Information Structure Constraints and Complex NP islands in Chinese

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1 Introduction

This paper proposes that the complex NP island phenomena in Chinese *wh*-interrogatives receive a functional-pragmatic explanation. I argue the treatments of Chinese islands in terms of movement constraints in transformational framework failed to address the interpretational distinctiveness associated with different categories of *wh*-words. Island facts follow naturally from an independently motivated constraint on the relative clause-internal propositional content triggered by this distinctiveness. I show the constraint-based HPSG framework allows us to impose fine-grained interactional constraints that capture the relation between *wh*-words and semantic interpretation.

2 Data

It has long been noted that *in situ wh*-arguments in Chinese don't induce the Complex Noun Phrase Constraint (CNPC), as the following relativization example illustrates

(1)   a. Ni xihuan [shei xie] de   shu?
                you like   who write REL book (REL: relative complementizer)
            'Who is the person s.t. you like the book(s) that (s)he wrote?'
             b. Ni xihuan [ta xie   shenme] de   shu?
                you like   he write what   REL book
            'What is the subject s.t. you like the book(s) that he wrote on that subject?

On the other hand, as (2) shows, CNPC arises when *in situ wh*-adjuncts, e.g. reason adverbials, are embedded within relative clauses

(2)   *Ni xihuan [ta weishenme xie] de   shu?
              you like   he why   write REL book
            #'Why$_i$ do you like the books that he wrote t$_i$?'

The following example further supports that the difference in island effects is due to the argument-adjunct dichotomy.

(3)   Ni xihuan [ta yinwei   shennme xie] de   shu?
             you like   he because.of what   write REL book
            'What is the reason s.t. you like the book(s) that he wrote for that reason?'

Furthermore, when the head noun of Chinese relative clauses receives a specific reading (via the presence of overt specificity markers, e.g. demonstratives), *in situ wh*-arguments will induce CNPC.

(4)   a.*Ni xihuan [shei xie] de   nei-ben   shu?
                you like who write REL DEM-CL book (DEM:demonstrative CL:classifier)
           #'Who$_i$ do you like that book that t$_i$ write?'

          b *Ni xihuan [ta yinwei   shenme xie] de   nei-ben   shu?
             you like   he because.of what   write REL DEM-CL book
          #'What$_i$ do you like that book that he wrote because of t$_i$?'

3 Previous Analysis

Since Huang (1982), *wh*-adverbial CNPC data have been invoked as crucial evidence for the existence of covert movement. Movement-based theories argue that for *wh*-interrogatives to receive proper interpretation, covert movement to the matrix scope position is required, but the complex NP domain constitutes a barrier against movement, causing CNPC effects. To account for the deviant data of *wh*-arguments, a separate, movement-free licensing mechanism for *wh*-interpretation, unselective binding, is proposed, which selectively targets *wh*-arguments.

However, this line of reasoning faces several theoretical and empirical difficulties.

Theoretically, movement-based theories should predict overt pied piping, commonly attested in Chinese filler-gap constructions, to be possible, since it involves extraction of the entire complex NP domain. This is contrary to fact, as the following shows

(5)   *[Ta weishenme xie] de   shu,   ni xihuan?
           he why   write REL book, you like

Empirically, such theories still leave the specific cases unexplained because in such cases *wh*-arguments still undergo no movement. More severely, such theories fail to take account of the fact that the inherently different lexical semantics associated with *wh*-arguments and reason adverbials/specific-marked head NPs give rise to different interpretations for the corresponding interrogative clauses. The semantic interpretation differences underlie the judgment variability, as I will show in the following.

4 Proposed analysis

In the *wh*-argument cases of (1), only generic readings for books are possible. A specific reading, where the set of books are already salient from context, is not available. For example, in (1a) the embedded *wh*-argument *shei* '*who*' denotes a salient set of individuals who have written books, and by inquiring after the set of individuals the question serves as a request to pick out one individual so that any books that bear the property of being written by this individual are liked. That is to say, the identity of the books cannot be known *a priori*, but has to crucially rely on anchoring the identity of the individual who writes them. In Hanblin/Karttunen terms, the domain of books make for a set of alternative sets, defined in terms of the set of individuals, hence (1a) could be represented as follows:

(6) $\lambda D_x [D_x \in D$ & like(*you*, D_x, e)]
            D denotes a set of sets of books defined relative to a set of individuals X:
            D:{D_x} where D_x={y | book(y) & write(x,y,e') for x$\in$X}

Similarly, in (3), a set of alternative sets of books are characterized in terms of a set of discourse-salient reasons as follows

(7) $\lambda D_r [D_r \in D$ & like(*you*, D_r, e)]
            D:{D_r} where D_r={y | book(y) & write(x,y,e')& cause (r,e') for r$\in$R: a salient set of
reasons}

   On the other hand, embedded reason adverbial *weishenme* cannot lend itself to such an interpretation, because a *weishenme*-question necessarily solicits the cause of a particular event which the argument of *weishenme* denotes.

   Although the semantic distinction of *weishenme*/*yinwei shenme* does not yield logically distinct interpretations when a singular event is predicated of, completely different readings arise when the context involves multiple events, as the following illustrates

(8)   a. Daduoshuren   weishenme cizhi?
                Majority.of.people why   resign
λr: [e':most people resigned & cause (r,e')] 'the singular reason that causes most people to resign'
            b. Daduoshuren   yinwei   shenme cizhi?
                Majority.of.people because.of   what   resign
λr: [$\exists E' \subseteq E$: card(E)>card(E^c) & cause(r,E')] 'the (possibly non-singleton) set of reasons that can account for the majority cases of resignations'
            c. Weishenme meiyouren cizhi?
                Why   nobody   resign
λr: [e': nobody resigned & cause (r,e')] 'the reason that causes the fact that nobody resigned'
            d. Meiyouren yinwei   shenme cizhi?
                Nobody   because.of what resign
λr: [$\neg \exists E$ cause(r,E)] 'the set of reasons that nobody who resigned did so for that'

One consequence of *weishenme*'s idiosyncratic semantics is that a specific reading is forced for the head noun of its relative clause. Chinese does not have definite articles. In the absence of overt demonstratives, the relative head noun's specificity is subject to semantic and pragmatic inference. Given that *weishenme* is anchored to a particular event, it cannot provide a classification base that derives alternative sets. Therefore, contrary to the *wh*-argument cases, question (3) is only logically coherent with a specific reading, i.e. there exists a reason that causes his writing a particular book that the addressee likes, and we are wondering what this reason is.

However, this would violate an information-structure constraint: in Chinese, restrictive relative clause-internal propositions must contain presupposed/old information (Li & Thompson, 1989; Erteschik-Shir, 2007). In (3) the clause-internal *weishenme*-constituent contains a narrow focus, which belongs to new information. Accordingly, contradiction necessarily arises, resulting in oddness. It follows that the specificity effect is due to the same reason, since a demonstrative marker forces a specific reading of the head noun and hence embedded *wh*-arguments will contain a narrow focus. In the cases of generic readings, as in (1a-b) or (3), embedded *wh*-arguments are drawn from discourse-salient sets and represent old information. They in turn derive a class of presupposed propositions deriving alternative sets of books, therefore violating no information-structure constraints.

5 Formalization

Below I present a preliminary HPSG formalization based on Ginzburg & Sag's (2000) analysis of *wh*-interrogatives. I show HPSG mechanisms neatly account for this informational structure-based island theory, without incurring the difficulties encountered by a movement-based theory.

The Chinese relative *wh*-interrogatives are subject to the interaction of constraints associated with matrix-level *in situ* interrogative clauses (*is-int-cl*) and embedded-level relative clauses (*rel-cl*). Importantly, *is-int-cl* shares the common properties of its supertypes, including pass-up of the STORE values for all the verbal arguments and the retrieval of parameters from the STORE of head daughter at the root clause level. These constraints are represented as follows

(9)   Store Amalgamation Constraint

$$
word \Rightarrow / \begin{bmatrix} & SS|LOC & \begin{bmatrix} CONT & [QUANTS \; order \; (\boxed{\Sigma 0})] \\ STORE & (\boxed{\Sigma 1} \cup ... \cup \boxed{\Sigma n}) \dot{-} \boxed{\Sigma 0} \end{bmatrix} \\ ARG-ST \; \langle [STORE \; \boxed{\Sigma 1}], ..., [STORE \; \boxed{\Sigma n}] \rangle \end{bmatrix}
$$

(10) Interrogative Retrieval Constraint

$$
\begin{bmatrix} STORE & \boxed{\Sigma 1} \\ CONT & [PARAMS \; \boxed{\Sigma 2}] \end{bmatrix} \rightarrow ... H[STORE \; \boxed{\Sigma 1} \uplus \boxed{\Sigma 2}]
$$

Contrary to fronted *int-cl*, *is-int-cl* allows non-initial *wh*-word in its *in situ* positions to bear specified WH value, which is identical to a parameter. Since there is no initial filler position, to guarantee identification of WH value and STORE and association with clause content such that the content type of *question* is guaranteed, I propose the following constraint that allows WH-feature to percolate up via head, alongside STORE.

(11) WH-Amalgamation Constraint

$$
word \Rightarrow / \begin{bmatrix} SS|WH & \boxed{\Sigma 1} \cup ... \cup \boxed{\Sigma n} \\ ARG-ST & \langle [WH \boxed{\Sigma 1}], ..., [WH \boxed{\Sigma n}] \rangle \end{bmatrix}
$$

Furthermore, *is-int-cl* clauses are not WH-unspecified, except that root clauses have to be WH { } for interpretation reasons (Ginzburg & Sag, 2000). I incorporate this into (11) and allow a relative clause to pass up its *wh*-argument's WH value to the head NP.

Finally, all NPs in Chinese are specified in their CONTENT for [DEF +] or [DEF −] features, which encode their definiteness, inferred from semantics/pragmatics. Thus the head NPs of *weishenme*-relative clauses and demonstrative head NPs are marked [DEF +], whereas the head NPs of wh-argumental relative clause are marked [DEF −].

For the *wh*-argumental *is-int-cl* in (12), the embedded WH value percolates all the way up until associated with the [PARAMS] value at root clause. For the *weishenme is-int-cl* in (13) the WH of *rel-cl* cannot percolate up to the head NP, because it is not compatible with the [DEF +] there. Indeed, words specified with a WH value must be treated as inherently [DEF -]. However, as such the WH parameter value wouldn't be associated with any clause content. The only option left is to retrieve the parameter in STORE at the embedded *rel-cl* level, but this will leave the root clause [PARAMS] empty, violating the constraint for *wh*-questions. For specificity effects we have the

same feature value conflict as in *weishenme*-clause. Therefore both types will be ruled out by the interacting constraints and not get generated in the grammar.

(12) *WhArg-rel-is-int-cl*

S
$\begin{bmatrix} \text{WH} & \{\} \\ \text{STORE} & \{\} \\ \text{CONT} \begin{bmatrix} question \\ \text{PARAMS} \{\boxed{1}\} \end{bmatrix} \end{bmatrix}$

NP $\begin{bmatrix} \text{WH} & \{\ \} \\ \text{STORE} & \{\ \} \end{bmatrix}$

VP $\begin{bmatrix} \text{WH} & \{\boxed{1}\} \\ \text{STORE} & \{\boxed{1}\} \end{bmatrix}$

V $\begin{bmatrix} \text{WH} & \{\boxed{1}\} \\ \text{STORE} & \{\boxed{1}\} \end{bmatrix}$

NP $\begin{bmatrix} \text{WH} & \{\boxed{1}\} \\ \text{STORE} & \{\boxed{1}\} \end{bmatrix}$

S $\begin{bmatrix} \text{WH} & \{\boxed{1}\} \\ \text{STORE} & \{\boxed{1}\} \\ \text{HEAD} [\text{MOD} \quad \boxed{2}\ ] \\ \text{SLASH} \{\} \end{bmatrix}$

$\boxed{2}$ NP $\begin{bmatrix} \text{CONT} [\text{DEF} \quad -] \\ \text{WH} \quad \{\boxed{1}\} \end{bmatrix}$

You   like   who write − REL   book(s)

(13) *Wh-Adv*

S
$\begin{bmatrix} \text{WH} & \{\} \\ \text{STORE} & \{\} \\ \text{CONT} \begin{bmatrix} question \\ \text{PARAMS} \{\} \end{bmatrix} \end{bmatrix}$

NP $\begin{bmatrix} \text{WH} & \{\ \} \\ \text{STORE} & \{\} \end{bmatrix}$

VP $\begin{bmatrix} \text{WH} & \{\} \\ \text{STORE} & \{\} \end{bmatrix}$

V $\begin{bmatrix} \text{WH} & \{\ \} \\ \text{STORE} & \{\} \end{bmatrix}$

NP $\begin{bmatrix} \text{WH} & \{\} \\ \text{STORE} & \{\} \end{bmatrix}$

S $\begin{bmatrix} \text{CONT} \begin{bmatrix} question \\ \text{PARAMS} \{\boxed{1}\} \end{bmatrix} \\ \text{WH} \{\boxed{1}\} \\ \text{STORE} \{\boxed{1}\} \\ \text{HEAD} [\text{MOD} \boxed{2}\ ] \\ \text{SLASH} \{\} \end{bmatrix}$

$\boxed{2}$ NP $\begin{bmatrix} \text{CONT} [\text{DEF} \quad +] \\ \text{WH} \quad \{\} \end{bmatrix}$

You   like   he why write − REL   book

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