

Two disjunctions in Mandarin Chinese

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Mandarin Chinese has two disjunctors, *háishi* and *huòzhe*. Alternative questions use *háishi* whereas logical, boolean disjunction is expressed with *huòzhe*. Building on previous decompositional analyses of disjunction, I propose that *háishi* spells out the junctor head J which projects its disjuncts as Roothian alternatives, whereas *huòzhe* spells out a version of the J head that must be existential closed, forming a quantifier. This account contrasts from previous work on disjunction in Mandarin, which requires *háishi* to move at LF or which requires the two disjunctors to differ in the size of disjuncts. Evidence comes from focus intervention effects and island (in)sensitivity.

I also consider environments where *háishi* and *huòzhe* are interchangeable, with disjunctive or conjunctive interpretation, which are also precisely where *wh*-phrases are used quantificationally. I offer a semantic characterization for these environments and argue against possible syntactic accounts. The distributions and interpretations of these disjunctors and *wh*-phrases in Mandarin Chinese form an argument for the two-dimensional Roothian Alternative Semantics framework over similar one-dimensional frameworks such as Hamblin semantics, from an empirical domain other than focus.

Keywords disjunction, alternative questions, *wh*-quantification, Alternative Semantics, Mandarin Chinese

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1 Introduction

Mandarin Chinese has two disjunctors: *háishi* and *huòzhe*. The sentences in (1a) and (1b) are superficially identical but for the choice of disjunction. Example (1a) uses *háishi* and must be interpreted as an alternative question, which is answered by identifying which person Zhang San likes. Equivalents of ‘yes’ or ‘no’ are not valid replies to question (1a). In contrast, example (1b) uses *huòzhe* and must be interpreted as a logical disjunction.¹

(1) Two disjunctors in Mandarin Chinese:

a. *háishi* ⇒ alternative question:

Zhāng Sān xǐhuān Lǐ Sì *háishi* Wáng Wǔ (ne)?

Zhang San like Li Si HAISHI Wang Wu NE

‘Does Zhang San like Li Si or Wang Wu?’ (alternative question)

b. *huòzhe* ⇒ boolean disjunction:

Zhāng Sān xǐhuān Lǐ Sì *huòzhe* Wáng Wǔ.

Zhang San like Li Si HUOZHE Wang Wu

‘Zhang San likes Li Si or Wang Wu.’

Such contrasts have led previous authors to posit a syntactic difference between these two disjunctions, such as bestowing *háishi* disjunctions with a [+wh] feature which must be checked by a question complementizer (Huang 1982, Huang, Li, and Li 2009, Tsai 2015).

There are, however, other environments where this difference is “neutralized.” This includes universal quantification with *dōu* as in (2), but also in conditional antecedents and consequents, and within the scope of epistemic modals and (high) negation—all environments that license non-interrogative interpretations of *wh*-phrases in Mandarin (see e.g. Lin 1998b). Note in particular that (2) with *háishi* does not have an interpretation as an alternative question.

¹Example (1b) can be made to be a polar question with the addition of the sentence-final polar question particle *ma*, but this still differs from (1a): (1a) disallows simple ‘yes’ or ‘no’ answers (Li and Thompson 1981:561ff), whereas these are the expected answers to a polar question built on (1b) with *ma*. The optional but frequent sentence-final *ne* particle on alternative questions such as (1a) will be discussed in section 2.2.

The disjunctor *huòzhe* can also be *huòshi* or simply *huò*. Some speakers report some preferences between these depending on the environment, but there seems to be some variation amongst speakers. For uniformity, here I use *huòzhe* throughout.

(2) *Háishi* and *huòzhe* are interchangeable in certain contexts:

Zhāng Sān *háishi*/*huòzhe* Lǐ Sì dōu jìn-lái-le.

Zhang San HAISHI/HUOZHE Li Si DOU enter-come-LE

‘Both Zhang San and Li Si came in.’

In a two-dimensional Alternative Semantics (Rooth 1985, 1992, von Stechow 1991), I propose two operators: a junctor head J which collects the ordinary values of disjuncts into a set of alternatives, and an existential closure operator \exists that operates over these alternatives. I propose that *huòzhe* realizes a J head which requires a local \exists , whereas *háishi* realizes the junctor J alone, resulting in an alternative set with no ordinary denotation, akin to the denotation of *wh*-phrases in Ramchand (1997), Beck (2006), Kotek (2014, to appear). These alternatives may be quantified over in certain alternative-sensitive environments such as with *dōu* in (2) or otherwise must be interpreted as a question as in (1a), just as *wh*-phrases are interpreted in Mandarin. This analysis is presented in section 2. The approach accords with many proposals that advocate for the decomposition of disjunction in other languages into similar ingredients, such as Winter (1995, 1998), Den Dikken (2006), Slade (2011), Szabolcsi (2013, 2015), Mitrović and Sauerland (2014), Uegaki (2016).

In section 3, I argue that both *huòzhe* and *háishi* disjunction take disjuncts of various sizes. In particular, *háishi* in alternative questions does not have to take disjuncts of clausal size—with conjunction reduction to give the appearance of local disjunction—as has been proposed by Ray Huang (2010) for Mandarin and which has been suggested more generally for a range of languages by Han and Romero (2004b).

In section 4, I show that the region between *háishi* disjunctions and the clause edge is susceptible to focus intervention effects (Beck 2006, Beck and Kim 2006). This supports my proposal that these disjunctions are interpreted in-situ at LF through the computation of Rooth-Hamblin alternatives. This evidence joins previous evidence from Huang (1991) that *háishi* disjunctions are sensitive to syntactic islands, in arguing against any analysis where *háishi* disjunction moves covertly at LF (Huang 1982, Huang, Li, and Li 2009).

Finally, in section 5, I discuss environments that “neutralize” the difference between *háishi* and *huòzhe*, as in (2). I show, following Hsin-yin Lin (2008), that these neutralizing contexts are precisely those environments which license non-interrogative uses of *wh*-phrases. I propose the generalization that these environments are those where only the alternative set dimension of meaning is used for interpretation, which accurately predicts their distribution under my proposal. I argue against syntactic analyses where *háishi* is

distinguished from *huòzhe* through a syntactic feature such as [+wh] or [+Q], unlike in a number of previous analyses.

Mandarin Chinese is far from the only language that makes such a lexical cut between these two types of disjunctors, which Haspelmath (2007) calls “interrogative” vs “ordinary.” A non-exhaustive list includes Albanian, Amharic, Egyptian and Syrian Arabic, Basque, Buriat, Finnish, Georgian, Gothic, Kannada, Latin, Lithuanian, Malagasy, Marathi, Polish, Sinhala, Somali, Vietnamese, and Yoruba; see Moravcsik (1971), Alonso-Ovalle (2006), Slade (2011), Winans (2013), Mauri and van der Auwera (2012) and references therein.² The analysis here offers what is, to my knowledge, the first analysis for interrogative vs ordinary disjunctions in any language in Alternative Semantics, and the first to account for environments where the two disjunctions become interchangeable. In the conclusion in section 6, I argue that the two-dimensional Rooth-Hamblin semantics is crucial for this deriving the full set of Mandarin facts captured here.

2 Proposal

My proposal is couched within the framework of Alternative Semantics (Rooth 1985, 1992) and its extension to interrogatives, which builds on Hamblin (1973) and is often associated with Beck (2006). The key features of this framework, which I call *Rooth-Hamblin Alternative Semantics*, is that it is two-dimensional and that the same alternative set dimension is used both for the computation of focus alternatives and interrogative (Hamblin) alternatives.

In Alternative Semantics, each node α in the syntax is associated with two meanings in different “dimensions”: the ordinary semantic value $\llbracket \alpha \rrbracket^o$ and a set of alternatives $\llbracket \alpha \rrbracket^{alt}$.³ The interpreted meaning of an utterance is its ordinary semantic value. Alternative sets are computed compositionally parallel to the computation of ordinary semantic values, in a manner described below.

I first describe the function of J , the abstract, polyadic functional head underlying

²To the best of my ability, here I do not include languages with two disjunctors which clearly take disjuncts of different syntactic size. Japanese is one such example, where *soretomo* forms alternative questions by disjoining clausal constituents, whereas *ka* can form logical disjunctions out of subclausal disjuncts. See Uegaki (2014b, 2016) for discussion.

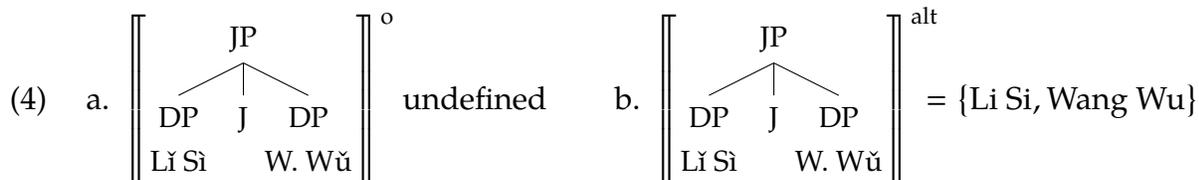
³In Rooth (1992) and much following work, the alternative set is called the “focus-semantic value” and annotated $\llbracket \alpha \rrbracket^f$. The use of this “alternative” dimension for focus alternatives but also for the interpretation of interrogatives, following Hamblin (1973), makes the term “focus-semantic value” somewhat misleading, so I use the notation $\llbracket \alpha \rrbracket^{alt}$ here, following e.g. Uegaki (2016). I write syncategorematic entries here for alternative-generating lexical items such as J in (3) and for alternative-sensitive operators such as \exists in (5) below, the latter instead of using Rooth’s squiggle \sim operator.

disjunctions (Den Dikken 2007), which is the common core of both *háishi* and *huòzhe*. J collects the ordinary semantic values of its disjuncts into a set, which is then the alternative set denotation for the JP. The ordinary semantic value of JP is undefined.

(3) **The semantics of J:**

- a. $\llbracket J x_1, \dots, x_n \rrbracket^o$ undefined
- b. $\llbracket J x_1, \dots, x_n \rrbracket^{alt} = \{\llbracket x_1 \rrbracket^o, \dots, \llbracket x_n \rrbracket^o\}$

J here is defined for an arbitrary number of arguments, though in most examples here I will illustrate its use with two disjuncts. For example, consider the disjunction of two DPs of type *e*, Li Si and Wang Wu, as in the examples in (1a) above.



Previous work such as Winter (1995, 1998), Alonso-Ovalle (2006), Simons (2005), Szabolcsi (2013, 2015) share the idea that (dis)junction collects a set of alternatives which then trigger the computation of corresponding alternatives at higher levels of structure (via pointwise composition, described below). However, these previous proposals are couched in a one-dimensional Hamblin semantics. My proposal for J in (3) is a particular implementation of this idea within Rooth’s two-dimensional Alternative Semantics. As we will see, the organization of meanings into these two dimensions will be crucial to modeling the differences and similarities between Mandarin *háishi* and *huòzhe*.

Meanings such as the JP with denotations in (4) are not by themselves interpretable, as ordinary semantic values are what are actually interpreted. Some higher alternative-sensitive operator must construct an ordinary semantic value based on the alternatives, so that the utterance root can be interpreted. Canonically, this happens in one of two ways: either an operator \exists existentially quantifies over these alternatives, resulting in boolean disjunction, or the alternatives are used to form a question, with each alternative corresponding to a possible answer. Other uses of the alternatives generated by J—in environments where *háishi* and *huòzhe* become interchangeable—are discussed in section 5.

2.1 Logical disjunctions with *huòzhe*

I first discuss the application of existential closure over the alternatives introduced by J, corresponding to the canonical uses of *huòzhe* as a logical disjunction. I define the abstract, unary existential closure operator \exists as in (5) below. Existential closure over propositional alternatives has been proposed in e.g. Kratzer and Shimoyama (2002), but here I follow Uegaki (2016) in adopting a cross-categorial meaning for \exists which applies to nodes of non-propositional type as well.⁴

(5) Existential closure of node α of type τ :

$$\begin{aligned} \text{a. } \llbracket \exists \alpha \rrbracket^o &= \begin{cases} \bigvee \llbracket \alpha \rrbracket^{\text{alt}} & \text{if } \tau = t \\ \lambda P_{\langle \tau, t \rangle} . \exists x \in \llbracket \alpha \rrbracket^{\text{alt}} [P(x)] & \text{otherwise} \end{cases} \\ \text{b. } \llbracket \exists \alpha \rrbracket^{\text{alt}} &= \llbracket \alpha \rrbracket^{\text{alt}} \end{aligned}$$

I propose that *huòzhe* is the realization of a J head—with the semantics in (3)—with a syntactic requirement for a local \exists operator. I also propose that \exists cannot be freely adjoined in the absence of a trigger such as the *huòzhe* J head that requires it, which will become important in the following section. I encode this requirement with the uninterpretable feature $[\text{u}\exists]$ on the J pronounced *huòzhe* which must be checked by Agree,⁵ but the syntactic details of this licensing are not crucial here.

For example, if \exists applies directly to the JP in (4), we yield the generalized quantifier meaning for the disjunction ‘Li Si or Wang Wu’ in (6). The resulting alternative set is equal to that for the JP: $\llbracket \exists \text{JP} \rrbracket^{\text{alt}} = \llbracket \text{JP} \rrbracket^{\text{alt}} = \{\text{Li Si}, \text{Wang Wu}\}$ (4b). The resulting two-dimensional denotation for $[\exists \text{JP}]$ is equivalent in both dimensions to that of the English disjunction *Li Si or Wang Wu* according to the two-dimensional proposals of von Stechow (1991:53ff) and Beck and Kim (2006).

$$(6) \quad \left[\begin{array}{c} \exists \quad \text{JP} \\ \text{DP} \quad \text{J}[\text{u}\exists] \quad \text{DP} \\ \text{Li Si} \quad \text{huòzhe} \quad \text{W. Wu} \end{array} \right]^o = \lambda P_{\langle e, t \rangle} . P(\text{Li Si}) \vee P(\text{Wang Wu})$$

⁴The presentation in (5) is an extensional version of Uegaki’s intensional formulation. The intensional variant is easily arrived at by replacement of t with $\langle s, t \rangle$.

⁵This follows the syntactic treatment of German *irgendein* as an existential-closure-dependent alternative generator in Kratzer and Shimoyama (2002). Tsai (2015) also suggests a similar syntactic feature for *huòzhe* (p. 62), but Tsai also proposes marking *háishi* as $[\text{+Q}]$ (p. 52), similar to Huang’s (1982) $[\text{+wh}]$, which is unnecessary in the proposal here.

In object position as in example (1b), repeated here as (7), the structure in (6) would have to QR to a node of propositional type.

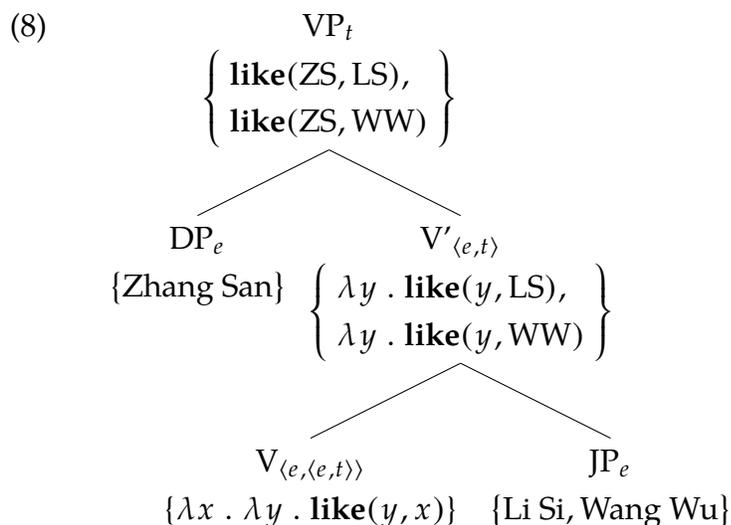
(7) **Boolean disjunction with *huòzhe* (=1b):**

Zhāng Sān xǐhuān [JP Lǐ Sì *huòzhe* Wáng Wǔ].

Zhang San like Li Si HUOZHE Wang Wu

‘Zhang San likes Li Si or Wang Wu.’

Alternatively, \exists may adjoin at a higher node of propositional type. Following Huang (1993), I assume the VP-internal subject hypothesis for Mandarin Chinese and describe the base position of agents as Spec,VP, making VP a node of propositional type. The tree in (8) illustrates the VP in (7) with the subject reconstructed in its VP-internal position, with alternative sets and the types of their elements indicated at each node.



As is reflected in (8), the alternative set for a branching node with daughters β and γ is computed by crossing each denotation in $\llbracket \beta \rrbracket^{\text{alt}}$ with each denotation in $\llbracket \gamma \rrbracket^{\text{alt}}$ and composing them using the appropriate rule of composition, e.g. function application. This process is called *Pointwise Composition* in much literature on Alternative Semantics. By default, the alternative set for a node α is simply the singleton set with its ordinary value, $\llbracket \alpha \rrbracket^0$. Each alternative in $\llbracket \text{JP} \rrbracket^{\text{alt}}$ of type e corresponds to an alternative of propositional type in $\llbracket \text{VP} \rrbracket^{\text{alt}}$.

Note that the node JP in (8) does not have an ordinary semantic value, as defined in (3). The nodes V' and VP, which are dependent on the denotation of JP, will therefore also

be undefined.

The application of \exists at this level creates an ordinary semantic value by disjoining the propositional alternatives, yielding the intended interpretation:

$$(9) \quad \llbracket \exists \text{ VP} \rrbracket^{\circ} = \mathbf{like}(\text{Zhang San}, \text{Li Si}) \vee \mathbf{like}(\text{Zhang San}, \text{Wang Wu}) \quad = \llbracket (7) \rrbracket^{\circ}$$

The height at which \exists adjoins to a propositional node will determine the observed scope of the disjunction, much as the height of QR of a generalized quantifier formed with \exists (6) would. An important remaining question is exactly where \exists is allowed to adjoin. Unfortunately, in my experience I have found these scope facts difficult to pin down, with significant speaker variation. For example, Lin (2008) claims that *huòzhe* in an embedded clause always takes narrow scope within the embedded clause (see pages 20, 31), but only some of my speakers report judgments compatible with Lin's claim. I will therefore leave this question open for future research.

2.2 Alternative questions with *háishi*

I propose that *háishi* is the pronunciation of the J head without syntactic requirement for existential closure with \exists , the uninterpretable $[u\exists]$ feature, and that \exists cannot be freely adjoined in the absence of this feature. Consider the basic alternative question example (1a) from above, repeated here as (10).

(10) Alternative question with *háishi* (=1a):

Zhāng Sān xǐhuān [_{JP} Lǐ Sì *háishi* Wáng Wǔ] (ne)?
 Zhang San like Li Si HAISHI Wang Wu NE

‘Does Zhang San like Li Si or Wang Wu?’

The semantic denotation for the TP clause in (10), modulo the contribution of tense/aspect semantics which I do not consider here, is equal to the denotation of the VP illustrated in (8) above. The alternative set contains two propositions, which I intensionalize here—corresponding to Zhang San liking Li Si and Zhang San liking Wang Wu. Its ordinary semantic value is undefined:

$$(11) \quad \text{a. } \llbracket \text{TP} \rrbracket^{\circ} \text{ undefined} \quad \text{b. } \llbracket \text{TP} \rrbracket^{\text{alt}} = \{ \wedge \mathbf{like}(\text{ZS}, \text{LS}), \wedge \mathbf{like}(\text{ZS}, \text{WW}) \}$$

Recall that whole utterances are interpreted as their ordinary semantic values. TP here cannot stand alone as an utterance.⁶ We need an operator that defines an ordinary semantic value—in this case of a question—based on the denotation in (11). Following Kotek (2016, to appear), I call this operator *ALTSHIFT*:

(12) **AltShift (Kotek 2016, to appear):**

- a. $\llbracket \text{ALTSHIFT } \alpha \rrbracket^{\circ} = \llbracket \alpha \rrbracket^{\text{alt}}$
- b. $\llbracket \text{ALTSHIFT } \alpha \rrbracket^{\text{alt}} = \{ \llbracket \text{ALTSHIFT } \alpha \rrbracket^{\circ} \} = \{ \llbracket \alpha \rrbracket^{\text{alt}} \}$

The denotation for *ALTSHIFT* in (12) is equivalent to the semantics that Beck (2006) and Beck and Kim (2006) attribute to the interrogative complementizer (Beck and Kim 2006:177), but Kotek argues that this function should be attributed to an adjoining operator distinct from the complementizer, but which must adjoin to an interrogative CP or a segment thereof. See Kotek (to appear) for discussion and see also footnote 12 below for my own rationale from Mandarin alternative questions for adopting Kotek’s *ALTSHIFT* proposal. The complementizer itself is semantically vacuous: $\llbracket \text{CP} \rrbracket = \llbracket \text{TP} \rrbracket$.

ALTSHIFT applied to the CP built from (11) results in a set of propositions as its ordinary semantic value, each corresponding to different possible answers, i.e. a question denotation (Hamblin 1973):

- (13) a. $\llbracket \text{ALTSHIFT CP} \rrbracket^{\circ} = \{ \wedge \text{like}(\text{ZS}, \text{LS}), \wedge \text{like}(\text{ZS}, \text{WW}) \}$
- b. $\llbracket \text{ALTSHIFT CP} \rrbracket^{\text{alt}} = \{ \{ \wedge \text{like}(\text{ZS}, \text{LS}), \wedge \text{like}(\text{ZS}, \text{WW}) \} \}$

The idea that an operator—here, *ALTSHIFT*—“lifts” a set from the alternative dimension into the ordinary dimension is due to Beck (2006) and Beck and Kim (2006). Beck and Kim discuss the interpretation of *wh*-phrases in-situ at LF and propose that *wh*-phrases have no ordinary semantic value but take the set of individuals in their domain as their alternative denotations, just as Ramchand (1997) independently proposed earlier:

(14) **The denotation of *wh*-phrases (Ramchand 1997, Beck 2006, Beck and Kim 2006):**

- a. $\llbracket \text{which book} \rrbracket^{\circ}$ undefined
- b. $\llbracket \text{which book} \rrbracket^{\text{alt}} = \{ x : x \text{ is a book} \} = \{ \text{Moby Dick}, \text{War and Peace}, \dots \}$

⁶Beck (2006:16) calls this requirement for root nodes to have an ordinary semantic value the *Principle of Interpretability*.

A clause including *which book* will end up with a denotation akin to our (11) above: no ordinary semantic value, but a set of propositions as its alternative set. The application of ALTSHIFT to this structure yields an interpretable *wh*-question. See also Kotek (2014, 2016, to appear) for a recent extension of this approach to the compositional semantics of a range of *wh*-question constructions cross-linguistically. Beck and Kim (2006) extends this approach to the interpretation of alternative questions, with disjunctions projecting alternatives which are interpreted by ALTSHIFT, which is a precursor to my analysis of *háishi* alternative questions.

It's worth noting that the interrogative complementizer and ALTSHIFT (12) are both distinct from the sentence-final particle *ne* which commonly marks the end of matrix alternative questions, as in (10).⁷ As convincingly argued in Constant (2014), Mandarin sentence-final *ne* is a marker of contrastive topic. Briefly, contrastive topics correspond to different sub-questions within a discourse strategy (family of questions); see e.g. Roberts (1996/2012), Büring (2003), Constant (2014) for more. Constant shows that Mandarin sentence-final *ne* is licensed in both declaratives and questions when the clause is congruent to a sub-question within a strategy or itself represents an entire strategy. As Constant notes, any alternative question denotation such as 'Does Zhang San like Li Si or Wang Wu?' (13a) can be mapped to a family of polar questions of the form {Does Zhang San like Li Si?, Does Zhang San like Wang Wu?}—an idea that Constant (pp. 341ff) attributes to discussion in Han and Romero (2004b: footnote 14). This consistently licenses the use of sentence-final *ne* in matrix alternative questions and, indeed, Constant observes that "It appears to be a robust generalization that matrix alternative questions with *háishi* can always be marked with a final *ne*" (p. 341). See chapter 4 of Constant (2014) for detailed discussion.

⁷A brief note on the syntax of sentence-final *ne*: Previous work such as Cheng (1991) proposed that sentence-final *ne* is a dedicated clause-typing complementizer for constituent questions, but I follow Constant (2014) in taking a contrary view.

The current consensus regarding the syntax of Chinese sentence-final particles is that they are head-final heads in the clausal spine; see e.g. Paul (2014) and Erlewine (2017). The cooccurrence of an interrogative complementizer and *ne* in matrix alternative questions can be naturally modeled within a Split CP architecture as in Rizzi (1997).

The fact that *ne* is limited to matrix clauses is a general property of Chinese sentence-final particles in the clause periphery (Paul 2014, Erlewine 2017). In contrast, I assume that embedded alternative questions are syntactically typed as interrogatives, requiring a local ALTSHIFT, even though *ne* cannot appear for these embedded questions. This is yet another reason to distinguish sentence-final *ne* from the complementizer.

Note that there is also another sentence-final *ne* in Mandarin Chinese, which marks durative aspect. Unlike contrastive topic *ne*, aspectual *ne* is available in embedded clauses. See Constant (2011) for details.

2.3 Don't lose the prejacent!

I now propose a condition on the use of ALTSHIFT in (12), not spelled out in earlier work that invokes such an operator (e.g. Beck 2006, Beck and Kim 2006, Kotek 2014, 2016).⁸ Building on discussions with Hadas Kotek (p.c.), the requirement is stated in (15):

(15) **Don't Lose The Prejacent!**

$\llbracket \text{ALTSHIFT } \alpha \rrbracket^{\circ}$ is only defined if $\llbracket \alpha \rrbracket^{\circ}$ is undefined or if $\llbracket \alpha \rrbracket^{\text{alt}}$ is a singleton set.

The intuition behind this condition is as follows. Recall that the two-dimensional Alternative Semantics framework adopted here was developed first for the interpretation of focus in Rooth (1985, 1992). If a constituent α is focused or focus-containing, it will have a non-singleton set of alternatives $\llbracket \alpha \rrbracket^{\text{alt}}$, one of which is the stated value—the *prejacent*, $\llbracket \alpha \rrbracket^{\circ}$. For example, the ordinary semantic value and alternative set for the sentence *Sarah likes [MARY]_F* is given in (16). The alternatives in $\llbracket \text{TP} \rrbracket^{\text{alt}}$ vary in the position of focus and $\llbracket \text{TP} \rrbracket^{\circ}$ encodes the choice of prejacent.

(16) **Two-dimensional Alternative Semantics encodes the choice of prejacent:**

- a. $\llbracket \llbracket \text{TP Sarah likes [MARY]_F \rrbracket^{\circ} \rrbracket^{\circ} = \wedge \text{like}(\text{Sarah}, \text{Mary})$
- b. $\llbracket \llbracket \text{TP Sarah likes [MARY]_F \rrbracket^{\text{alt}} \rrbracket^{\text{alt}} = \left\{ \begin{array}{l} \wedge \text{like}(\text{Sarah}, \text{Mary}), \\ \wedge \text{like}(\text{Sarah}, \text{Bill}), \dots \end{array} \right\}$

The application of ALTSHIFT to a meaning of this form in (16) results in denotations as in (17). Notice that the original choice of prejacent (*Mary*, as opposed to *Bill* etc.) has been lost.

(17) **Misapplication of Q loses the prejacent information:**

- a. $\llbracket \llbracket \text{ALTSHIFT TP} \rrbracket^{\circ} \rrbracket^{\circ} = \llbracket \llbracket \text{TP} \rrbracket^{\text{alt}} \rrbracket^{\text{alt}} = \left\{ \begin{array}{l} \wedge \text{like}(\text{Sarah}, \text{Mary}), \\ \wedge \text{like}(\text{Sarah}, \text{Bill}), \dots \end{array} \right\}$
- b. $\llbracket \llbracket \text{ALTSHIFT TP} \rrbracket^{\text{alt}} \rrbracket^{\text{alt}} = \left\{ \left\{ \begin{array}{l} \wedge \text{like}(\text{Sarah}, \text{Mary}), \\ \wedge \text{like}(\text{Sarah}, \text{Bill}), \dots \end{array} \right\} \right\}$

⁸Beck and Kim (2006) do propose their own condition on the application of ALTSHIFT: “ $\llbracket \llbracket \text{ALTSHIFT } \alpha \rrbracket^{\circ} \rrbracket^{\circ}$ is only defined if $\llbracket \alpha \rrbracket^{\text{alt}}$ has two or more members” (p. 185, with notation changed), motivated by the idea that “a singleton set is not appropriate as a question meaning.” However, here I follow Erlewine & Kotek (ms) in adopting the view that polar questions have singleton set denotations, with the single element corresponding to their *yes* answer (Roberts 1996/2012, Abels 2005, Biezma and Rawlins 2012).

The proposed constraint in (15) militates against such prejacent-destroying applications of ALTSHIFT. The statement reflects the fact that there are two situations in which ALTSHIFT will not lose prejacent information: when the ordinary semantic value is undefined (i.e. when there is no prejacent chosen among the alternatives) and when there is only one alternative. See Erlewine & Kotek (ms) for discussion of the latter case.

The demonstration in (16–17) above provides important empirical motivation for this constraint. Notice that the denotation we yield by applying ALTSHIFT to a focus-containing clause in (17) is equivalent to the denotation for the *wh*-question *Who does Sarah like?* within this framework. If ALTSHIFT were allowed to freely apply to the clause *Sarah likes [MARY]_F*, then, we predict it to be interpretable as a constituent question, contrary to fact. A constraint such as Don't Lose The Prejacent! (15) is necessary to block this illicit question interpretation of focus.

Returning now to disjunction in Mandarin Chinese, Don't Lose The Prejacent! blocks the application of ALTSHIFT to clauses where \exists has been applied and introduces an ordinary semantic value. Given the correlation between \exists and the $[u\exists]$ feature on *huòzhe* proposed in the previous section, this amounts to blocking the use of ALTSHIFT with *huòzhe* disjunctions, which would turn them into alternative questions. This derives the basic one-to-one correlation in simple case as in (1) of *háishi* with alternative questions on the one hand and *huòzhe* with logical disjunction on the other. Other contexts, where *huòzhe* and *háishi* become interchangeable, will be discussed in section 5.

3 On the syntax of *huòzhe* and *háishi* disjunction

I now briefly discuss the syntax of *huòzhe* and *háishi* disjunctions. I argue that both disjunctions can take XPs of any category as their disjuncts, for example allowing for the local disjunction of DPs as in the 'Li Si *huòzhe/háishi* Wang Wu' examples above. However, disjunction at the clausal level with stripping/bare argument ellipsis can lead to the appearance of discontinuous disjuncts.

Han and Romero (2004b) argue that, in English, Hindi, and Korean, disjunctions for alternative questions necessarily take disjuncts of clausal size (in their terms, IP or VP), even though these languages have logical disjunctions of DP. This discussion suggests that alternative questions perhaps universally must take disjuncts of clausal size. The arguments here that Mandarin *háishi* does not require clausal disjuncts, contra Huang (2010), is thus an important contribution for our understanding of the typology of the

alternative question syntax/semantics.⁹

My primary evidence for local disjunction in *háishi* disjunction comes from the placement of the focus particle *shì* (see e.g. Teng 1979). *Shì* is a focus-sensitive operator with cleft-like semantics.¹⁰ What is important here is its syntactic distribution: *shì* adjoins to the clausal spine and is required to be as low as possible while taking its focus in its scope (Paul and Whitman 2008, Erlewine 2015a).¹¹

For example, for *shì* to associate with a narrow focus within the VP, it must adjoin directly to the VP (18). The position between the verb and object is banned because *shì* must adjoin to the clausal spine and cannot adjoin directly to DPs. The position before the subject is not possible as a lower position (adjoining to VP) was possible. In contrast, *shì* must adjoin to TP in the case of subject focus (19), as that is the lowest position from which *shì* can associate with the focus.

(18) **Focus on object** ⇒ **pre-verbal *shì***

{*shì} Wǒ {√shì} mǎi-le {*shì} [kāfēi]_F gěi Zhāng Sān.
SHI 1sg SHI buy-LE SHI coffee give Zhang San

‘I bought [coffee]_F for Zhang San.’ (...not tea)

(19) **Focus on subject** ⇒ **pre-subject *shì***

{√Shì} [māo]_F {*shì} tōu-le yú.
SHI cat SHI steal-LE fish

‘[The cat]_F stole the fish.’ (...not the dog)

The same syntactic restriction is observed with *shì* associating with the *háishi* disjunctions in alternative questions. If we have a disjunction of objects, *shì* can adjoin to VP, but not higher or lower (20). If we have a disjunction of subjects, *shì* can adjoin to TP (21).

⁹Uegaki (2014a: section 4.1) similarly considers and rejects the view that alternative questions cross-linguistically all involve clausal disjunctions, but without in-depth argumentation.

¹⁰The addition of *shì* adds constraints on the relationship between the current clause and existing QUDs, but it does not affect the at-issue content. I do not discuss the semantic effect of *shì* here. See (Erlewine 2015b) for discussion.

¹¹When examples with embedded clauses are considered, the final generalization is that *shì* must be as low as possible relative to a given phase. See Erlewine (2015a) for detailed evidence for this generalization in Mandarin. See also Büring and Hartmann (2001) and Erlewine (to appear) for similar effects in German and Vietnamese, respectively.

(20) **Object disjunction** \Rightarrow **pre-verbal *shì***

{*shì} Nǐ {√shì} mǎi-le {*shì} [kāfēi *háishi* hóngchá] gěi Zhāng Sān?
SHI 2sg SHI buy-LE SHI coffee HAISHI tea give Zhang San

‘Did you buy coffee or tea for Zhang San?’ (alternative question)

(21) **Subject disjunction** \Rightarrow **pre-subject *shì***

{√Shì} [māo *háishi* gǒu] {*shì} tōu-le yú?
SHI cat HAISHI dog SHI steal-LE fish

‘Did the cat or the dog steal the fish?’ (alternative question)

The distribution of *shì* in alternative questions is best explained if *háishi* forms local disjunctions of DPs in (20), as indicated above, without any ellipsis. In contrast, consider the derivation that Huang (2010) would posit for the object *háishi* question in (20):

(22) **Clausal disjuncts with ellipsis makes the wrong prediction for *shì* in (20):**

[Nǐ mǎi-le kāfēi gěi ZS] *háishi* [nǐ mǎi-le hóngchá gěi ZS]?
2sg buy-LE coffee give ZS HAISHI 2sg buy-LE tea give ZS

According to Huang (2010), *háishi* always disjoins full clauses, followed by optional *Conjunction Reduction*: a non-constituent deletion process that will “delete the identical constituent[s] from the edge of conjuncts in coordinate sentences... forward deletion applies where a coordinate structure shows an identical element on a left branch, whereas backward deletion applies the other way around” (p. 98). Given that *shì* must be in a position to associate with the entire disjunction, the structure in (22) predicts *shì* to be in pre-subject, sentence-initial position in example (20), contrary to fact.

So far the examples here have shown subject and object disjunctions, but both *háishi* and *huòzhe* can disjoin VPs as well as full clauses; see (23–24). This is in stark contrast to conjunction in Mandarin, where different conjunctors are used for conjuncts of different categories and sizes.

(23) **VP disjunction:**

Zhāng Sān [[_{VP} sǎo dì] *háishi/huòzhe* [_{VP} xǐ wǎn]]
Zhang San clean floor HAISHI/HUOZHE wash dish

HAISHI: 'Does Zhang San clean the floor or wash dishes?' (alternative question)

HUOZHE: 'Zhang San either cleans the floor or washes dishes.'

(24) **Sentential disjunction:**

[[_{TP} Zhāng Sān nòng cuò le] *háishi/huòzhe* [_{TP} diànnǎo zìjǐ dāngjī le]]
Zhang San make wrong LE HAISHI/HUOZHE computer self crash LE

HAISHI: 'Did ZS make a mistake or did the computer crash by itself?' (alt. question)

HUOZHE: 'Either Zhang San made a mistake or the computer crashed by itself.'

Although I have argued against the Huang's (2010) idea that *háishi* disjunction always takes clausal disjunction followed by Conjunction Reduction, I should note that some *háishi* alternative questions do involve clausal disjunction followed by a form of ellipsis. I argue that example (25) from Constant (2014) is one such example. The availability of two sentence-final *ne* particles here is the tell-tale sign that there are two clauses being disjoined.

(25) **Alternative question with two *ne* (Constant 2014:341):**

Tā xiǎng qǐ Xiǎo-Wáng ne *háishi* Xiǎo-Lǐ ne?
3sg want marry little-Wang NE HAISHI little-Li NE

'Does s/he want to marry Wang or Li?' (alternative question)

I propose that example (25) is indeed derived from the disjunction of two full clauses, each with their own *ne*, followed by a form of ellipsis in the second disjunct. However, we need not resort to the non-constituent Conjunction Reduction as proposed by Huang (2010). The second disjunct is an instance of what is called 'stripping' or 'bare argument ellipsis' (Hankamer and Sag 1976, Rooth 1992, and others). I assume a movement-and-deletion derivation for stripping, as illustrated for (25) in (26) below. See Merchant (2003) and Wurmbrand (2017) and references there for more detailed discussion.

(26) **Derivation for (25) through stripping:**¹²

[[_{CP} Tā xiǎng qǔ Xiǎo-Wáng ne] *háishi* [_{CP} Xiǎo-Lǐ [_{TP} tā xiǎng qǔ t] ne]]
 3sg want marry little-Wang NE HAISHI little-Li 3sg want marry NE

An alternative analysis for (25), briefly discussed by Constant, is that (25) involves a local disjunction of the object DPs ‘little Wang’ and ‘little Li,’ and *ne* is allowed to appear at the right edge of *háishi* disjuncts. But as Constant notes, *ne* cannot generally appear at the edges of disjuncts (27).

(27) ***Ne* cannot simply be added to the edges of disjuncts (Constant 2014:341):**

Tā xiǎng [[_{PP} gēn Xiǎo-Wáng] (*ne) *háishi* [_{PP} gēn Xiǎo-Lǐ] (*ne)] jiéhūn (‘ne)?
 3sg want with little-Wang NE HAISHI with little-Li NE marry NE

‘Does s/he want to marry Wang or Li?’ (alternative question)

Although Constant introduces the data in (25) and (27), he does not offer an analysis, concluding that “the syntactic restrictions remain to be explained” (p. 342). My account here offers a natural explanation for such data. In (25), it just so happens to be the case that the correlate ‘little Wang’ of the stripping constituent ‘little Li’ is clause-final, giving the surface illusion of a possible local disjunction parse, but it is actually the disjunction of two full clauses with stripping. No such clausal disjunction parse is possible in (27), which must be a local disjunction.

If stripping is instead applied with the correlate of stripping in a clause-medial position in the left disjunct, we yield the appearance of a discontinuous disjunction of subclausal constituents. Such examples are indeed possible, as predicted by my account. In example (28), the right disjunct has been reduced through stripping to the PP ‘with little-Li,’ which corresponds to the clause-medial PP ‘with little-Wang’ in the left disjunct. I give some bracketing to indicate the derivation in (28), with Δ standing in for the elided TP in the right disjunct.¹³

¹²The disjuncts of *J* (pronounced as *háishi*) must be CPs, because that the sentence-final *ne* here is in the CP domain. See footnote 7 on the syntax of *ne*. In the interpretation of (26), ALTSHIFT then adjoins above the disjunction of the two CPs. Such examples are the reason that I adopt Kotek’s (to appear) proposal which associates the semantics in (12) with the adjoining operator ALTSHIFT rather than with a complementizer.

¹³The contrast between (27) and (28) is reminiscent of patterns with high *either* in English *either...or* disjunction as discussed in Schwarz (1999); see e.g. his examples (18) vs (27). Descriptively, Schwarz proposes that *either* cannot be high—under his proposal, indicating an underlyingly larger disjunction—“if that disjunction is not final” (p. 349).

(28) **Stripping with a clause-medial correlate:**

[[_{CP} Tā xiǎng [_{PP} gēn Xiǎo-Wáng] jiéhūn (ne)] *háishi* [_{CP} [_{PP} gēn Xiǎo-Lǐ] Δ (ne)]]?
3sg want with little-Wang marry NE HAISHI with little-Li NE

‘Does s/he want to marry Wang or Li?’ (alternative question)

I conclude that both *háishi* and *huòzhe* disjunctors can take XPs of different sizes and categories. In this section we have seen DPs, PPs, VPs, TPs, and CPs disjoined. The fact that *háishi* and *huòzhe* are indistinguishable in the size of disjuncts that they take—contra Huang (2010) and the cross-linguistic suggestion of Han and Romero (2004b)—is predicted by my account, where both *háishi* and *huòzhe* are realizations of (variants of) the same syntactic head, J. Disjunctions can also involve ellipsis in the second disjunct, but only well-defined and independently necessary forms such as stripping, not the non-constituent deletion of Conjunction Reduction proposed by Huang (2010).

4 Island (in)sensitivity and intervention effects in alternative questions

As discussed in work such as Han and Romero (2004a,b), Beck and Kim (2006), Uegaki (2014a), and Biezma and Rawlins (2015), there is a tension between the surface form and interpretation of alternative questions with apparently local disjunctions as in (29). The issue is that its ultimate denotation as a question is that of a set of propositions—here, {[^]like(Zhang San, Li Si), [^]like(Zhang San, Wang Wu)} (13a)—but the disjunction appears to be over subclausal constituents, *Lǐ Sì* and *Wáng Wǔ*.

(29) **Alternative question with local *háishi* disjunction (=1a/10):**

Zhāng Sān xǐhuān [Lǐ Sì *háishi* Wáng Wǔ] (ne)?
Zhang San like Li Si HAISHI Wang Wu NE

‘Does Zhang San like Li Si or Wang Wu?’

One possibility is that the disjunction is underlyingly a clausal disjunction with some form of ellipsis. I argued against this view for Mandarin alternative questions in the previous section. The other possibility is that the disjunction (JP in (29)) takes scope over the clause. In contemporary theorizing on the syntax/semantics interface and scope-taking, there

are at least two possibilities for this scope-taking: covert movement and the projection of Rooth-Hamblin alternatives. My proposal here in section 2 is based on the latter. In this section, I present arguments for the in-situ interpretation of *háishi* disjunctions using Rooth-Hamblin alternative computation.

Huang (1982) and Huang et al. (2009:242 fn. 5) propose that *háishi* disjunction in an alternative question moves covertly to the interpreting complementizer at LF. But Huang (1991) shows that *háishi* disjunctions are not sensitive to sentential subject and relative clause islands. This core data is reproduced here in (30–31). Huang (1982, 1991) shows that these environments are syntactic islands for at least some covert movements in Mandarin.

(30) ***Háishi* is not sensitive to sentential subject islands (Huang 1991:313–314):**

[_{island} Wǒ qù [měiguó *háishi* yīngguó]] bǐjiào hǎo?
 I go America HAISHI England comparatively good

‘Is it better for me to go to America or to England?’ (alternative question)

(31) ***Háishi* is not sensitive to relative clause islands (Huang 1991:314):**

Nǐ xǐhuān [[_{island} ___ [[rènshì nǐ] *háishi* [bu rènshì nǐ]]] de rén]?
 you like know you HAISHI NEG know you DE person

‘Do you like people who know you or people who don’t know you?’ (alt. question)

Huang (1982) argues that covert movement in Mandarin Chinese exhibits an argument/adjunct asymmetry, with arguments able to covertly move out of islands. A possible concern about examples such as (30), then, is that what the disjunction is an argument—the object of ‘go’—which may move covertly without violating the island constraint. However, *háishi* disjunctions of adjuncts are also not sensitive to these islands. See the disjunction of ‘because’ clauses in (32), which contrasts with the ‘why’ adjunct in the same environment in (33). This data thus shows that *háishi* disjunctions are uniformly interpreted in-situ at LF.¹⁴

¹⁴Erlewine (2014) shows that *háishi* in alternative questions is sensitive to *wh*-islands. This is expected under the analysis here: embedded questions will have their own ALTSHIFT at their edge, which will interpret the alternatives from *háishi* below, blocking their interpretation by a higher ALTSHIFT. This is essentially the logic of focus intervention effects, discussed in section 4 below. See also similar discussion of *wh*-island sensitivity in Japanese interrogatives and *wh*-quantification in Shimoyama (2006).

(32) **Adjunct *háishi* is not sensitive to complex NP islands (Huang 2010:125):**

Nǐ xiāngxìn [[_{island} Xiǎodi shì [[yīnwèi qiàn zhài] *háishi* [yīnwèi shī
you believe Xiaodi SHI because owe debt HAISHI because lose
liàn]] ér zìshā] de shuōfǎ] ne?
romance so suicide DE story NE

‘Do you believe the story that Xiaodi committed suicide because of owing debt or because of failing at love?’ (alternative question)

(33) **Adjunct *wh* is sensitive to relative clause islands (ex Huang 2010:124):**

*Nǐ xǐhuān [[_{island} Xiǎodi wèishénme xiě ___] de shū]?
you like Xiaodi why write DE book

Intended: ‘What is the reason *x* such that you like books which Xiaodi wrote for reason *x*?’

Having established that *háishi* disjunctions are interpreted in-situ at LF, I turn to the identification of the interpretational link between the in-situ disjunction and the clause edge. Here I will employ *focus intervention effects* (Beck 2006, Beck and Kim 2006, and others) as a diagnostic for Rooth-Hamblin alternative computation. Beck (2006) argues that an intervention effect occurs when a focus-sensitive operator (*intervener*) intervenes between a *wh*-phrase and its interpreting operator (*Op*), which here is ALTSHIFT. Intervention does not affect movement chains or other forms of binding.

Consider the Korean object *wh*-questions in (34). Korean is a *wh* in-situ language, so example (34a) reflects the default word order for object *wh*-questions, but it is ungrammatical due to the higher subject ‘only.’ Scrambling the *wh*-phrase above the intervener results in the grammatical, intended interpretation.

(34) **Intervention affects alternative computation but not movement (Beck 2006:3):**

- a. *Minsu-**man** *nuku*-lúl po-ss-ni?
Minsu-only who-ACC see-PAST-Q
- b. *Nuku*-lúl minsu-**man** *t* po-ss-ni?
who-ACC Minsu-only see-PAST-Q
‘Who did only Minsu see?’

Beck (2006) proposes that the badness of (34a) reflects its uninterpretability due to disruption of the interpretation of the *wh* by the focus-sensitive operator. Beck (2006) proposes that *wh*-phrases in languages like Korean are interpreted in-situ at LF using the computation of Rooth-Hamblin alternatives, as described in section 2.2 above. Two problems occur when an intervening focus-sensitive operator such as ‘only’ is introduced. First, focus-sensitive operators such as ‘only’ quantify over the alternatives in their complement and have the effect of “resetting” the alternative set projected above it. Higher operators such as ALTSHIFT at the clause edge will no longer be able to access the alternatives introduced by the *wh*-phrase. Second, focus-sensitive operators such as ‘only’ require both a defined ordinary value as well as an alternative set for their complement, but the scope of ‘only’ in (34a) contains the *wh*-phrase and therefore does not have a defined ordinary value. Both of these problems are avoided by scrambling the *wh*-phrase above ‘only’ in (34b) as the alternatives introduced by ‘who’ are never in the scope of ‘only.’ Intervention affects regions of Rooth-Hamblin alternative computation, not movement.¹⁵

Similar intervention effects of *wh* interpretation by focus-sensitive operators has been reported for Mandarin Chinese. See Yang (2008, 2012), Li and Cheung (2015), Li and Law (2016) for further data and discussion.

(35) **Intervention of *wh* in Mandarin (Yang 2012:47):**

- a. ***Zhǐyǒu** [Zhāng Sān]_F chī-le *shénme*?
 only Zhang San eat-LE what

Intended: ‘What did only [Zhang San]_F eat?’

- b. ***Lián** [Zhāng Sān]_F dōu chī-le *shénme*?
 even Zhang San DOU eat-LE what

Intended: ‘What did even [Zhang San]_F eat?’

Beck (2006), Beck and Kim (2006) show that such intervention effects also occur with alternative questions. Both examples in (36) are intended as alternative questions. This interpretation is possible in (36a) but not in (36b), where ‘only’ has been added to the subject. Their explanation for such effects is the same as for intervention in *wh*-in-situ.

¹⁵This explanation of Beck’s for focus intervention effects is specifically a consequence of the Rooth-Hamblin framework as adopted here, where the same “alternative” dimension denotations are used for the propagation of focus alternatives as well as alternatives from *wh* and disjunctions. Such an interaction is not predicted if focus alternatives and *wh*/disjunctive alternatives are computed in different ways, for example as suggested for compositional inquisitive semantics in Ciardelli et al. (2017: footnote 30).

Example (36) is interpreted with a local disjunction (*Mary or Susan*) projecting alternatives which must then be interpreted at the clause edge (here, by ALTSHIFT). The addition of ‘only’ in (36b) blocks the intended interpretation of the alternatives introduced by the embedded disjunction.

(36) **Intervention effects in alternative questions (Beck and Kim 2006:167):**
 (both intended as alternative questions)

- a. ✓ Does Sarah like Mary *or* Bill?
- b. *Does **only** Sarah like Mary *or* Bill?

I now demonstrate that Mandarin alternative questions are also susceptible to intervention effects, as predicted if *háishi* disjunctions are interpreted in-situ at LF by the computation of Rooth-Hamblin alternatives. I begin with the ‘only’ and ‘even’ particles shown to be interveners for Mandarin *wh*-questions in (35) above.

(37) **Intervention of Mandarin alternative questions:**
 (all intended as alternative questions)

- a. ***Zhǐyǒu** [Zhāng Sān]_F xǐhuān [Lǐ Sì háishi Wáng Wǔ] (ne)?
 only Zhang San like Li Si *haishi* Wang Wu NE
 Intended: ‘Does only [Zhang San]_F like Li Si or Wang Wu?’
- b. ***Lián** [Zhāng Sān]_F dōu xǐhuān [Lǐ Sì háishi Wáng Wǔ] (ne)?
 SHI Zhang San DOU like Li Si HAISHI Wang Wu NE
 Intended: ‘Does even [Zhang San]_F like Li Si or Wang Wu?’

The ungrammaticality of (37) reflects the focus intervention effect caused by a focus-sensitive operator hierarchically coming between the *háishi* disjunction (JP) which introduces alternatives and ALTSHIFT at the clause edge. For the intended interpretation as an alternative question, ALTSHIFT must interpret the alternatives projected by the disjunction, but the intervening focus-sensitive operators disrupts this projection of alternatives.

This intervention effect can be avoided by using larger, clausal disjuncts which each individually contain the focus-sensitive operator. An example of this form with ‘only’ is in (38). The interpretation of (38) is equivalent to the intended interpretation of (37a), which was ungrammatical.

(38) ‘Only’ in each disjunct does not trigger intervention; cf (37a):¹⁶

[[_{CP} Zhǐyǒu [_{ZS}]_F xǐhuān LS (ne)] háishi [_{CP} zhǐyǒu [_{ZS}]_F xǐhuān WW (ne)]]?
 only ZS like LS NE HAISHI only ZS like WW NE

‘Does only Zhang San like Li Si or does only Zhang San like Wang Wu?’ (alt. q.)

The difference between (37a) and (38) is clear: in (37a), the focus-sensitive operator ‘only’ intervened between the disjunction, disrupting the interpretation of the alternatives from disjunction by ALTSHIFT at the clause edge. In contrast, in (38), ‘only’ is interpreted within each clause independently, and the resulting propositions are taken as disjuncts of J, and then lifted into a question meaning by ALTSHIFT.

Note too that under Huang’s (2010) Conjunction Reduction analysis for *háishi* alternative questions, a structure akin to (38) would be the underlying structure for the ungrammatical (37a), with the only difference being in the application of optional Conjunction Reduction. This forms yet another argument against the clausal disjunction analysis of *háishi*. The sensitivity of Mandarin alternative questions to focus intervention effects and the distribution of such effects are predicted by and support my account in section 2, where *háishi* disjunction is interpreted in-situ at LF through the computation of Rooth-Hamblin alternatives.

¹⁶We might imagine that a surface string similar to (37a) but with *ne* after each disjunct—as in the double *ne* examples in (25) and (28) above—might be possible through the application of stripping to the clausal disjunction structure in (38). But this prediction is false:

(i) *[[_{CP} Zhǐyǒu [_{ZS}]_F xǐhuān LS ne] háishi [_{CP} WW [_{TP} ~~zhǐyǒu [_{ZS}]_F xǐhuān t~~] ne]]?
 only ZS like LS NE HAISHI WW only ZS like NE

The problem with this structure has to do with the invocation of stripping. Stripping involves movement of the focused phrase followed by clausal ellipsis; see (26). In the case of (i), this ellipsis site includes a focused (F-marked) constituent, *Zhāng Sān*, against the common prohibition against the deletion of F-marked material (Tancredi 1992, Heim 1997, Merchant 2001, and others). This explains the ungrammaticality of the stripping in (i).

5 The difference between *háishi* and *huòzhe* and its neutralization

Finally, I return to the difference between *háishi* and *huòzhe*. Under my proposal, *háishi* and *huòzhe* are both realizations of the same head J with the same semantics in (3) above, but *huòzhe* requires that an existential closure operator \exists (5) adjoins above it. For concreteness, take the ordinary and alternative denotations of $[\text{JP } \text{Lǐ Sì J } \text{Wáng Wǔ}]$ with and without \exists adjoined, repeated from (4) and (6) above:

(39) A JP denotation, e.g. for *Lǐ Sì háishi Wáng Wǔ*, from (4):

$$\text{a. } \left[\left[\begin{array}{c} \text{JP} \\ \diagup \quad \diagdown \\ \text{DP} \quad \text{J} \quad \text{DP} \\ \text{LS} \quad \quad \text{WW} \end{array} \right] \right]^{\circ} \text{ undefined} \qquad \text{b. } \left[\left[\begin{array}{c} \text{JP} \\ \diagup \quad \diagdown \\ \text{DP} \quad \text{J} \quad \text{DP} \\ \text{LS} \quad \quad \text{WW} \end{array} \right] \right]^{\text{alt}} = \{\text{LS}, \text{WW}\}$$

(40) JP (39) with \exists adjoined, i.e. *Lǐ Sì huòzhe Wáng Wǔ*, from (6):

$$\text{a. } \left[\left[\begin{array}{c} \exists \quad \text{JP} \\ \diagup \quad \diagdown \\ \text{DP} \quad \text{J} \quad \text{DP} \\ \text{LS} \quad \quad \text{WW} \end{array} \right] \right]^{\circ} = \lambda P_{\langle e,t \rangle} . P(\text{LS}) \vee P(\text{WW}) \qquad \text{b. } \left[\left[\begin{array}{c} \exists \quad \text{JP} \\ \diagup \quad \diagdown \\ \text{DP} \quad \text{J} \quad \text{DP} \\ \text{LS} \quad \quad \text{WW} \end{array} \right] \right]^{\text{alt}} = \{\text{LS}, \text{WW}\}$$

\exists introduces an ordinary semantic value of a disjunction in (40a), whereas $[\text{JP}]^{\circ}$ in (39a) is undefined—just as the ordinary value of a *wh*-phrase is undefined (Ramchand 1997, Beck 2006, and others). In section 2, I showed how this simple difference in their denotations yields their canonical difference in interpretation. The ALTSHIFT operator will yield a question denotation from a clause containing JP (40), leading to an interpretation as an alternative question, but ALTSHIFT cannot apply to a clause built from (40), as it already has an ordinary semantic value (15). In simple examples, this derives the one-to-one correlation of *huòzhe* being a logical disjunction and *háishi* resulting in an alternative question interpretation.

But now notice that the sets of alternatives here are identical: $[\text{JP}]^{\text{alt}}$ (39b) = $[\exists \text{ JP}]^{\text{alt}}$ (40b). \exists simply passes up the alternative set of its complement. This makes a prediction: pairs of JP with and without \exists as in (39–40) should be indistinguishable in the immediate scope of an operator whose interpretation depends only on the alternative set denotation of its scope. In other words, the disjunctors *háishi* and *huòzhe* should become interchangeable in such contexts.

As noted briefly in the introduction, there are a number of such contexts which “neutralize” the difference between *háishi* and *huòzhe*. I will now briefly survey these contexts, and then present a generalization regarding these neutralizing contexts, based on the prediction above. I then return to the question of the difference between *háishi* and *huòzhe*.

Example (41), repeated from (2) above, demonstrates neutralization in the context of quantification with *dōu*, which has variously been described as a distributor or universal quantifier; see e.g. Lin (1998a).¹⁷ Both the *háishi* and *huòzhe* variant of (41) are interpreted as quantifying universally over the individuals Zhang San and Li Si. In particular, the *háishi* variant does not have an alternative question interpretation.

(41) **Neutralization by *dōu* universal quantification:**

[Zhāng Sān *háishi*/*huòzhe* Lǐ Sì] dōu jìn-lái-le.
 Zhang San HAISHI/HUOZHE Li Si DOU enter-come-LE

‘Both Zhang San and Li Si came in.’

Such neutralization is also observed in the scope of certain negators. Examples (42) and (43) below show this for *méiyǒu* and *búshì*, where both *háishi* and *huòzhe* are interpreted as disjunctions under the scope of negation.¹⁸ (I have independently verified the interpretation of the *huòzhe* variants and added them here.) Again, the *háishi* variants in (42–43) do not have alternative question readings.

(42) **Neutralization under *méiyǒu* high negation (Hsieh 2004:89):**

Wǒ méiyǒu kànjiàn [Zhāng Sān *háishi*/*huòzhe* Lǐ Sì].
 1sg ASP.NEG see Zhang San HAISHI/HUOZHE Li Si

‘I haven’t seen Zhang San nor Li Si.’ ($\neg > \vee$)

¹⁷Here the constituent that describes the domain of *dōu*’s quantification is a subject in its canonical preverbal position, but *dōu* generally requires this constituent to be to its left, which can trigger fronting for non-subjects.

¹⁸Note that Hsieh (footnote 22) reports that some speakers do not accept *háishi* in (42). Example (43) is marked without a clear contextual alternative to Zhang San and Li Si, as *búshì* prefers to associate with a focus. See discussion below on the focus-sensitive nature of *búshì*.

(43) **Neutralization under *búshì* high negation (Lin 2008:52):**

Tā búshì xǐhuān [Zhāng Sān *háishi*/huòzhe Lǐ Sì].

3sg NEG like Zhang San HAISHI/HUOZHE Li Si

‘S/he doesn’t like Zhang San nor Li Si.’ (¬ > ∨)

As noted by Lin (2008), this neutralization is not observed with the negator *bù*, which is structurally lower than *méiyǒu* and *búshì* (Huang 1988, Yeh 1992, Hsieh 1996). *Háishi* under *bù* simply yields an alternative question interpretation in (44).¹⁹

(44) **No neutralization under low negation *bù* (Lin 2008:51):**

Tā bù xǐhuān [Zhāng Sān *háishi* Lǐ Sì]

3sg NEG like Zhang San HAISHI Li Si

a. *‘S/he doesn’t like Zhang San nor Li Si.’ (¬ > ∨)

b. ✓‘Does s/he not like Zhang San or Li Si?’ (alternative question)

Another neutralizing environment is the antecedent of conditionals, where both *háishi* and *huòzhe* are interpreted as disjunctions in the conditional clause, or as conjunctions out of the scope of the conditional clause; see Alonso-Ovalle (2006) and Rawlins (2008) for relevant discussion. Conditional clauses can take various forms in Mandarin. A *rúguǒ*-conditional example is shown in (45) below. See also Lin (2008:59ff) for additional examples.

(45) **Neutralization in *rúguǒ*-conditional:**

Rúguǒ (yǒu) [ZS *háishi*/huòzhe LS] dǎdiànhuà lái, jiù shuō wǒ bú zài.

if have ZS HAISHI/HUOZHE LS call come then say 1sg not present

‘If Zhang San or Li Si calls, say that I’m not here.’

There are also conditionals that are explicitly marked as unconditionals (see Rawlins 2008, 2013) with *dōu* in the consequent, with the antecedent optionally introduced by *wúlùn* or *bùguǎn* ‘no matter.’ *Háishi* and *huòzhe* are interchangeable in these environments, as has been noted by many authors; see Ito (2014) and citations there.

¹⁹See Lin (2008:51–59) for additional data on non-interrogative interpretations of *háishi* under negation. The generalization seems to be that a certain distance between the negation and the alternative-source is necessary, not that only high negations are able to trigger existential licensing.

(46) **Neutralization in ‘no matter’ unconditional:**

(Wúlùn/bùguǎn) [ZS *háishi/huòzhe* LS] *dǎdiànhuà lái, wǒ dōu bú zài.*
no.matter ZS HAISHI/HUOZHE LS call come 1sg DOU not present

‘No matter whether Zhang San or Li Si calls, I’m not here.’

Epistemic modals also neutralize the difference between *háishi* and *huòzhe*. Example (47) is based on an example from Huang (2010:130). Both *háishi* and *huòzhe* are interpreted as disjunctions in the scope of the modal here. See Lin (2008:74ff) for additional examples, including with some non-epistemic modals.

(47) **Neutralization under epistemic modals (based on Huang 2010:130):**

Tā dàgài/kěnéng xǐhuān [Zhāng Sān *háishi/huòzhe* Lǐ Sì].
3sg probably/might like Zhang San HAISHI/huozhe Li Si

‘S/he probably/might like(s) Zhang San or Li Si.’

Dōu quantification, negation, conditionals, and modals are not the only neutralizing environments. See Lin (2008) for extensive additional data, including with negative adverbs and downward-entailing quantifiers, non-factive embeddings such as ‘hope,’ imperatives, and polar questions.²⁰ As noted by Lin (2008), what is notable is that these contexts are precisely those which license non-interrogative interpretations of *wh*-phrases in Mandarin Chinese.²¹ See the examples below, which correspond to examples (41), (42),

²⁰There seems to be some speaker variation with these contexts. See Ito (2014) for some survey results which reflect this variation, and see also footnote 18 above. In particular, there is outright disagreement in reported judgments in the literature for polar questions. See the polar questions in (i) vs (ii) below with polar question particle *ma*, which are identical modulo choice of participants. Huang (2010) reports (i) as grammatical but Dong (2009) reports (ii) as ungrammatical.

(i) ✓Tā xǐhuān Zhāng Sān *háishi* Lǐ Sì ma? (Huang 2010:130)
3sg like Zhang San HAISHI Li Si MA

‘Does s/he like either Zhang San or Li Si?’ (polar question)

(ii) *Zhāng Sān xǐhuān Lǐ Sì *háishi* Mǎlì ma? (Dong 2009:74)
Zhang San like Li Si HAISHI Mary MA

Intended: ‘Does Zhang San like either Li Si or Mary?’

(45), and (46) above:

(48) **Non-interrogative *wh* in the neutralizing contexts above:**²²

- a. *Shéi* dōu jìn-lái-le.
who DOU enter-come-LE
'Everyone came in.' (Cheng and Giannakidou 2013:124)
- b. Wǒ méiyǒu kànjiàn *shéi*.
1sg ASP.NEG see who
'I haven't seen anyone.'
- c. Rúguǒ (yǒu) *nǎ-ge rén* dǎdiànhuà lái, jiù shuō wǒ bú zài.
if have which-CL person call come then say 1sg not present
'If anyone calls, say that I'm not here.' (Ibid.:140)
- d. (Wúlùn/bùguǎn) *nǎ-ge rén* dǎdiànhuà lái, wǒ dōu bú zài.
no.matter which-CL person call come 1sg DOU not present
'No matter who calls, I'm not here.' (Ibid.:140)

Recall also that there was a difference between structurally higher and lower negators. This difference is also reflected in the licensing of non-interrogative *wh*:

(49) ***Wh*-indefinite licensed by high *búshì* but not by *bù* (Lin 2008:53):**

- a. Tā búshì tǎoyàn *shéi*.
3sg NEG dislike who
'S/he doesn't dislike anyone.'

²¹With just one exception: Lin (2008) claims that subject 'only' licenses indefinite interpretations of *háishi* but not *wh*. See her pages 80–81 and 162–163. We can imagine various reasons for this one discrepancy. If we are to think of indefinite *wh* or *háishi* as polarity licensed—as suggested by discussion in Li (1992), Lin (1998b), Kuo (2003) and others on *wh* and Lin (2008) for *háishi*—it's worth noting that polarity licensing by 'only' is notoriously complex, both syntactically and semantically (see e.g. von Stechow 1999, Wagner 2006, Xiang to appear). It may also be relevant that 'only' is itself a focus-sensitive operator that triggers intervention; see section 4. I will leave this issue open here.

²²Cheng and Giannakidou (2013) report some differences between simplex *wh*-words such as *shéi* 'who' vs complex *wh*-phrases such as *nǎ-ge rén* 'which person' in some of these environments, but such restrictions appear to be subject to some speaker variation as well.

- b. Tā bù tǎoyàn shéi
 3sg NEG dislike who
- i. *‘S/he doesn’t dislike anyone.’
 ii. ✓‘Who does s/he not dislike?’

Recall that in the two-dimensional Rooth-Hamblin Alternative Semantics framework adopted here, *wh*-phrases have an alternative set denotation corresponding to its domain, but no ordinary value defined. Environments that quantify over the domain of a *wh*-phrase are necessarily considering only the alternative set denotation of their scope. The fact that these environments that yield non-interrogative quantificational readings of *wh*-phrases are also exactly those where *háishi* and *huòzhe* become interchangeable supports my conjecture regarding neutralizing contexts above. Based on these facts, I offer the following generalization:

(50) **Generalization:**

If and only if *Op* is a non-ALTSHIFT operator whose interpretation $\llbracket Op \alpha \rrbracket$ depends only on the alternative set denotation of its scope $\llbracket \alpha \rrbracket^{\text{alt}}$, and not on its ordinary denotation $\llbracket \alpha \rrbracket^{\circ}$, then in the immediate scope of *Op*:

- a. *wh*-phrases will have non-interrogative interpretation; and
 b. *háishi* and *huòzhe* will be interchangeable and *háishi* cannot form an alternative question.

This uniform generalization in (50) regarding the distribution of non-interrogative *wh* and the neutralization of *háishi* and *huòzhe* yields an important new desideratum for the analysis of the semantics of individual neutralizing contexts. While providing detailed analyses for each of these contexts is not possible within the confines of this paper, I will offer some brief suggestions of possible directions for the four contexts surveyed above.

For *dōu* quantification, Dong (2009) has proposed a denotation for *dōu* as a universal quantifier over a set denotation in a one-dimensional Hamblin semantics, following Kratzer and Shimoyama (2002), Kratzer (2005), Shimoyama (2006). This denotation can be straightforwardly modified so that it is specifically the alternative set denotation that is quantified over, in the two-dimensional Rooth-Hamblin semantics here. See recent related discussion in Tsai (2015). See also Xiang (2016) and Liu (to appear) for two other recent analyses for various uses of *dōu*; in both approaches, *dōu* quantifies over sets of

alternatives—though not necessarily with *dōu* itself providing the universal quantification directly—and therefore can be adapted to the two-dimensional semantics here.

For modals, conditionals, and negation, previous work has described the non-interrogative uses of *wh*-phrases in their scope as polarity items (Huang 1982, Li 1992) or free choice items, with licensing in non-veridical or non-episodic environments being one prominent proposal; see e.g. Lin (1998b), Cheng and Giannakidou (2013), Giannakidou and Cheng (2006) on Mandarin and also Giannakidou (1998) for a more general theory. Work such as Kratzer and Shimoyama (2002), Aloni (2007), and Chierchia (2013) have aggressively pursued the idea that the common core of such polarity and free choice items—not just for those derived of *wh*-words—is the projection of a set of alternatives.

Based on the interpretations of disjunctions under modals, Simons (2005), Alonso-Ovalle (2006), and Aloni (2007) argue that modals should have access to the individual disjuncts in its prejacent as a set of alternatives—i.e., modals quantify over the alternative dimension, satisfying the generalization in (50). Similar considerations have led to the claim that disjunction in conditional clauses should project Hamblin alternatives which can be quantified over; see e.g. Alonso-Ovalle (2006) and Rawlins (2008, 2013). (I return to a claim of Rawlin’s, below.)

Finally, I consider negation. The facts for negation are a bit more complex. Recall the contrasts between high and low negations in (43–44) and (49) above. This correlates with the fact that the higher *búshì* negator, rather than the lower *bù*, is used for metalinguistic and contrastive negation (Hsieh 1996)—a cross-linguistically common pattern of “external” negation; see e.g. Kroeger (2014). One way to think about the negation data is as a last resort insertion of \exists licensed by higher negations, precisely in the cases where the higher, focus-sensitive negation would cause an intervention effect. I will leave the detailed investigation of the semantics of higher and lower negations in Mandarin for future study.

I return now to the question of the difference between *háishi* and *huòzhe*. Recall that a number of previous analyses have proposed that *háishi* is distinguished from *huòzhe* by being syntactically marked [+wh] (Huang 1982, Huang et al. 2009) or [+Q] (Tsai 2015).²³ Let’s spell out the [+wh] feature proposal first. Suppose that certain operators probe for a [+wh] constituent in its scope and specify its quantificational force. For example, if a [+wh] is checked by *dōu*, it will be used for universal quantification; if it is checked

²³Uegaki (2014a) similarly suggests a [+wh] feature based on the discussion of similar pairs of disjunctors in other languages, but without discussion of Mandarin.

by an interrogative complementizer, it will be interpreted as an interrogative phrase, etc. A [+wh] feature on *háishi* predicts *háishi* disjunctions to always be interpreted on par with a *wh*-phrase in the same environment. This is in fact correct: as shown above and supported through much additional data in Lin (2008), the interpretation of *háishi* disjunction in a particular environment—whether interrogative, existential (disjunction), or universal (conjunction)—corresponds exactly to the interpretation of a *wh*-phrase in the same environment.²⁴

However, this [+wh] feature account fails to explain why it is exactly these environments that have these *wh*-probes. The fact that *wh*-phrases and *háishi* disjunction do not yield interrogative interpretations when in a conditional clause becomes an arbitrary fact about the lexicon: heads introducing conditional clauses, such as *rúguǒ*, just happen to have such a *wh*-probe. Instead, I have shown that there is a *semantic* characterization for the environments where *wh*-phrases are used non-interrogatively and *háishi* and *huòzhe* disjunctions are neutralized: they are in the immediate scope of operators that consider only their scopes' alternative set denotations for their interpretation (50). The semantics for *háishi* and *huòzhe* proposed here is superior to the [+wh] feature account in explaining this distribution.

Now consider the proposal where *háishi* is marked [+Q] as in Tsai (2015). Taken at face value, this requires *háishi* to always form a question denotation. The environments which appear to quantify over *háishi*'s disjuncts then must all be analyzed as question embeddings. Rawlin's (2008, 2013) claim that all unconditionals are syntactically questions lends support for such a view. For example, *rúguǒ*-conditionals appear to necessarily be clausal; see (51–52). This is compatible with a view where all neutralizing contexts are question embedders.

(51) *Rúguǒ*-(un)conditionals are clausal:

- a. *Rúguǒ* [Zhāng Sān *háishi*/*huòzhe* Lǐ Sì xiǎng lái], tā dōu kěyǐ lái.
 if Zhang San HAISHI/HUOZHE Li Si want come 3sg DOU able come
 'If Zhang San or Li Si wants to come, he/they can come.'
- b. *Rúguǒ* [*shéi* xiǎng lái], tā dōu kěyǐ lái.
 if who want come 3sg DOU able come
 'If anyone wants to come, they can come.'

²⁴Modulo one exceptional case: see footnote 21 above.

(52) *Rúguǒ*-(un)conditionals cannot be phrasal:

- a. **Rúguǒ* [Zhāng Sān *háishi/huòzhe* Lǐ Sì], tā dōu kěyǐ lái.
if Zhang San HAISHI/HUOZHE Li Si 3sg DOU able come
- b. **Rúguǒ* [*shéi*], tā dōu kěyǐ lái.
if who 3sg DOU able come

However, when we compare this to another, very similar neutralizing context—*wúlùn* unconditionals—we see that neutralizing contexts cannot all be question embeddings. Notice that *wúlùn* can take a clausal or phrasal argument with a source of alternatives such as a disjunction or a *wh*-phrase:

(53) *Wúlùn*-unconditionals can be clausal:

- a. *Wúlùn* [Zhāng Sān *háishi/huòzhe* Lǐ Sì xiǎng lái], tā dōu kěyǐ lái.
no.matter Zhang San HAISHI/HUOZHE Li Si want come 3sg DOU able come
'No matter whether Zhang San or Li Si wants to come, he/they can come.'
- b. *Wúlùn shéi* xiǎng lái, tā dōu kěyǐ lái.
no.matter who want come 3sg DOU able come
'No matter who wants to come, they can come.'

(54) *Wúlùn*-unconditionals can be phrasal:

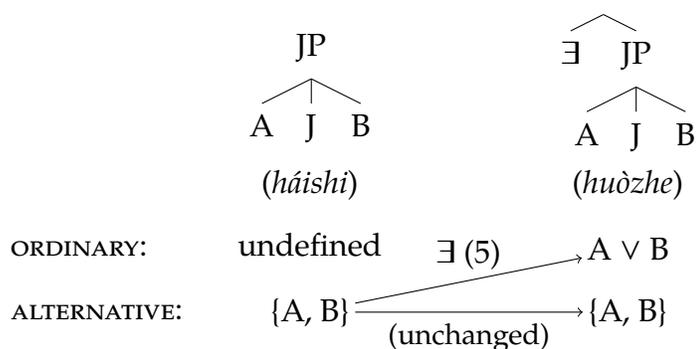
- a. *Wúlùn* [Zhāng Sān *háishi/huòzhe* Lǐ Sì], tā dōu kěyǐ lái.
no.matter Zhang San HAISHI/HUOZHE Li Si 3sg DOU able come
'No matter Zhang San or Li Si, he/they can come.'
- b. *Wúlùn* [*shéi*], tā dōu kěyǐ lái.
no.matter who 3sg DOU able come
'No matter who, they can come.'

In particular, the phrasal arguments of *wúlùn* in (54) are identical to the attempted arguments of *rúguǒ* in (52) above. This argues against a possible description of (54) as a superficially reduced question embedding, for example with a form of copula drop. If the forms in (54) count as questions, and all neutralizing contexts are question embeddings, these same phrases should be grammatical in (52).

6 Conclusion

In this paper I investigated the distributions and interpretations of the two disjunctors in Mandarin Chinese, *háishi* and *huòzhe*. I proposed that the two disjunctors are both realizations of the same J head, both taking disjuncts of various sizes. J projects the disjuncts' denotations as a set of alternatives. *Huòzhe* is syntactically marked as requiring an existential operator \exists to adjoin above and create an existential quantifier from these disjuncts. These meanings are given schematically in (55) with the disjuncts *A* and *B* and with adjunction of \exists directly to JP for *huòzhe*.

(55) **Two disjuncts in a two-dimensional semantics:**²⁵



A crucial ingredient of this proposal is the use of the two-dimensional Alternative Semantics of Rooth (1985, 1992) as applied to the interpretation of interrogatives as well as focus, as in Beck (2006)—what I call *Rooth-Hamblin Alternative Semantics* here. The two separate dimensions of meaning—ordinary and alternative in (55)—allow for *huòzhe* to differ from *háishi* in having an ordinary semantic value of a disjunction over its disjuncts, while also continuing to project the same sets in the alternative dimension. The difference in the ordinary dimension meaning results in their classic division of labor between alternative question formation and logical disjunction. The fact that their alternative denotations are equivalent explains their identical behavior in neutralizing contexts, as well as my semantic characterization of these environments as those which consider only the alternatives in their scope, and the fact that these are also environments where *wh*-phrases receive non-interrogative interpretations (50).

In contrast, consider a variant of the proposal here in a one-dimensional Hamblin semantics, as in Kratzer and Shimoyama (2002) or Alonso-Ovalle (2006). In this framework, every node is associated with a set denotation. Constituents have singleton denotations

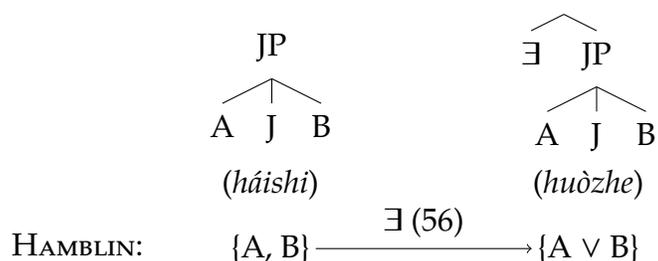
²⁵For ease of presentation, \vee is used in (55–57) as a cross-categorical disjunction. See (5a) for a formulation.

if they do not include a source of alternatives such as a disjunction or *wh*-phrase. These alternatives compose pointwise, as with the alternative set denotations in the Roothian framework. Clauses with non-singleton denotations are then interpreted as questions. *Háishi* disjunctions must have a non-singleton denotation in order to introduce alternatives that can lead to a question interpretation. An existential closure operator as in (56), similar to my \exists in (5), then applies in the case of logical disjunction (Hagstrom 1998, Kratzer and Shimoyama 2002, Shimoyama 2006, Alonso-Ovalle 2004, and others).

(56) **Existential closure in a Hamblin semantics:**

$$\llbracket \exists \alpha \rrbracket = \{\vee \llbracket \alpha \rrbracket\}$$

(57) **Two disjunctions in a Hamblin (one-dimensional) semantics:**



Because there is only one dimension in the semantics, this operator (56) introduces the disjunction in (57) at the expense of overwriting the set of individual disjuncts. This correctly predicts that the disjunction with \exists (*huòzhe*) cannot be used to form an alternative question, but we lose the ability to later access the individual disjuncts and quantify over them. The one-dimensional Hamblin framework is thus insufficient to model the behavior of “neutralizing” environments, discussed in section 5, which quantify over the set of alternatives in their scope.²⁶

²⁶The same criticism applies to most formulations of Inquisitive Semantics (Ciardelli et al. 2013, Roelofsen 2013, Ciardelli et al. 2017:see e.g.), which are similarly one-dimensional. Suppose a basic disjunctive J introduces the disjuncts as separate alternatives, resulting in an “inquisitive” meaning appropriate for *háishi*. (See e.g. Ciardelli et al. (2013) on the formal representations used in Inquisitive Semantics, although the notion of (propositional) alternative here is similar to the notion in Alternative Semantics. See Ciardelli et al. 2013 endnote 5.) The non-inquisitive closure operator ! will collapse the individual disjuncts together, yielding a meaning appropriate for *huòzhe*, but with the effect of making the individual disjuncts no longer accessible for quantification.

To my knowledge the only proposal for a similar pair of interrogative and logical disjunctors in Inquisitive Semantics is Winans’s (2013) proposal for the Egyptian Arabic disjunctions *wallaa* vs *au*. Although the details of her formulation differ, *wallaa* is necessarily a source of inquisitiveness, whereas *au* never can be (pp. 31–34). Again, modeling *huòzhe* as in this *au* would not allow us to access the individual disjuncts for quantification in neutralizing contexts.

A variant in the Inquisitive Semantics tradition that may fare better is Roelofsen and Van Gool (2009), but

The additional dimension of meaning offered in the two-dimensional Alternative Semantics of Rooth (1985, 1992) is independently necessary for the interpretation of focus, over and above what is offered by one-dimensional Hamblin semantics or Inquisitive Semantics, in order to encode choices of prejacent. (On Inquisitive Semantics, see footnotes 15 and 26.) I have shown here that capturing the difference between *háishi* and *huòzhe* disjunctions in Mandarin—as well as their behavior in neutralizing environments—also independently necessitates such a two-dimensional semantics. This constitutes an important new argument for the Alternative Semantics framework from an empirical domain other than the interpretation of focus.

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this is because it is a two-dimensional framework, computing a “highlighting” denotation for each node in addition to the standard Inquisitive Semantics “proposing” denotation. The motivation for this addition is in fact the consideration of effects of focus, which similarly cannot be captured in the one-dimensional Hamblin semantics.

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