

Negated disjunctions in Mandarin revisited

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Introduction Disjunctions have been found to exhibit different polarity properties in different languages (Szabolcsi 2002, 2004; Goro 2007; Crain 2012; Nicolae 2017; a.o.). In Crain's (2012) research on scope parameters, he claims that OR in adult Mandarin (i.e. "huo(zhe)") is +PPI. Compare (1) with (2).

- (1) Ted didn't order pasta or sushi. (Crain 2012: 180–181)
 Narrow scope reading: Ted didn't order pasta AND didn't order sushi. $\neg > \vee$
- (2) (wo cai) Ted meiyou dian yidalimian huozhe shousi.
 (I guess) Ted not order pasta or sushi
 Wide scope reading: Ted didn't order pasta OR didn't order sushi. $\vee > \neg$

This study attempts to give a full picture of the interactions between negation and disjunction in Mandarin, demonstrating that such +PPI generalization is too hasty – Boolean disjunction in Mandarin is neither an NPI nor a PPI.

Data pattern First, when there is no higher overt modals or quantifiers, most *huo*-disjunctions have free scopal interactions with the syntactically higher negation. In particular, complement disjunctions obligatorily take the narrow scope, whereas Hurford disjunctions obligatorily take the wide scope (Gajewski and Sharvit 2012; Spector 2015). Compare (3) with (4).

- (3) Complement disjunctions
 ta mei qu-guo Beijing huo (renhe) qita chengshi.
 s/he not go.to Beijing or (any) other cities
 Unique reading: S/he hasn't been to Beijing or any other cities. (*I don't know which) $\neg > \vee$
- (4) Hurford disjunctions
 zhe ping jiu de jiage bu chao-guo shi kuai huo ershi kuai.
 this CL wine ADN price not exceed ten dollars or twenty dollars
 Unique reading: The price of this wine doesn't exceed \$10, or doesn't exceed \$20. (\checkmark I don't know which) $\vee > \neg$

Second, the presence of a higher modal/quantifier makes one of the scopings more salient – universal modals/quantifiers prefer the narrow scope reading, whereas existential modals/quantifiers prefer the wide scope reading. The less salient readings are available in very specific contexts. Compare (5) with (6).

- (5) Universal epistemic modals: $\square > \neg$
 ta kending mei qu-guo Beijing huo Shanghai.
 s/he definitely not go.to Beijing or Shanghai
 Salient reading: S/he definitely hasn't been to Beijing or Shanghai. $\square > \neg > \vee$
 Specific context: I have been told s/he hasn't been to one of these two cities, but I can't remember which. $\vee > \square > \neg$
- (6) Existential epistemic modals: $\diamond > \neg$
 ta keneng mei qu-guo Beijing huo Shanghai.
 s/he maybe not go.to Beijing or Shanghai
 Salient reading: S/he maybe hasn't been to Beijing, or maybe hasn't been to Shanghai. $\vee > \diamond > \neg$
 Specific context: I guess s/he has never left her hometown. $\diamond > \neg > \vee$

Moreover, performative deontic modals always block the wide scope reading, yielding categorical facts.

- (7) Imperatives (Commands): $\square > \neg$
 buyao/bie qu Beijing huo Shanghai!
 not.should go.to Beijing or Shanghai
 Performative use only: Don't go to Beijing or Shanghai! $\square > \neg > \vee$

Proposal To account for the contrast between (5), (6) and (7), we propose: (i) universal modals that require opinionated speakers block ignorance/uncertainty inferences, which in turn will block the wide scope reading; (ii) the competition between disjunctions and conjunctions would contribute to the preference for the wide scope reading.

Blocking uncertainty To be concrete, for universal modals, if the authority of the ordering source is the speaker, the speaker must be opinionated about every single proposition. Most universal modals require speaker authority/opinionated speakers by default; performative deontic modals are not compatible with ignorant speakers – according to the speaker's rules, $r \in \{p, q\}$ is either prohibited or not (*the speaker doesn't know which one is prohibited). In the meantime, wide scope disjunctions have noncancellable ignorance/uncertainty inferences, while narrow scope disjunctions don't. As a consequence, universal modals that require opinionated speakers ($K\square\neg p \vee K\square\neg q$) will block the wide scope reading.

	Uncertainty inferences	Free choice inferences
	$\Box\neg p \vee \Box\neg q$	$\rightsquigarrow \neg K\Box\neg p \wedge \neg K\Box\neg q$
	$\Box(\neg p \vee \neg q)$	$\rightsquigarrow \neg\Box\neg p \wedge \neg\Box\neg q$
☺	$\Box\neg(p \vee q)$	$(K\Box\neg p \wedge K\Box\neg q)$ $(\Box\neg p \wedge \Box\neg q)$

Competing with AND As for existential modals, wide scope disjunctions give rise to free choice inferences, which would be compatible with opinionated speakers. Therefore, existential modals that require opinionated speakers ($K\Diamond\neg p \vee K\Diamond\neg q$) won't block the wide scope reading.

	Uncertainty inferences	Free choice inferences
	$\Diamond\neg p \vee \Diamond\neg q$	$\rightsquigarrow \neg K\Diamond\neg p \wedge \neg K\Diamond\neg q$
☺	$\Diamond(\neg p \vee \neg q)$	$\rightsquigarrow \Diamond\neg p \wedge \Diamond\neg q$
	$\Diamond\neg(p \vee q)$	$(\models K\Diamond\neg p \wedge K\Diamond\neg q)$ $(\models \Diamond\neg p \wedge \Diamond\neg q)$

However, AND in Mandarin is PPI-like, taking wide scope over negation obligatorily. That is, negated conjunctions and negated narrow-scope disjunctions have the same truth conditions, as shown by (8). Since negated conjunctions are unambiguous, negated disjunctions are not the clearest expressions of the narrow scope reading, which leads to the preference for the wide scope reading according to the Maxim of Manner.

(8) PPI-like AND

ta mei qu-guo Beijing he Shanghai.
s/he not go.to Beijing and Shanghai

Unique reading: S/he hasn't been to Beijing or Shanghai.

$\wedge > \neg \equiv \neg > \vee$

To sum up, the competition with negated conjunctions results in the preference for the wide scope reading in general, which may explain Crain's (2012) observation that OR in adult Mandarin is +PPI. However, universal modals tend to require speaker authority/opinionated speakers, which will block the wide scope reading by default. The table below summarises the interaction between these two factors.

	Blocking uncertainty $\neg > \vee$	Competing with AND $\vee > \neg$ (preference)	Predictions
\Box Opinionated Speaker $> \neg$	+	n/a	Only narrow scope
\Box Ignorant Speaker $> \neg$	-	+	Preferred wide scope
\Diamond Opinionated Speaker $> \neg$	+	+	Preferred wide scope
\Diamond Ignorant Speaker $> \neg$	-	+	Preferred wide scope

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