atomic individuals that have the property of being a student that I have taught, most have the property of being identical to those that were admitted into Tsinghua University and Peking University. In other words, the *most*-relation must obtain between two sets of atomic individuals. Nevertheless, the plural DP *those admitted into Tsinghua University and Peking University* is computed based on a property that holds of plural individuals. An individual cannot be both atomic and hold such property (or strictly speaking, be both atomic and be identical to a plural individual). Therefore, quantifier raising in its default interpretation seems to predict, incorrectly, that the *most*-sentence in (32) is always contradictory.

Quantifier raising encounters a further issue with the negative *no*-quantifier, manifested by the following example in (35). Example (35) is unacceptable, which does not follow by simply assuming that the *none-of* quantifier must denote a GQ. Assuming the negative quantifier receives a GQ meaning, quantifier raising does not produce a contradiction here. Instead, it yields a tautology: The truth condition of (35) is such that none of the atomic students I have taught is identical to the

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of the referents of the subject. The lexical entry of the copula *be* is in (ib), and the combination of the copula with the *ident*+DP chunk is in (ic):

(i) a. *ident(a)*: λy [y = a]
     b. *be*: $\lambda P \lambda x [P(x)]$
     c. [*is (be) ident a*]: $\lambda P \lambda x$ [P(x)](λy [y = a]) = λx [x = a]

plural group of students who were admitted into Peking University and Tsinghua University, which is always trivially true.

(35)   #[Kaoshang   qinghua   beida   de ren]   shi
           admitted.to Tsinghua.University Peking.University REL person COP
        [meiyou yi-ge   wo jiaoguo de   xuesheng].
        no   one-CLF I   teach   REL student.
        #'[Those admitted into Tsinghua University and Peking University] are
        [none of the students that I have taught].'

   To address this issue, we could assume that natural language follows a system of grammaticality based on L-triviality (Gajewski 2002; Fox & Hackl 2006; Fox 2007; Abrusán 2011). Crucially, sentences that express a contradiction or a tautology by virtue of their logical constants alone (i.e. L-trivial sentences) are ungrammatical. The *none of*-quantifier sentence in (35) is tautological regardless of non-logical words, with the skeletal LF truth condition stating that of the atomic individuals that have the property of P, none has the property of those that Q. Moverover, the *few*-quantifier sentence in (32) is contradictory independently of the choice of the non-logical vocabulary. The skeletal LF form devoid of non-logical words has the truth condition, in which of the atomic individuals that have the property of P, few have the property of those that Q. This truth condition necessarily leads to contradiction. As such, L-triviality guarantees that downward quantifier sentences are ungrammatical. The problem remains to be that combining L-triviality and quantifier raising derives ungrammaticality *regardless of* quantifier type, and fails to predict the upward quantifier data.

   An anonymous reviewer has observed that if a pluralization operator * (Link 1983; Landman 1989) is appended to *student* in the upward case, as in [*most *student*], then a meaningful truth condition would come out. That is, the truth-condition would then say that the cardinality of the student plurality identical to the plurality of those admitted to university is larger than half the cardinality of the total student plurality. Cardinality of a plurality here is measured by looking at the atomic parts of that plurality. Since *most* now relates plural properties, contradiction does not arise and the grammaticality of upward quantifier sentences is derived.

   The pluralized version of the quantifier raising account, however, would run into difficulties with the downward quantifier sentence in (32). It is unclear what mechanism prevents quantifiers such as *few* from receiving a parallel syntax and semantics as in *most*. And without such a mechanism, the ungrammaticality of *few*-sentences remains unaccounted for. The above interpretation problems disappear, if we do away with quantifier raising and assume that the equative copula composes

with a type-e denoting object.[18] The *most*-quantifier, by way of being witnessable, denotes a choice-function selected plurality. That is, *most of the students* in (32) denotes a student plurality whose cardinality is larger than half of that of the total student plurality. The subject plural DP *those admitted into Tsinghua University and Peking University* denotes the (iota-ized) maximal plurality with the property of being those that were admitted. With the copula denoting the relation of identity (e.g. Partee 1987), we arrive at the desired interpretation such that both the subject and the object plural DPs have the same referent. The type-e treatment also extends to quantifiers *all* and *five*. Finally, if a downward quantifier does not have a type-e denotation due to its non-witnessability, and with quantifier raising off the table, then it fails to compose with the copula as a result of type mismatch. Therefore, the fact that downward quantifiers cannot occur as objects of equatives is also accounted for.

Thirdly, the correlation between witnessable quantifiers and topicality finds backing in morphological marking. As Tomioka (2007) points out, a quantifier's topical status can be diagnosed by its compatiblity with dedicated topic markers. In Japanese, the morpheme *-wa* has been widely considered to be a topic marker. Importantly, Tomioka shows that the Japanese quantifier phrases *subete-no gakusei-wa* 'all students-TOP' and *hotondo-no gakusei-wa* 'most students-TOP' are judged to be the most acceptable, followed by bare numerals such as *3-ri-no gakusei-wa* 'three students-TOP'. Monotone increasing modified numerals such as *ijo-no 3-pon-wa* 'more than three books-TOP' are more marginal, and decreasing quantifiers are considered the worst (Tomioka observes a similar pattern in Korean, cf. also Lee 1987), although the scant attention that has been paid to quantificational topics so far means that these tentative judgments must be treated with caution. In Mandarin Chinese, we have previously reviewed supporting evidence from the contrastive topic *-ne* marking. Morphological evidence of discourse topichood is less reliable, given that the few suffixes that accompany topic expressions are optional, and also take up other discourse functions elsewhere, so that they are standardly assumed to be discourse particles rather than dedicated topic markers (Xu 2006). In Shanghainese (a Sinitic Wu language closely related to Mandarin Chinese), the suffix -məʔ has been argued to be a dedicated discourse topic and contrastive topic suffix (Qian 2002). According to my consultation, the Shanghainese topic marking behaviors pattern with Japanese. All monotone decreasing quantifiers resist the suffixation of -məʔ. In contrast, the suffixation of -məʔ to monotone increasing and non-

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18 There has been independent evidence that object quantifier phrases and *wh*-phrases do not take wide scope over subjects in Chinese and observe scope rigidity, prompting some authors (e.g. Pan 2018) to doubt the plausibility of assuming quantifier raising in Chinese. If this is on the right track, it might provide additional motivation for ruling out quantifier raising in equatives. I will leave this exploration to future research.

monotonic quantifiers are judged better: Non-numeral quantifieres such as *datusu ɦoʔsan-məʔ* 'most students-TOP' and *mɛ-gəʔ ɦoʔsan-məʔ/sujɸ ɦoʔsan-məʔ* 'every student-TOP/all students-TOP' are considered good, and the numerals *sɛ-gəʔ ɦoʔsan-məʔ* 'three students-TOP' and *tsɹsɔ sɛ-gəʔ ɦoʔsan-məʔ* 'at least three students-TOP' are considered marginally acceptable.[19] In a related discussion, Krifka (1998) has observed that the *die meisten* 'most' quantifier phrases in German consistently take wide scope when occurring with another scope-taking (quantificational) element, such as in (36) (ex. 74a of Krifka 1998). A wide-scoping *most* reading is the only available reading even under a rise-fall stress contour, which otherwise allows two ambiguous scopal readings. This prompts Krifka to suggest that *most*-phrases are topical phrases and hence have inherently wide scope (see my relevant discussion in the upcoming subsection 4.3).

(36)   Die meisten Studenten haben jeden Roman gelesen.
       the most   students   have every novel   read.
       'Most students have read every novel.' (MOST > EVERY)

In the above, I have presented evidence from contrastive topics, equatives and morphological marking in support of type-e interpretations for a wider range of quantifiers than Reinhart (1997)'s initial classification. Note that Reinhart (1997) excluded genuine quantifiers such as *every* and *most* from a choice-functional analysis because they are believed to behave differently in terms of escaping scope islands. A discussion regarding their ability to escape islands would be apt here.

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19 In the equative diagnostic, I have pointed out that *dou* is not part of the universal phrase. In the following, (ia) is acceptable, in which the universal nominal receives topic marking and *zɛ*, the Shanghainese equivalent of *dou*, sits below the topic position. (ib) shows that topic marking cannot fall on *zɛ*. This would be accounted for again if the *dou*-operator is analyzed as a separate constituent (an adverb) from the universal nominal (hence it does not form a topic phrase with the universal nominal). (ic) further shows that the adverb *zɛ* cannot topicalize on its own, evidenced by its resistance to a separate CT-marking (note that multiple CT-marking is elsewhere possible in Chinese languages). It has been mentioned earlier in the paper that degradedness arises when *dou* precedes *why*. Such constraint can be captured if *dou* takes scope below *weishenme* and fails to topicalize. See footnote 23 for a possible account of *dou* along this line.

(i)   a.   mɛ-gəʔ   ɦoʔsan-məʔ zɛ   ma-tsɨ   vãdzɨ
            every-CLF student-NE DOU buy-PRF house.
            'Every student bought a house.'
       b.   #mɛ-gəʔ   ɦoʔsan zɛ-məʔ   ma-tsɨ   vãdzɨ
            every-CLF student DOU-NE buy-PRF house.
            'Every student bought a house.'
       c.   #mɛ-gəʔ   ɦoʔsan-məʔ zɛ-məʔ   ma-tsɨ   vãdzɨ
            every-CLF student-NE DOU-NE buy-PRF house.
            'Every student bought a house.'

The previous literature has often assumed that the scope behavior of universals is substantially different from that of indefinites. However, I believe this notion is debatable. Specifically, I draw upon Szabolcsi (2010)'s argument that *every*-NPs exhibit parallel island-escaping behaviors with plural indefinites and hence should be treated in a uniform way.

First of all, we need to see that *every*-NPs exhibit exceptional wide scope on its run-of-the-mill interpretation. Consider the following example (where *every* embeds under a complex NP island):

(37)   Nobody believes the rumor that [every student of mine will be expelled].
          Possible reading: 'There is a set of students of mine (in fact, the set of all my students) such that nobody believes the rumor that they will be expelled.'

On this interpretation *every*-NP has a unique witness, the set of all my students, and assuming an existential presupposition such that this set is non-empty, the *every*-NP then denotes its witness on the interpretation. In this sense, its existential import is just like that of a plural definite.

Second, previous observations have tended to draw attention to the *every*-quantifier's inability to take exceptional wide scope under a distributive wide scope reading. Consider the following sentence where *every* embeds under a relative clause (Endriss 2009):

(38)   Anne has read some book that [every teacher recommended].

(38) could mean that for the set of all domain-restricted teachers (i.e. *every*'s unique witness), Anne has read some book that this teacher-set recommended. The sentence cannot mean: For every teacher it holds that Anne read some book that she recommended. In other words, what is ruled out is distributivity across islands, rather than the ability to take exceptional wide scope *per se*. Independently, the ability for a distributive reading to escape scope islands has been widely considered to be very restricted anyway (Ruys 1992; Reinhart 1997; Winter 1997). In fact, for plural indefinites a distributive reading also has to be clause-bounded. In sum, *every* and indefinites display parallel scope properties: Unbounded (non-distributive) existential scope and clause-bounded distributive scope. Based on the above evidence, scope facts do not contradict a choice-functional analysis of the *every*-quantifier.

The previous literature has also observed a difference between *most*/modified numerals and unmodified numerals in the wide scope reading across islands (e.g. Reinhart 1997; Endriss 2009). Contrast (39a) with (39b):[20]

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20 The previous literature has observed several cases where *most* scopes out of islands (Abusch 1994; Endriss 2009; Constant 2013). For example, in (i), the interpretation is such that for most companies it holds that when *each of them* designs a car, this company does not pay attention to its customers.

(39)   a.   If three of Maria's relatives die, she will inherit the house.
        b.   If {most/at least three} of Maria's relatives die, she will inherit the
              house.

At least three/most in (39b) does not easily give rise to a reading in which
the speaker refers to a specific group of individuals in mind. In contrast, (39a)
easily allows for a reading in which the speaker refers to a particular group of three
in mind.[21] It is important that in both cases the wide scope reading in question
necessarily involves uniquely identifiable referents.[22] That is, the extracted three
relatives in (39a) have to bear an identity such that it is not the case that for another
group of three relatives with a different identity, Maria will inherit a house if this
alternative group die. Note that reference to a specific identity that the speaker has in
mind is not a requirement for the wide-scoping quantifiers in the pre-*why* position.

Addressing the contrast between unmodified numerals and modified numerals
(i.e. *at least n*) in (39), Schlenker (2004) proposes that the requirement for a unique
referent identity is pragmatically incongruous with the felicity condition on modified
numerals, so that modified numerals are independently ruled out even though they
could exhibit wide scope. In a nutshell, if the speaker knows who the referents are
by way of a unique plural individual, she would opt to refer to the referents using *n*
rather than the less informative *at least n*. If, on the other hand, the speaker does not
know with certainty the exact number of an otherwise uniquely identifiable plural
individual, it is hard to explain why the speaker chooses a quantifier with a numeral
component over other quantifiers denoting non-exact numbers, such as *some*.

A similar explanation can apply to *most*. A genuine specific reading requires that
most makes reference to a particular individual the speaker has in mind. However,
proportional quantifiers involve a more complicated verification task than count-

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(i)   When most companies design a car, they don't pay attention to it. But we do.
        (Endriss 2009:249, courtesy of Kai von Fintel)

Note that the above reading is a distributive one. While the availability of a distributive wide
scope reading challenges Reinhart's original claim against *most* taking wide scope across islands, it
is not directly predicted by my own choice-functional account either. At present I will have to leave
this issue unresolved.

21 Schwarzschild (2002) and Schlenker (2004) argue that, in scope island contexts, the speaker is having
   a specific referent in mind but opts to utter an indefinite to refer to that referent because she knows
   that there is a speaker-hearer asymmetry: She knows the individual she wants to refer to, but the
   hearer does not. This asymmetry means that a name or a definite description is off the table.
22 More specifically, in uttering a referential indefinite the speaker is making reference to an identifying
   property (Stanley & Szabo 2000). This identifying property is introduced by a covert *certain*
   contained within the quantifier phrase. The property can be so specific that it uniquely identifies a
   (group) individual (Schlenker 2004). Schlenker further provides a translation procedure showing
   that identifying properties can be restated in terms of choice functions, rendering his analysis
   implementable under my current approach.

ing quantifiers, requiring that the totality of individuals in context be calculated. Therefore, it is again hard for the hearer to accommodate that the speaker chooses a proportional quantifier over a counting quantifier (e.g. *three/some/certain*) to refer to a uniquely identifiable individual.

In short, it is possible that in scope island contexts, quantifiers such as *most* tend to be incongruous with the uniquely identifying property defined on the quantifier phrases in a specific wide scope reading (à la Schlenker 2004). Hence, this would allow scope facts not to contradict my independent evidence presented in this section that *every*-DPs and *most*-DPs can be type-e denoting.

Before proceeding, it warrants mention that, in assigning topical status to quantifiers, I subscribe to the view that topics are *not* necessarily discourse-given or familiar (e.g. Ebert & Hinterwimmer 2010, contra Gundel 1985; Portner & Yabushita 2001). In fact, quantifiers generally cannot refer back to familiar entities that have already existed in prior discourse. This assumption can be illustrated by the following two sentences:

(40)   #There are two boys, Lavender and Tin. Two boys got weird names.

The second sentence's bare numeral *two boys* cannot refer back to the same referents established by the first *two boys*. Reinhart (1981) nevertheless argues that bare numerals and other indefinites such as *some people/a man* may serve as sentential topics, in the sense that they perform a frame-setting function, by establishing an address for a new discourse referent x, such that a proposition can be made in which the referent x serves as the argument within the propositional content (see also the file metaphor of topics in Heim 1982). For familiar topics, the address or file for a pre-existing discourse referent is already set up, so that a proposition is made to be matched to that address/file as an update. In sum, familiarity need not be a necessary condition for topichood. Rather, topics are understood as entities that fulfill the frame-setting function in certain discourse conditions. Combining this definition of topichood with the view that a subclass of quantifiers are ambiguous between entity-denoting and GQ-denoting, the current paper goes on to claim that certain quantifiers can be candidates for topics, which we turn to in the next subsection.

4.3   The wide scope behavior of topical quantifiers

If witnessable quantifiers are candidates for topics, their ability to outscope *weishenme* 'why' would follow from the ability for topics to take scope outside speech acts. Various authors have pointed out that if any part of a proposition is capable of scoping out of a speech act, it will have to be a topic (Krifka 2001; Ebert et al. 2014). This is because topic establishment is a separate speech act by itself. The idea that topics are assigned illocutionary operators of their own was first raised

in Jacobs (1984). Jacobs points out that one way to understand Reinhart (1981)'s view where topics establish an address is to consider the introduction of a topic as an act of frame-setting. As such, frame-setting is a referring speech act that selects an entity, and then requires a subsequent speech act that says something about this entity. According to Krifka's (2001) proposal, natural language allows speech acts to conjoin. A topic-comment structure thus expresses two sequential, conjoined speech acts, comprising the topic's referring act, to be followed by a basic speech act (assertion, request, command, etc.) that is performed as an update on the referent established by the topic. Krifka notes that, in English, comma intonations are used to mark topics as scoping out of questions, commands and curses, such as the following:

(41)   a.   As for Al, Bill and Carl, which dishes did they make?
        b.   The hamburger, please hand it to me.
        c.   This guy, he should go to hell!

According to Krifka, topics even *have to* scope out of speech acts, given that they function as a separate speech act. If we follow this claim and assume that, in Chinese, the topic act conjoins with a subsequent speech act of request performed by a *weishenme*-question, we would predict that all the expressions that qualify as topics may occur outside the scope of *weishenme* without causing intervention. This prediction is borne out. As (42) demonstrates, proper names, pronouns and temporal/locative adverbs can legitimately precede *weishenme*. These are expressions that have long been known to allow for a topic reading (Partee 1973; Dowty 1979; Enç 1986; Ernst 1994; Kratzer 1998a; Law 2006).

(42)   a.   Lisi/ta weishenme mei qu paobu?
              Lisi/he why   NEG go jogging
              'As for Lisi/him, why didn't he go jogging?'
        b.   {Zuotian/zai   na'er} weishenme dajia yao   chi kaorou?
              {yesterday/LOC there} why   folks want.to eat barbecued.meat
              'Yesterday/at that place, why did the folks want to have barbecue?'

(43) additionally shows that when multiple topics are co-occurring, they can all c-command *weishenme*. There seems to be a functionally-based cognitive constraint preventing more than three topics from co-occurring in the same sentence in Chinese, but a sentence with three topics is marginally acceptable (Xu 2000:31-32). In such case, we also find a *weishenme*-question with three c-commanding topics acceptable:

(43)   Zhei-chang yinyuehui ni   mingtian weishenme yao qu?
        this-CLF   concert   you tomorrow why   will go

'(As for) this concert, (speaking of) you, (talking about) tomorrow, why will you go?'

Another prediction is that if an element is by nature not topical, it will never c-command *weishenme*. This would immediately explain the fact that focus-sensitive expressions licensed by overt focus operators induce intervention when they scope out of *weishenme*-questions. Sentence (44a) is unacceptable, because *weishenme* is c-commanded by the focus-sensitive *only*-NP. (44b) is similarly unacceptable, when *weishenme* is c-commanded by an *even*-NP.[23]

(44)   a.   #Zhiyou Lisi weishenme cizhi?
                 only   Lisi why   resign
                 'Why did only Lisi resign?'
         b.   #Lian Lisi ye/dou   weishenme cizhi?
                 LIAN Lisi YE/DOU why   resign
                 'Why did even Lisi resign?'

Apart from topics, the second class of subsentential expressions that scope out of speech acts are epistemic attitude adverbs such as *daodi* 'on earth' and *jiujing* 'frankly/honestly'. This class of adverbs have also been called speech act-related adverbials (Davison 1973; Sadock 1974; Ernst 2001; Krifka 2014) or utterance(-modifying) adverbs (Jackendoff 1972; Potts 2004) in the literature. Importantly, they are not interpreted as related to the propositional content. Rather, they signal the speaker's epistemic attitude towards the performance of speech acts. Thus, in (45), what is being described as frank is not the fact that you're not the best poker player itself, but rather my statement of this fact. I am being frank in saying that you are a bad poker player.

(45)   Frankly, you're not the best poker player.

This is the same interpretation we obtain with explicit performatives (Krifka 2014):

(46)   I tell you quite frankly that you're not the best poker player.

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23 According to Liu (2017), *dou* is a covert *even* scalar item that ranks alternative propositions in terms of likelihood. As covert *even*, *dou* takes scope above its prejacent but stays within the scope of *why* (in accordance with cartographic views in which the focus operator takes scope below [Spec, IntP], and also compatible with Bromberger's treatment of the interaction between focus and *why*'s scope in *Why did* [*Adam*]^F *eat his apples*?). As a result, we can explain the infelicity of (44b). Recall that in *why*-questions with universals, *dou* must follow *why*. If we additionally subscribe to Liu's (2017) view that *dou*'s *even*-semantics is involved in encoding universal sentences, we arrive at an explanation of the [*why* < *dou*] requirement. In principle, such configuration constraint could be captured in other approaches to *dou* (e.g. Lin 1998; Giannakidou & Cheng 2006; Xiang 2008), as long as *dou* takes scope below *why* and its topicalization is prohibited.

As such, an epistemic attitude adverb has been argued to take an illocutionary operator as its argument and yields a modified speech act meaning (Krifka 2014) or, equivalently, to modify the relation between a speaker and an utterance (Potts 2004).[24] In (47), I show that both an epistemic attitude adverb and a topic may scope above *weishenme*:

(47)   Ta daodi/jiujing   weishenme cizhi?
        he in.the.hell/honestly why   resign
        'As for him, why the hell did he resign?'/'As for him, honestly, why did he resign?'

A contrast exists between this class of speech act-level adverbs and proposition-level attitude adverbs such as *yiding* 'definitely' and *kongpa* 'probably/most likely', the latter inducing intervention as follows:

(48)   #Ta yiding/kongpa   weishenme cizhi?
        he definitely/probably why   resign
        'Why did he definitely/probably resign?'

Unlike *daodi/jiujing*, adverbs such as *yiding* 'definitely' indicate the speaker's attitude towards propositional contents or contents of smaller units, rather than the speaker's attitude towards speech acts. Interpreting the question's speech act within the scope of *yiding* creates a semantic anomaly, because this adverb is not compatible with taking illocutionary operators as arguments (Ernst 1994). In sum, my theory amounts to saying that an expression is able to scope above *weishenme* if and only if it is able to take the *weishenme*-question's speech act operator in its scope. Both speech act adverbs and topics exhibit such scopal behaviors, and in both cases, my prediction is borne out.

Note that I have assumed all along that c-command relations mirror scopal relations in the Chinese left periphery. This is because Chinese is a scope-rigid language that does not allow the scrambling of quantifiers across the directly merged *weishenme* (Huang 1982; Ernst 1994; Ko 2005). In Japanese and Korean, scrambled operators reconstruct their scopes at LF, so that when generalized quantifiers are scrambled across the *why*-adjunct at surface syntax, they receive interpretation at their trace positions (Kitagawa 1990). Importantly, in Chinese it is not possible for generalized quantifiers to c-command *weishenme* and still be reconstructed below the scope of *weishenme* (and hence receive the GQ-reading). Therefore, taking an

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24 According to Krifka (2014), the *frankly*-sentence in (45) receives the following interpretation: *Frank* (ASSERT (*you're not the best poker player*)), in which ASSERT is an illocutionary operator that takes in a proposition and outputs the speech act of assertion (or more accurately, it takes in three arguments, a speaker, an addressee in addition to the propositional radical: ASSERT (sp, ad, prop)).

exceptional wide scope is the only way for c-commanding quantifiers to obtain a legitimate interpretation in Chinese.[25]

4.4   Intervention as a speech act constraint

In section 4.3, I have presented evidence that topics (together with speech act-modifying epistemic attitude adverbs) are able to scope above speech acts. In this section, I lay out the details of how an exceptional wide scope theory of topics explains the intervention pattern in Chinese *why*-questions.

First, I discuss how a scope theory of topics can be couched in a formally precise framework of speech act establishment and conjoining. Here I follow the Wittgensteinian view that the speech act of a sentence corresponds to a sentential component that combines with the sentence radical. The sentence radical can be seen as unsaturated unless attached to the speech act operator (Åqvist 1974; Belnap 1969; Lang & Steinitz 1978; Wachowicz 1978; Chierchia 1993). According to Krifka (2001), we can define a basic speech act (assertion, request, command, etc.) as a semantic object with the basic type a. A speech act operator thus can be seen as taking as input a sentence radical and returning a speech act. For example, the assertion operator ASSERT is of type $<st, a>$ (taking as input a proposition, and returning a basic speech act of assertion). Following Åqvist (1974) and Vanderveken (1990), I assume that a question performs the basic speech act of request. The question operator REQUEST is of type $<stt, a>$ (taking as input a set of propositions, and returning a basic speech act of request). We further assume that natural language allows speech acts to conjoin. A topic-comment structure expresses two sequential, conjoined speech acts, comprising the referring act of a topic, to be followed by a basic speech act that is performed against the referent as established by the topic. To capture the topic's referring act, Krifka also posits a referring speech act operator REF of type $<e, a>$. Finally, & is a conjunction operator that conjoins speech acts (type $<a, <a, a>>$). In the case where a sentence performs an assertion, the proposition is structured into a topic and a comment, represented as the following schema:[26]

(49) $\text{ASSERT}(<\phi_{\text{topic}}, \psi_{\text{comment}}>) \rightarrow \text{REF}_{\text{X}}(\phi_{\text{topic}}) \, \& \, \text{ASSERT}(\psi_{\text{comment}}(\text{X}))$

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25 For further discussions on Japanese and Korean scrambling and reconstruction, see Saito (1992), Choe (1994) and Grewendorf & Sabel (1999). For the argument that Chinese does not allow the scrambling of generalized quantifiers, see also Soh (1998).

26 Vanderveken (1990) is credited by Krifka for first drawing attention to the phenomenon of conjoining speech acts in natural language. Drawing on Wittgenstein's (1958) proposal of speech acts as conversational moves, Krifka suggests that speech acts may conjoin because one conversational move may change the conversational states (states where social commitments hold) into a state that expects another move/speech act. For example, a question-answer pair is viewed as one initiating act followed by a responding act. The first act makes the move to introduce a state where social

Similarly, in the case where a question is structured into a topic and a comment, the sentence performs a conjunction of topic establishment and request, represented as the following schema:

(50) $\text{REQUEST}(<\phi_{\text{topic}}, \psi_{\text{comment}}>) \to \text{REF}_{\text{X}}(\phi_{\text{topic}}) \ \& \ \text{REQUEST}(\psi_{\text{comment}}(\text{X}))$

To capture the topic-comment structure in terms of conjoined speech acts, I follow von Stechow (1991), Krifka (1992) and Ebert et al. (2014) and make use of the structured meaning $<\phi, \psi>$ as a means to keep track of two meaning contributions in parallel, in particular the meaning contributions of topic-comment expressions. This is done by introducing a dotted type:

(51)   a.   e, s, t, *a* are basic types (for individuals, worlds, truth-values, speech acts, respectively).

         b.   If σ, τ are types, $(\sigma \circ \tau)$ is a type.

         c. $D_{(\sigma \circ \tau)} = D_\sigma \times D_\tau$ is the domain of σ-τ pairs.

Based on (51), the structured meaning $<\phi, \psi>_{(\sigma \circ \tau)}$ is interpreted as pairs of denotations of the corresponding domain (e.g. given a topic with the denotation ϕ_σ and a comment with the denotation ψ_τ).

We additionally assume that topicalization triggers predicate abstraction within the comment. Application of predicate abstraction yields an LF of $<\phi, \psi>$ as follows:

(52) $<\phi, [_\psi \ \lambda x[...x...\ ]]>$

Crucially, the dotted type assigned to the $<\phi, \psi>$ structure does not belong to any of the basic types. As speech act operators are defined on basic types, this presents a type mismatch during interpretation. Ebert et al. (2014) propose to resolve this type mismatch by the following interpretation rule, the result of which gets us conjoined speech acts:

(53)   If the utterance of a sentence S with meaning $[\![S]\!] = <\phi, \psi>$ cannot be interpreted as SA ($<\phi, \psi>$) where SA $\in$ {ASSERT, REQUEST,...} (i.e., SA is one of the basic speech act operators), then this utterance is interpreted as a conjunction of speech acts as follows: $\text{REF}_{\text{X}}(\phi) \ \& \ \text{SA}(\psi(\text{X}))$

Here the interpretation of a conjunction of speech acts proceeds as follows (Ebert et al. 2014:398-399): The effect of the first speech act $\text{REF}_{\text{X}}(\phi)$ is such that the operator REF takes in the first component of the structured meaning and introduces a novel discourse referent X for it. The $\text{REF}_{\text{X}}(\phi)$ act then supplies the discourse referent X as an argument to the second component ψ, if the application ψ (X) is of

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convention commits the other interlocutor to making a counter-move as a response, thereby triggering the responding act.

the appropriate type to yield a semantic object that can serve as the argument to the speech act operator SA.

We can see that this interpretation rule applies to the structured meaning of a topic-comment structure. This is because REQUEST ($<\phi_{topic}, \psi_{comment}>$) cannot be interpreted due to a type mismatch. Here the request speech act operator is of type $<stt, a>$, requiring a question of type $<stt>$ as its argument. According to our interpretation rule using dotted types, $<\phi_{topic}, \psi_{comment}>$ is of type $<e \circ estt>$ (when the comment is a question). As a result, a type mismatch arises and rule (53) applies, so that the topic-comment structure always gets interpreted as a conjoined speech act instead. The REF$_X(\phi_{topic})$ act introduces a topic referent X to the discourse, and subsequently supplies X as an argument to the second component $\psi_{comment}$. In this case, the type of ϕ is e, and the type of ψ is $<e, <stt>>$, making the application $\psi(X)$ possible. The resulting type of $\psi(X)$ is $<stt>$. Thus, the application $\psi(X)$ yields semantic objects that are of the right intensional type for the REQUEST operator.

It is worth noting that conjoining speech acts is only one way to resolve the type mismatch. Nothing crucial hinges upon interpreting the meaning pair $<\phi, \psi>$ in terms of conjoined speech acts. Other means to resolve the type mismatch, such as applying ψ to ϕ directly, given ϕ of type e and ψ of type $<e, <stt>>$, have also been proposed (cf. von Stechow 1991; Krifka 1992).[27]

Now we can derive intervention effects from the interaction of topics, conjoined speech acts and the referentiality of quantifiers. If a quantifier is witnessable and hence is able to be construed as topical, it may scope above *weishenme*. On the other hand, if a quantifier cannot be construed as topical, outscoping would be impossible, due to *why*'s high scope. Intervention effects arise in such cases, because for the non-topicalizable quantifier, the ordering of the quantifier preceding *weishenme* is impossible, hence semantically anomalous. The so-called intervention effects arise when an expression that cannot scope above *why* nevertheless occupies a wide scope position. In other words, there is no 'real' intervention involved here. Rather, the intervention in *why*-questions should be better characterized as a scope effect. In (54a), the *why*-question with the quantifier *daduoshu ren* 'most people' is acceptable, because it has the semantics in (54b). I also provide a less formal paraphrase of the question's meaning in (54c):[28]

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27 For universal quantifiers, Krifka (2001) applies the strategy of quantifying-in, in which the universal quantifier does not embed under the referring act, but binds into the topic part and the question nucleus (still assuming conjunction of speech acts). Quantifying-in correctly derives the absence of intervention for universals in Chinese *why*-questions. Nevertheless, the current proposal argues that universals can be topics, and as such can embed under the REF operator. The quantifying-in option is not adopted. I thank an anonymous reviewer for demonstrating to me the option of quantifying-in.

28 I assume a Hamblin-Karttunen view of *wh*-questions as sets of propositions. Thus, the question of *who left*? has the following denotation:

(54)   a.   Daduoshu ren   weishenme qu?
              most   person why   go
        b.   Semantics: REF$_y$(y= f($\lambda x_e[people(x) \wedge |\text{Atoms}(x)| > 1/2|\{y : \text{atom}(y) \wedge person(y)\}|]$)) & REQUEST($\lambda q \exists r[reason(r) \wedge q = \lambda w[r \text{ CAUSE } p \text{ in } w \wedge p = \lambda w' \ go(y)(w')]]$)
        c.   Paraphrase:
              '(Speaking of/As for) the plurality returned by the choice function f
              when applied to the property of being a majority of all the context-
              relevant individuals, why are they going?'

On the contrary, the *why*-question with the quantifier *henshao ren* 'few people'
is unacceptable, because *henshao ren* cannot be a topic and is unembeddable under
REF. That is, (55a) does NOT have the interpretation in (55b). Also, the paraphrase
in (55c) is an impossible one:

(55)   a.   #Henshao ren   weishenme qu?
              few   person why   go
        b.   NOT compatible with the semantics:
              REF$_y$(y= f($\lambda x_e[people(x) \wedge |\text{Atoms}(x)| < 1/2|\{y : \text{atom}(y) \wedge person(y)\}|]$))
              & REQUEST($\lambda q \exists r[reason(r) \wedge q = \lambda w[r \text{ CAUSE } p \text{ in } w \wedge p = \lambda w' \ go(y)(w')]]$)
        c.   NOT compatible with the paraphrase:
              #'(Speaking of/As for) the plurality returned by the choice function f
              when applied to the property of being few of all the context-relevant
              individuals, why are they going?'

In sum, when we consider quantifiers in terms of topicality, we immediately ex-
plain why monotone decreasing quantifiers induce intervention effects in *weishenme*-
questions: They cannot be topical, hence they cannot give rise to coherent readings
in *weishenme*-questions. Non-decreasing quantifiers are unproblematic, because
they denote individuals that serve as topics. We should expect that the topicality
constraint thus formulated applies in the absence of *weishenme* 'why', since the
topic position is generally available. This prediction is borne out. As mentioned
above, the class of epistemic attitude adverbs such as *daodi* 'on earth' and *jiujing*
'frankly/honestly' take scope above speech act operators. This class of adverbs can
be used to identify topic positions, in the absence of *weishenme* 'why', because when
a quantified expression precedes this class of adverbs, that quantified expression has

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(i) $[\![Who \ left?]\!] = \lambda p. \exists x[person(x) \wedge \ p = \lambda \ w'.x$ leaves in w']

Furthermore, I adopt Belnap's (1969) view that the answer of a *why*-question relates a proposition
to another proposition that serves as the former's explanation. I use CAUSE (ϕ, ψ) to represent the
binary causal relation between propositions (Johnston 1994; Scheffler 2005). The exact nature of the
causal relation in *why*-questions is beyond the scope of this paper.

to reside outside the speech act of the sentence it occurs with and thus must receive a topical reading rather than a GQ reading (again assuming scope isomorphism). Importantly, as (56) shows, monotone decreasing quantifiers induce intervention when they precede epistemic attitude adverbs even in non-*why* questions. Intervention is absent for non-decreasing quantifiers.[29]

(56) a. #{Henshao ren/budao   san-ge   ren}   daodi/jiujing
          {few   person/less.than three-CLF person} on.earth/honestly
          xiang yao shenmeyang de   gongzuo?
          want get which.type   REL job
          #'For {few people/less than three people}, honestly, what kind of job
          do they want?'

     b. Daduoshu ren   daodi/jiujing   xiang yao shenmeyang de
          most   person on.earth/honestly want get which.type   REL
          gongzuo?
          job
          'For most people, honestly, what kind of job do they want?'

Hence, (56) is compatible with the claim that we can reduce the 'intervention' in *why*-questions to a broad phenomenon of topicalizability.

Furthermore, my theory predicts that monotone increasing and non-monotonic quantifiers referring to particular entities (e.g., modified numerals, bare numerals, *ji-ge* 'a few') should not induce intervention given that they are candidates for topics. We still need to explain why these witnessable numerals induce weak intervention, as seen in (57).[30]

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29 The position preceding *daodi/jiujing* is critical to the unacceptability of decreasing quantifiers. As mentioned above, in a non-*why wh*-question (e.g. a *which*-question), a [*Quant < wh*] configuration normally induces no intervention.

30 As an anonymous reviewer points out to me, in English, an indefinite in subject position, under a negative context, does not entail a witness, as the following example illustrates. This presents an exception to the assumption that monotone increasing quantifiers entail non-empty witnesses:

(i)   A solution to this problem has not been found.

However, the Chinese example in (ii) cannot receive the same reading as in English (note also there is no indefinite article *a/an* in Chinese and *yi-ge* 'one' is a numeral).

(ii)   Yi-ge   zhei-ge wenti   de   jiefa   mei   bei   zhaodao.
        one-CLF this-CLF problem POSS solution haven't PASS find.out.
        'For a (certain/particular) solution to this problem, it has not been found.'

The indefinite subject in (ii) has a witness. The sentence is only felicitous when a particular solution (that exists) is in question. To derive a reading in which no solution(s) to this problem has been found, a *none-of* quantifier is used in subject position as follows.

(iii)   Meiyou yi-ge   zhei-ge wenti   de   jiefa   bei   zhaodao-le.
        none   one-CLF this-CLF problem POSS solution PASS find.out-PRF.

(57)   ?{San-ge   ren/zhishao   san-ge   ren/ji-ge   ren}
         {three-CLF person/at.least three-CLF person/a.few-CLF person}
         weishenme cizhi?
         why   resign
         ?'For {three people/at least three people/a few people}, why did they re-
         sign?'

I believe the weak acceptability in (57) has a pragmatic reason. Following
Kratzer (1998b, 2003), I assume that choice function variables receive their values
directly from the context of utterance. When uttered out of the blue and the context
does not readily offer a specific plurality as the value for a choice function variable,
the speaker may well accommodate a plurality, but she also needs to accommodate
a discourse structure in which the picked plurality and the sentence predicate it
fulfills are embedded, so as to provide information about the plurality against other
individuals. As numerals denote a given cardinality, a very specific discourse
structure is often needed, which is independently difficult to accommodate.

Once again, the explanation offered here does not crucially hinge upon the
presence of *weishenme* and we would predict that a witnessable numeral quantifier
is generally degraded in a topic position when a *wh*-question (i.e. an information-
seeking utterance) is uttered. Evidence that this prediction is borne out is shown in
(58), where a contrast obtains between *daduoshu ren* 'most people' and *san-ge ren*
'three people' in non-*why* questions, with *daodi* forcing a topical reading.

(58)   a.   Zheme pianyi de   dongxi juran   mai bu   chuqu. Daduoshu
             so   cheap REL stuff   unbelievably sell NEG out.   Most
             ren   daodi   yao duoshaoqian cai   ken   mai a?
             person on.earth need how.much   until.then willing.to buy EXCL
             'Stuff this cheap, can you imagine it is sold so poorly? For most
             people, how much on earth would they be willing to accept in order to
             buy (this stuff)?'
        b.   Zheme pianyi de   dongxi juran   mai bu   chuqu. ?San-ge
             so   cheap REL stuff   unbelievably sell NEG out.   Three-CLF
             ren   daodi   yao duoshaoqian cai   ken   mai a?
             person on.earth need how.much   until.then willing.to buy EXCL

'No solutions to this problem have been found.'

A *why*-question with a preceding *one*-quantifier induces mild degradedness, illustrated in (iv).

(iv)   ?Yi-ge   zhei-ge wenti   de   jiefa   weishenme mei   bei   zhaodao?
        one-CLF this-CLF problem POSS solution why   haven't PASS find.out?
        'Why has a solution to this problem not been found?'

My explanation for this is that (iv) parallels cases of other numerals (e.g. *san-ge ren* 'three
people'). The oddness is due to the difficulty in settling for a particular individual.

?'Stuff this cheap, can you imagine it is sold so poorly? For three people, how much on earth would they be willing to accept in order to buy (this stuff)?'

It is natural to conceive of a partition of the domain-restricted individuals into a majority plurality and the rest of individuals, as making this move can be seen as befitting a plausible discourse strategy of the speaker. For example, given (58a)'s context, it might not be realistic to know the price preferences of all the customers, so that knowing the preferences of a majority subgroup proves the most practical strategy. Even if the exhaustive information of all the customers is available, it might still be reasonable to break up the entire group into the majority subgroup and the rest, with the priority set to catering to the needs of the majority. None of these real world scenarios are enough in conceiving of a discourse strategy that involves the need to isolate a particular plurality of three individuals. While it is plausible to talk about the price preference of the majority within the entire context-relevant population, it is not clear what pattern of distribution underlies a partition into a group of three versus the rest of the population (How many individuals in toto? Why is three relevant w.r.t. the entire population?). Hence it is also unclear what discourse strategy is involved. This does not mean that there is something inherently inconceivable about such a discourse. Rather, my claim is that utterances such as (58b) require highly unnatural contexts and richly specified explicit knowledge.

Krifka (2001:193) observes the same problem for the English example in (59):

(59)   ?Which dishes did two boys make?
         'For two boys that you select: Which dishes did they make?'

The acceptability is claimed by Krifka to be marginal. This low acceptability of *two boys* similarly follows from the fact that it places a higher requirement on the discourse structure and on hearers' efforts to infer which particular group of two boys are relevant.

The natural prediction for this pragmatic story is that examples with witnessable numerals should be improvable, when a better scenario can be constructed that makes a coherent discourse strategy inferrable. This is indeed the case. For example, all my consultants either considered (60) to be fine, or to be at least vastly improved compared with the out-of-the-blue sentence in (58b).[31]

(60)   (A soccer coach needed a minimum of three more healthy players to fill up his squad for a match. He felt frustrated that the scheduled operations on his injured players were two months away)

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31 Some English speakers draw attention to a similar contextually-conditioned amelioration for witnessable numerals in English, in which 'which suits do two of the cards have?' is judged significantly better than 'which dishes did two boys make?'.

> Shangyuan   li   de zhishao san-ge   weishenme bu   neng xian
> injured.players inside REL at.least three-CLF why   NEG can   first
> anpai   shoushu?
> arrange.for operation
> 'For at least three of the injured players, why can't they be arranged to undergo operations first?'

One caveat is that the significant improvement is achieved by the use of a partitive form of the quantifier. According to my consultants, if we use a non-partitive form *zhishao san-ge shangyuan* 'at least three injured players', the sentence is still better than its out-of-the-blue counterpart, but is nowhere close to the fine judgment we are getting with the partitive quantified expression in (60). Note that Constant (2013, 2014) also reports that partitive forms of quantifiers more readily license a referential reading than non-partitive forms in English. At present, I do not know how to account for this, and have to leave an answer to future work.

Finally, numeral *why*-questions induce no intervention when embedded under *know*-class predicates. I illustrate this with the example in (61):

(61)   Wo (yijing) zhidao/faxian-le [san-ge   ren]^{CT} weishenme cizhi.
        I   (already) know/find.out-PRF three-CLF person why   resign
        'I (already) knew/found out for three people, why they resigned.'

Here the numeral carries a CT intonation contour. I assume that, in (61), the CT-containing embedded *why*-questions under *know*-class predicates are declarative sentences and express CT-answers. Following Ginzburg (1995), Ginzburg & Sag (2000) and Krifka (2001), *know*-class predicates select for proposition type complements, in which *wh*-complements denote answers of corresponding questions. *Wonder*-type predicates, in contrast, take genuine question-complements (This captures the fact that *know*-type, but not *wonder*-type, can embed *that*-clauses).

The crucial distinction here is between question type and proposition type: All question types fail to ameliorate. Thus, aside from direct questions, embedded questions under *wonder*-class predicates similarly induce degradedness, illustrated in (62) (repeated from example (i), footnote 7):

(62)   ?Xiao li {xiangzhidao/ wen} san-ge   ren   weishenme cizhi.
        little Li {wonder/   ask} three-CLF people why   resign
        'Little Li wonders/asks why three people resigned.'

I propose that a CT-declarative is subject to a congruence condition, the verification of which triggers existential quantification over the CT-marked topic referent (also assuming that existential binding applies to the choice function f). This allows a part-of relation to be established between the topic referent and an implied larger

individual. Specifically, drawing on Büring (2003), a CT-declarative answers a prior overall question that is about a larger individual (of which the CT-marked topic is a part). CT-answers (partially) address this larger question by resolving one of a sequence of subquestions. Thus, the shape of discourse a CT-answer appears in is constrained such that a local discourse is CT-congruent iff the CT-containing utterance answers the subquestion Q_1, but also indicates at least one sister subquestion Q_2, such that the sister subquestions, Q_1 and Q_2, address a common larger issue (Q). The congruence condition can be verified by checking for the existence of a larger issue and at least one contrasting subquestion that results from making substitutions for the CT-marked topic phrase.[32]

Verification of the CT-congruence of an out-of-the-blue *three people* CT-answer proceeds as follows. Given (61) out of the blue, the hearer identifies a larger overall question (Q) by inferring the existence of a larger plurality (i.e. $\exists X. |X| \geqslant 4$). The introduction of this larger plurality comes with a part-of relation that holds between the larger plurality and the topic referent (that is, there exists a plurality of three people such that it is contained within the larger plurality). Therefore, a plurality of three individuals is also introduced via existential quantification. Following the treatment of witnessable quantifier in our proposal, existential binding applies to the choice function f defined on the quantifier *three people*, such that the f-selected plurality is a part of the larger plurality X ($\exists X \, \exists f. \, |X| \geqslant 4 \wedge f(\llbracket three\ people \rrbracket) < X$) (where $<$ stands for the part-of relation). Also, at least one sister subquestion may be inferred. Given a subquestion (Q_1) that the CT-utterance is directly resolving, which asks about a choice function-selected plurality of three people, the sister subquestion asks about the rest of the individuals (of whom the CT-utterance does not resolve). That is, the overall question may be partitioned into the following set of subquestions: {Why did f($\llbracket three\ people \rrbracket$) resign? Why did the other individual resign?}. Through verifying one larger issue and at least one sister subquestion, the utterance of the *three people*-question (61) satisfies the congruence condition.

Importantly, a similar congruence condition is **not** defined on CT-questions. I follow Büring (2003) in assuming that CT congruence is only defined for declarative sentences. As (63) shows, direct CT-questions are degraded in Chinese (indicated with the *-ne* marker). Here the choice of the question form in (63a) shows that the degradedness is not due to the special property of *why*. (63b) further indicates that the degradedness is not confined to specific properties of CT-marked numerals.

(63)   a. ??[San-ge   ren]^{CT}-ne xiang gan shenme?
             three-CLF people-NE want do   what

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32 Standard definitions of subquestions make use of ct-value formation (Büring 2003; Rooth 2005; Constant 2014), according to which all contrasting subquestions belong to the set denoted by the CT utterance's ct-value.

'[Three people]^{CT}, what do (they) want to do? '

  b. ?[Xiao zhang]^{CT}-ne xiang gan shenme?

     little zhang-NE   want do what

     '[Little Zhang]^{CT}, what does (he) want to do?'

On this account, numerals are doubly excluded in direct questions. They cannot readily settle upon a particular plurality via discourse topics, and they cannot indicate a larger individual via contrastive topics. My account predicts that the *most*-quantifier similarly fails to receive CT-marking in direct questions (as evidence, a *-ne*-marked *most*-quantifier in a direct *why*-question is also degraded). However, *most* has the option of settling upon a majority plurality and receiving a discourse topic reading.

Embedded *wh*-questions can be implemented by making use of Krifka's (2001) type-shifting operation. I assume with Krifka that both *know*-class and *wonder*-class predicates embed question acts, but that verbs like *know* type-shift this question act to the set of true answers. Krifka posits an operator TA that shifts *know*'s *wh*-interrogative complement to the right type (from question acts to propositions). TA appears when *know*-class predicates select for a question complement (instead of *that*-clauses).

(64a) gives the semantics of the TA operator, and (64b) provides the semantics of a non-topicalized sentence *John knows why Mary resigned*. Here we assume with Krifka (2001) that $\oplus$ is a sum operator, and TA yields the sum of propositions that are true answers (any two propositions p, p' can form a sum proposition p$\oplus$p').[33]

(64)   a.   TA(REQUEST) = $\oplus$ {p | p is a true answer of REQUEST}

        b.   **know**$(w)($**j**$,(\oplus$ {p | p is a true answer to REQUEST$(\lambda q \exists r[reason(r) \wedge q = \lambda w[r$ CAUSE p *in* $w \wedge p = \lambda w'$ *resigned*$(\mathbf{m})(w')]])\}))$

We now go back to a CT topic-marked embedded *why*-question as follows:

(65)   Yuehan zhidao-le [san-ge   ren]^{CT} weishenme cizhi.

       John   know-PRF three-CLF person why   resign.

       'John knew for [a group of three people]^{CT}, why they resigned.'

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33 The semantics of *know* is spelled out as follows.

(i)   a. $[\![know]\!]^w = \lambda p \in D_{<s,t>}$: $[p(w) = 1]$ $\lambda x.\text{DOX}_x^w \subseteq p$, where $\text{DOX}_x^w = \{w' \in W$: x's beliefs in w are satisfied in $w'\}$

        b. $[\![John\ knows\ why\ Mary\ resigned]\!]^w = 1$ iff $\text{DOX}_\mathbf{j}^w \subseteq \oplus$ {p | p is a true answer to REQUEST$(\lambda q \exists r[reason(r) \wedge q = \lambda w[r$ CAUSE p *in* $w \wedge p = \lambda w'$ *resigned*$(\mathbf{m})(w')]])\}$

In addition, we should guarantee the exhaustivity of *know*'s answers (Lahiri 2002). That is, *John knows why Mary resigned* should also entail that John knows the reason(s) that does not cause Mary's resigning. The exhaustivity part is left out of my discussion here.

Here I assume that a topic takes the widest possible scope. In embedded questions, a contrastive topic raises to the leftmost position from its embedded position to make CT scope above everything (Constant 2014). As usual, the topic-comment structure is characterized in terms of structured meaning and lambda abstraction is triggered for the comment's matrix clause in line with Ebert et al. (2014):

(66) $\langle [\![$[three people]$^{\text{CT}}]\!]$, $\lambda x_i [\![$John knows why x_i resigned$]\!]\rangle$

The argument derived from the topic referent is supplied to the λ-abstracted matrix clause via the application of the special speech act resolution rule (repeated in (67)). Applying (67) to the structured meaning (66) yields the semantic interpretation in (68).

(67) $\text{ASSERT}(<\phi_{\text{topic}}, \psi_{\text{comment}}>) \rightarrow \text{REF}_{\text{X}}(\phi_{\text{topic}}) \,\&\, \text{ASSERT}(\psi_{\text{comment}}(\text{X}))$

(68) $[\![(66)]\!] = \exists f\, \text{REF}_{\text{y}}\, (y = f(\lambda x_{\text{e}}\, [\text{people}\,(x) \wedge |\, \text{Atoms}(x)\, | = 3]) \,\&\, \text{ASSERT}$
        $(\mathbf{know}(w)(\mathbf{j},(\oplus \{p \mid p \text{ is a true answer to } \text{REQUEST}(\lambda q \exists r[reason(r) \wedge q =$
        $\lambda w[r \,\text{CAUSE}\, p \text{ in } w \wedge p = \lambda w'\, resigned(y)(w')]])\})))$

In contrast, monotone decreasing quantifiers cannot be ameliorated in embedded contexts. (69) repeats an example from (9) (adding a CT intonation contour has no rescue effect):

(69)   #Wo (yijing) zhidao/faxian-le   henshao ren   weishenme cizhi.
         I   (already) know/find.out-PRF few   person why   resign
         #'I (already) knew/found out for few people, why they resigned.'

The choice function mechanism does not apply to a non-witnessable quantifier. As such, we can explain why monotone decreasing quantifiers consistently induce intervention.

Furthermore, if the previous literature (Kripke 1963; Partee 1973) is right about the parallelism drawn between adverbs of quantification and quantificational nominal phrases, in that the former quantify over times or possible worlds in the same way as the latter quantify over individuals, then we should expect that adverbs of quantification that are monotone non-decreasing are witnessable, and adverbs that are monotone decreasing are non-witnessable and shall never scope above *weishenme* (see also Constant 2013:294). As we already saw in (11) and (12) (repeated below), the quantificational adverb *dabufen shijian* 'most of the time' may take wide scope over *weishenme* when contexts allow speakers to infer a plurality of situations, such that they cover the majority of all the relevant situations. On the other hand, contextualization fails to rescue the intervention created by the quantificational adverb *henshao* 'seldom'.

(70) a. Ta dabufen shijian weishenme bei   xia-dao?
          he most   time   why   PASS scare-RES
          'Why was he scared for a majority of situations?'
      b. #Ta   henshao weishenme bei   xia-dao?
           he seldom   why   PASS scare-RES
          'Why was he scared for few occasions?'

5   Comparison with previous approaches

Aside from Ko (2005), there are other syntax-based theories of the Chinese inter-
vention effects in *why*-questions. This section reviews several recent minimalist
proposals assuming LF movement. I then show that this line of research holds out
little promise in accommodating the full range of data discussed in the previous
sections.

Building upon Beck (1996) and Pesetsky (2000), Soh (2005) proposes that *in
situ weishenme* 'why' undergoes covert feature movement at LF. According to Soh,
intervention effects detect the movement of the *wh*-feature, such that the feature
cannot be separated from what's left behind on the *wh*-phrase by a scope-bearing
element. Cheng (2009) echoes Soh's solution, taking intervention effects as one
crucial piece of evidence for the existence of feature movement.

Yang (2009, 2011) reformulates the feature movement approach in terms of
Relativized Minimality (Rizzi 1990, 2001, 2004). In Yang's analysis, intervention
follows from a minimality effect, according to which the quantificational 'likeness'
between a quantifier and the interrogative phrase *weishenme* 'why' means that
weishenme is attracted to the left periphery scope position only if it is closer to
the scope position than the quantifier is. Yang borrows from Starke (2001) and
Rizzi (2004) and proposes the following condition, in which the minimality effect is
captured in terms of a filter:

(71)   Maximal Matching Filter (Yang 2011:63)
        Let X and Y be bundles of features in a sequence of [...X...Y...]; Y cannot
        cross X when Y is maximally matched by X.

If a scopal element Y bears feature [F1] and needs to move to its left periphery
scope position, and if another scopal element X has the feature geometry that includes
the bundle [F1 F2], then the movement of Y from its initial merge position to its
scope position is blocked because the bundle [F1 F2] *maximally matches* [F1]. In
other words, the filter condition rules out the scope-taking of an operator at the left
periphery when a 'like' operator is closer to the scope position of said operator.

The criteria of operator type matching are determined as follows (Rizzi 2004:19):

(72)   (i) Argumental: person, number, gender, case
          (ii) Quantificational: Wh, quantifier, measure, focus...
         (iii) Modifier: evaluative, epistemic, Neg, frequentative, celerative, mea-
               sure, manner,...
          (iv) Topic

Based on this classification, quantifiers as well as focus-sensitive phrases (focus) possess the same quantificational feature as the interrogative operator (Wh). Apart from the quantificational feature, quantifier/focus also bear other features. In a [*Quant < Wh*] configuration, Maximal Matching Filter is violated during feature movement, because Wh's quantificational feature is maximally matched by the intervening quantifier.[34]

However, treating intervention in *why*-questions in terms of minimality is problematic upon closer scrutiny. This is because the minimality approach treats all quantifiers as legitimate interveners that block the LF movement of an interrogative operator. Quantifiers are interveners, simply because they bear a quantificational feature. Therefore, this approach would not predict the Chinese intervention pattern in *why*-questions, where the intervention is sensitive to the type of quantifier (monotone non-decreasing versus monotone decreasing). Instead, the approach as it stands should predict that a finer distinction within quantifier type won't make any difference in intervention. If quantifiers in general possess enough features to maximally match the interrogative operator, then by including monotonicity as a further dimension in the feature geometry we only increase the inventory of the feature set for the quantifiers. Therefore, both monotone increasing and decreasing quantifiers are supposed to maximally match the interrogative operator and block its covert movement. Given the lack of a well-motivated apparatus to allow only a

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34 Other *wh*-phrases, such as *shenme* 'what' and *zenme* 'how', do not cause intervention in the same way as *weishenme* 'why' does (Cheng & Rooryck 2000; Ko 2005; Soh 2005; Stepanov & Tsai 2008; Yang 2011). For Soh (2005), the absence of intervention is because these *wh*-phrases undergo covert phrasal movement, rather than feature movement. In phrasal movement, entire *wh*-phrases are pied-piped across quantificational interveners. As such, there is no separation between *wh*-feature and the restriction on *wh*-phrases (Pesetsky 2000). Yang (2011) accounts for the absence of intervention by resorting to the mechanism of unselective binding (Pesetsky 1987). Citing Cheng & Rooryck (2000), Yang endorses the view that *wh*-phrases have the option of being licensed at a distance by a Q operator that merges directly at [Spec, CP]. According to this view, in *weishenme* 'why'-questions, intervention arises because the *weishenme*-adjunct does not possess this option, and *ergo* must be licensed via covert feature movement. In contrast, other *wh*-phrases can be licensed by unselective binding and undergo no movement, in which case Maximal Matching Filter is vacuously satisfied and no intervention arises. Note in addition that Yang's framework is also compatible with a phrasal movement solution: Pied-piped *wh*-phrases may be argued to bear more features than intervening quantifiers, therefore Maximal Matching Filter is not violated, unlike in feature movement.

subset of quantifiers to block LF movement, it seems that the validity of a minimality account is in question.

Conceivably, we can modify the feature geometry so as to make quantifier monotonicity the only relevant feature in maximal matching. However, the problem still persists with regard to the mild degradation witnessed for monotone increasing modified numerals and non-monotonic bare numerals. By incorporating monotonicity into the feature matching account, it is still not clear how to address the three-way distinction of acceptability-mild degradation-unacceptability that we have seen in Section 1 (specifically examples (4) through (6)). Another difficulty has to do with the disappearance of such mild degradation in embedded questions. Under embedded contexts, a minimality account predicts that the covert interrogative operator still moves to take the embedded [Spec, CP] scope position (crossing the quantificational interveners along the way). Hence, even assuming that quantifier types can be fine-tuned to accommodate the full array of intervention data in matrix questions, it is mysterious how a minimality account handles the selective amelioration phenomenon in the embedded questions of (7)-(9) in a principled manner.[35]

Related to the current proposal, a topic-based analysis of the quantifier-induced intervention is proposed by Grohmann (2006) for German. Grohmann points out that, in multiple *wh*-constructions, intervention arises in monotone decreasing environments, but not in monotone increasing environments. The monotone property of quantifiers, he claims, is underlied by topicalizability, since decreasing quantifiers are not topicalizable in German.[36] Grohmann suggests a syntactic account in which quantifiers must be hosted in topic positions. He posits that all *wh*-items in a German multiple *wh*-construction overtly move to landing sites at the high end of the articulated CP, such that the quantifier sandwiched between two landing sites has to occupy the Top^0 position, and hence must be topicalizable. The present paper does not attempt to make crosslinguistic comparisons. It is possible that a substantive link between Chinese *why*-questions and German multiple *wh*-questions (in terms of topicalizability) can be established in future investigations, if we can predict which language-specific constructions license a topical reading for quantifiers (e.g. as I

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35 There is another issue with incorporating a refined quantifier-specific feature into a minimality account. Section 4 has mentioned that proposition-level adverbs (such as *yiding* 'definitely') also induce intervention when preceding *weishenme*. In my proposal, this phenomenon is subsumed under a uniform wide-scope theory of *weishenme*-questions. A feature-matching approach, on the other hand, cannot unify such adverb-induced intervention with quantifier-induced intervention, as these adverbs are not quantificational. Therefore, one has to posit two types of intervention in *weishenme*-questions.

36 Mayr (2013) adds to Grohmann's empirical generalization by reporting that non-decreasing modified numerals elicit mild degradation. If this judgment holds up, then the German distribution would resemble my proposed pattern in Chinese *why*-questions (Mayr does not discuss amelioration in embedded clauses).

have argued, the high merge position of Chinese *why*-adjunct, combined with the fact that Chinese is a scope-rigid language, crucially causes pre-*why* quantifiers in Chinese to reside in a topic position).

6   Conclusion

The present paper explains the intervention effects in Chinese *weishenme* 'why'-questions by looking into the interaction between *why* and quantificational topics. The major descriptive generalization is that monotone decreasing quantifiers never scope above *weishenme* at surface, with *weishenme* 'intervening' between those quantifiers and the rest of the sentence. In my analysis, an *in situ weishenme* merges at the position where it syntactically checks off the *wh*-feature and semantically gets interpreted. Quantifiers to the left can only be interpreted as topics, giving rise to a secondary speech act in the sense of Jacobs (1984) and Krifka (2001). A topical interpretation is possible when quantifier determiners give rise to witnessability (in the sense of Chierchia 1993; Reinhart 1997; Szabolcsi 2010), thus excluding monotone decreasing quantifiers. Witnessable numerals are also degraded in apparent intervention configurations, unless these sentences are embedded. I argue that this is due to the lack of context in root sentences, thus leaving the choice function variables (that select a plural referent for witnessable quantifiers) without a value. In combining a disparate set of independently motivated ideas, the current analysis arrives at a uniform semantic solution to a rich array of empirical facts.

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