

We present an analysis of the universal (or free choice) interpretation of Mandarin *wh*-items in the so-called *wh-dou* construction (Giannakidou & Cheng 2006). *Wh*-items are argued to be existentials, and the universal force is generated by covert exhaustification (Fox, 2007; Chierchia, 2013), independently needed for free choice disjunction and obligatorily triggered by *dou* to satisfy its EVEN presupposition (Liu 2017), as in Crnič's (2017) analysis of English *any*.

**The *wh-dou* construction** are cases like (1) where a displaced *wh* precedes *dou*, rendering a  $\forall$ -interpretation for the sentence. Three points are worth noting. First, *dou* is obligatory – without it, (1) are questions. Second, predicates participating in the construction can be positive episodic, negated,  $\diamond$  or  $\square$ -modalized. Third, the demonstrative phrase *these teachers* in (1) mimics the effect of partitive-*any* (Dayal 98), ruling out subtrigging as a potential factor.

- (1) *Zhexie laoshi shei; Lisi dou qing.le / mei.qing / neng.qing / bixu.qing t<sub>i</sub>.*  
 these teacher who Lisi DOU invite.ASP / not.invite / can.invite / must.invite *t<sub>i</sub>*  
 Every one of these teachers is such that Lisi has/didn't/can/must invite(d) him/her.

**The analysis** of Mandarin universal *wh*'s has three independently motivated components.

*Dou* as EVEN: following Liu (2017), we take *dou* to be EVEN (cf. Liao 2011; Xiang 2016), which requires (as a presupposition) its prejacent to be the strongest among its alternatives. Different 'uses' of *dou* are analyzed by conceptualizing strength in different ways: *even-dou* corresponds to being strong in terms of likelihood, while distributive-*dou* (Lin, 1998) in terms of entailment. We further assume (for concreteness) that *wh-dou* involves strength based on entailment. In other words, the *dou* in (1) requires its prejacent entail all the other alternatives.

*Wh*'s as existentials with domain alternatives: *wh*'s in questions have a long history of being treated as existentials since (Karttunen 77). Mandarin *wh*'s also have NPI uses (Cheng 97, Li 92), analyzed by Liao 2011 and Chierchia & Liao 2014 as existentials and fitted into Chierchia's overall theory of the polarity system. Following the existential tradition, we take the *wh*'s in *wh-dou* construction to be existentials, triggering subdomain alternatives (Chierchia 13).

Free choice and recursive exhaustification: a tension exists between the above two ideas. *Dou* requires its prejacent to be strong, and yet a prejacent with a wide domain  $\exists$  (assuming *dou* has wide scope) is weak, in fact entailed by its subdomain alternatives. The conflict can be resolved by bringing in free choice effects that usually accompany disjunctions/indefinites turning  $\vee/\exists$  into  $\wedge/\forall$  and fix the relation between *dou*'s prejacent (a wide domain  $\forall$  strengthened by free choice) and its alternatives (now sub-domain  $\forall$ 's). Finally, following a large literature since Kratzer & Shimoyama (2002) we take free choice as an inference resulting from reasoning about alternatives, specifically, recursive exhaustification over domain alternatives (Fox 2007).

**Implementation** of the proposal follows Crnič's (2017) analysis of English *any*. (2) is the semantics of *dou*, which takes a *B*(ackground) and a *F*(ocus) as its arguments, presupposes that the result of applying *B* to *F* entails those of applying *B* to alternatives of *F*, and returns *B*(*F*) if the presupposition is met. *Wh*'s are existentials with their domain arguments *D* syntactically represented as in (3). We further assume in a *wh-dou* construction *wh*'s domain argument *D* is focused and moves to the specifier of *dou* as in (5a), and alternatives of *D<sub>F</sub>* are its subsets. Next, for the prejacent of *dou* to entail all other alternatives, recursive exhaustification is employed (the underlined part in (5a)), turning a existential statement containing [*shei t<sub>3</sub>*] into a universal one. The process is illustrated in (5b-e), with the help of a standard *Exh* in (4) that negates excludable alternatives (Fox 2007). Finally, surface word order is obtained by taking the part of *wh* that moves (the *D<sub>F</sub>*) to be its pronounced position and reconstruct *dou* to its VP position.

$$(2) \quad \llbracket dou \rrbracket^g = \lambda B \lambda F \lambda w : \forall F' \in Alt(F) [F \neq F' \rightarrow B(F) \subset B(F')]. B(F)(w)$$

$$(3) \quad \llbracket shei D \rrbracket^g = \lambda P \lambda Q \lambda w \exists x \in D \cap person [P(w)(x) \wedge Q(w)(x)]$$

$$(4) \quad \llbracket Exh C \rrbracket^g = \lambda p \lambda w [p(w) \wedge \forall q \in Excl(C, p) [p \not\subseteq q \rightarrow \neg q(w)]]$$

- (5) An illustration using the episodic positive sentence in (1): *shei* Lisi *dou* invited
- $[D_F [dou [\lambda 3[Exh C_2][Exh C_1][Lisi\ invited\ [shei\ t_3]]]]]$
  - $C_1 = \{\lambda_w.Lisi\ invited_w\ a\ person\ in\ D \mid D \subseteq g(3)\}$
  - $\llbracket [Exh C_1][Lisi\ invited\ [shei\ t_3]] \rrbracket^g = \lambda_w.Lisi\ invited_w\ a\ person\ in\ g(3)$
  - $C_2 = \{\lambda_w.Exh(C_1)(Lisi\ invited_w\ a\ person\ in\ D) \mid D \subseteq g(3)\}$   
 $= \{\lambda_w.Lisi\ ivtd_w\ a\ person\ in\ D \wedge Lisi\ didn't\ ivt_w\ a\ person\ in\ g(3) \setminus D \mid D \subseteq g(3)\}$
  - $\llbracket [Exh C_2][Exh C_1][Lisi\ invited\ [shei\ t_3]] \rrbracket^g = \lambda_w.Lisi\ invited_w\ a\ person\ in\ g(3) \wedge \forall D \subset g(3)[Lisi\ invited_w\ a\ person\ in\ D \rightarrow Lisi\ invited_w\ a\ person\ in\ g(3) \setminus D]$   
 $= \lambda_w.\forall D \subset g(3) \cap person[Lisi\ invited_w\ a\ person\ in\ D]$   
 $= \lambda_w.\forall x \in g(3) \cap person[Lisi\ invited_w\ x]$
  - Assertion of (5a):  $\lambda_w \forall x \in D \cap person[Lisi\ invited\ x]$   
 Presupposition of *dou* is satisfied, since  $\forall D' \subset D : \lambda_w \forall x \in D \cap person[Lisi\ invited_w\ x] \subset \lambda_w \forall x \in D' \cap person[Lisi\ invited_w\ x]$

*Wh-dou*'s with  $\square$  (*bixu*) pose a problem. With the LF in (6a), *dou*'s strongest presupposition cannot be satisfied:  $\square(Lisi\ invite\ a\ person\ in\ D) \wedge \forall x \in D \cap person[\diamond(Lisi\ invite\ x)]$  does not entail its subdomain alternatives. Recursive exhaustification below  $\square$  solves the problem (6b).

- (6) a.  $[D_F [dou [\lambda 3[Exh C_2][Exh C_1][\square[Lisi\ invited\ [shei\ t_3]]]]]]$  *dou*'s Pres not met  
 b.  $[D_F [dou [\lambda 3[\square[[Exh C_2][Exh C_1]Lisi\ invited\ [shei\ t_3]]]]]]$  *dou*'s Pres met

**Disjunction with *dou*** behaves differently from *wh-dou*. As observed in Xiang (2016) and shown in (7), only  $\diamond$ -modalized predicates (*can.invite*) license pre-*dou* disjunctions.

- (7) *Yuehan huozhe Mali lisi dou #qing.le / ??mei.qing / neng.qing / #bixu.qing ti.*  
 John or Mary Lisi DOU invite.ASP / not.invite / can.invite / must.invite  
 With *neng* 'can': Lisi can invite John or Mary.

The contrast between *wh*'s and disjunction follows from our proposal, if we further assume that the two trigger different alternatives. In particular, disjunction has conjunction as its alternative, while *wh*'s, though being existentials, do not have universal alternatives (cf. Bowler 2014). This explains the infelicity of disjunction-*dou*'s with episodic positive predicates such as *qing.le* 'invite.AP': with the  $\wedge$ -alternative activated, recursive exhaustification would generate not only a free choice inference but also a scalar implicature; the two clashes and the sentence becomes infelicitous. Cases with  $\square$  receive a similar explanation: exhaustification below  $\square$  as in (6b) renders a clash between free choice and scalar implicature, while exhaustification above  $\square$  as in (6a) does not satisfy *dou*'s presupposition. Finally, we argue the fact that disjunction-*dou*'s are bad with negated predicates like *mei.qing* 'not.invite' is due to a separate property of *huozhe* 'or': it is a positive polarity item as is often the case with disjunctions across languages (such as French *ou*): *Lisi mei.qing John huozhe Mary* strongly prefers the wide scope  $\vee$  reading.

**Conclusion:** Our analysis of Mandarin universal *wh* explains the source of its universal force and the appearance of *dou*. Components of the proposal are independently motivated and a unified  $\exists$ -semantics for *wh*'s is maintained. Our account provides further support for the presence of EVEN in the composition of universal free choice items (Lahiri 98, Crnič 17). In the talk, we will further reconcile our proposal with the original observation that Mandarin *wh*'s are polarity sensitive. Specifically, the positive episodic \**Lisi qingle shei* "Lisi invited who" is bad (as a declarative) and does not have a universal interpretation, not because a contradiction is incurred by recursive exhaustification (Chierchia 13), but because a competition with *Lisi shei dou qingle* "Lisi who DOU invited" block the former. In particular, the extra presupposition of *dou* triggers Maximize Presupposition, preferring (5a) over  $[Exh C_2][Exh C_1][Lisi\ invited\ [shei\ D]]$ .  
**Selected References:** Crnič 17 Free choice under ellipsis *LingRev*. Giannakidou & Cheng 06 (in)definiteness, polarity and free choice *JoS*. Liao 11 Alternatives and Exhaustification. Harvard thesis. Liu 17 Varieties of alternatives *L&P*. Xiang 16 Interpreting Questions Harvard thesis.