

Obligatory Neg-raising in Mandarin: Negatives and Aspects¹

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1. INTRODUCTION

1.1. Preliminaries

- “Neg-raising” (NR) is a phenomenon that the clause-mate negation of some sentence-embedding verb is interpreted as taking scope in the complement clause.

Neg-raising predicates (NRPs)

- (1) a. John doesn't believe that it is raining. $\neg\text{bel}\phi$
 b. \rightsquigarrow John believes that it isn't raining. $\text{bel}\neg\phi$

Non-neg-raising predicates (Non-NRPs)

- (2) a. John isn't certain that it is raining.
 b. $\not\rightsquigarrow$ John is certain that it isn't raining.

- Bartsch (1973): NR relates to an *excluded middle* (EM) inference, i.e. the subject is opinionated about the truth or falsity of the complement clause.

- (3) ‘John believes ϕ ’ $\text{bel}\phi$
 ‘either John believes ϕ or John believes $\neg\phi$.’ $\text{bel}\phi \vee \text{bel}\neg\phi$

Gajewski (2005): an NRP is hard to be negated without assuming an EM.

- (4) John doesn't think that it is raining, ? he is not opinionated.

1.2. The problem: obligatory NR in Mandarin

- In English, a non-NR reading arises when the negative auxiliary or the NRP is stressed. (Gajewski 2005, 2007)

- (5) a. John DOESN'T believe that it is raining, he isn't sure.
 b. John doesn't BELIEVE that it is raining, he KNOWS that.
 c. \rightsquigarrow John believes it isn't raining.

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- Mandarin negative *bu*, however, does not admit a non-NR reading;
 - (6) a. Yuehan **BU** xiangxin zai xiayu, # ta qishi bu queding.
 John NEG believe PROG rain he actually NEG sure
 - b. ? Yuehan **bu** XIANGXIN zai xiayu.
 John NEG believe PROG rain

To suspend the EM, a focus marker *shi* must be present.

- (7) a. Yuehan **bu shi** xiangxin zai xiayu, ta qishi bu queding.
 John NEG FOC believe PROG rain, he actually NEG sure
 ‘John DOESN't believe that it is raining, he is actually not sure.’
 b. Yuehan **bu shi** XIANGXIN zai xiayu, ta ZHIDAO zai xiayu.
 John NEG FOC believe PROG rain, he know PROG rain.
 ‘John doesn't BELIEVE that it's raining, he KNOWS that it is raining.’

Compare, the other negative *mei* behaves in the same way as English *n't*.

- (8) a. Yuehan **MEI** juede zai xiayu, ta qishi bu queding.
 John NEG think PROG rain, he actually NEG sure
 (Roughly) ‘John doesn't think that it is raining, he is actually not sure.’
 b. Yuehan **mei** JUEDE zai xiayu, ta ZHIDAO zai xiayu.
 John NEG think PROG rain, he know PROG rain.
 ‘John doesn't THINK that it's raining, he KNOWS that it is raining.’

Goal: To explain the obligatory NR with Mandarin negative *bu*.

Roadmap:

- * The exhaustification-based theory for (non-)NR
- * Negatives and aspectual system of Mandarin
- * Obligatory NR with Mandarin *bu*

2. THE EXHAUSTIFICATION-BASED THEORY FOR (NON-)NR

2.1. The grammatical view of scalar implicatures

- Scalar Implicature (SI) was firstly considered as wholly pragmatic (Grice 1975).
- The “grammatical view” (Chierchia 2004 a.o.) conceives SI as a grammatical issue: SIs are results of applying an exhaustivity operator EXH (\approx *only*), which affirms the prejacent and negates all the alternatives not entailed by the prejacent.

- (9) $\text{EXH}(p) = p \wedge \forall q \in \mathcal{Alt}(p)[p \not\subseteq q \rightarrow \neg q]$
 (p is true, and any alternative of p that is not entailed by p is false.)

– Direct SI

(10) Some of the students came. \rightsquigarrow Not all of the students came.

a. $\mathcal{A}lt(\phi_{\text{SOME}}) = \{\phi_{\text{SOME}}, \boxed{\phi_{\text{ALL}}}\}$

b. $\text{EXH}(\phi_{\text{SOME}}) = \phi_{\text{SOME}} \wedge \neg\phi_{\text{ALL}}$

– Indirect SI

(11) Not all of the students came. \rightsquigarrow Some of the students came.

a. $\mathcal{A}lt(\neg\phi_{\text{ALL}}) = \{\neg\phi_{\text{ALL}}, \boxed{\neg\phi_{\text{SOME}}}\}$

b. $\text{EXH}(\neg\phi_{\text{ALL}}) = \neg\phi_{\text{ALL}} \wedge \neg\neg\phi_{\text{SOME}} = \neg\phi_{\text{ALL}} \wedge \phi_{\text{SOME}}$

2.2. Romoli (2012, 2014)

- NR inferences are derived in the same way as indirect SIs: an entailment of the negative assertion and negation of the negated EM.

(12) a. $\mathcal{A}lt(\neg\text{bel}\phi) = \{\neg\text{bel}\phi, \boxed{\neg[\text{bel}\phi \vee \text{bel}\neg\phi]}\}$

b. $\text{EXH}(\neg\text{bel}\phi) = \neg\text{bel}\phi \wedge \neg\neg[\text{bel}\phi \vee \text{bel}\neg\phi] = \text{bel}\neg\phi$

2.3. Xiang (2014)

- Whether a sentence is NR or not is determined by the distributions of two features, both of which have to be checked by a c-commanding EXH.

1. The focus feature [+F] activates an alternative set $\mathcal{A}lt_F(p)$.

$\mathcal{A}lt_F(p)$: A subset of $\llbracket p \rrbracket^f$ (the focus value of p) containing p and particular contextually selected elements.

(Cf. the interpretation operator ‘ \sim ’ in Rooth 1996.)

2. The SI feature [+ σ] in the lexicon of an NRP activates an EM alternative.

(13) a. $\mathcal{A}lt(\mathbf{P}_{[-\sigma]}) = \{\lambda x \lambda \phi. \mathbf{P}(\phi)(x)\}$ Non-NRPs

b. $\mathcal{A}lt(\mathbf{P}_{[+\sigma]}) = \{\lambda x \lambda \phi. \mathbf{P}(\phi)(x), \lambda x \lambda \phi. [\mathbf{P}(\phi)(x) \vee \mathbf{P}(\neg\phi)(x)]\}$ NRPs

• NR: global exhaustification

(14) John doesn’t believe that it is raining.

a. $\text{EXH} \neg [\text{John believes}_{[+\sigma]} \text{it's raining}]$

b. $\mathcal{A}lt(\neg\text{bel}_{[+\sigma]}\phi) = \{\neg\text{bel}\phi, \boxed{\neg[\text{bel}\phi \vee \text{bel}\neg\phi]}\}$

c. $\text{EXH}(\neg\text{bel}_{[+\sigma]}\phi) = \neg\text{bel}\phi \wedge \neg\neg[\text{bel}\phi \vee \text{bel}\neg\phi] = \text{bel}\neg\phi$

• Non-NR

A. F-marked negation: double exhaustification (See appendix for more details)

In (15), the F-marked negation covertly moves to F^0 to check off [+F], forming an LF with double exhaustification and yielding a non-NR.

(15) John DOESn’t believe that it is raining.

a. $\text{EXH} \neg_{[+F]} \text{EXH} [\text{John believes}_{[+\sigma]} \text{it's raining}]$

b. $\text{EXH}[\text{bel}_{[+\sigma]}\phi] = \text{bel}\phi$

c. $\mathcal{A}lt(\neg_{[+F]}\text{EXH}[\text{bel}_{[+\sigma]}\phi]) = \mathcal{A}lt(\neg_{[+F]}\text{bel}\phi) = \{\neg\text{bel}\phi, \boxed{\text{bel}\phi}\}$

d. $\text{EXH}[\neg_{[+F]}\text{EXH}[\text{bel}_{[+\sigma]}\phi]] = \neg\text{bel}\phi \wedge \neg\text{bel}\phi = \neg\text{bel}\phi$

B. F-marked NRP: local exhaustification

In (16), to make the F-mark on NRP meaningful, EXH has to scope below negation.

(16) John doesn’t BELIEVE that it is raining, he KNOWS it.

a. $\neg \text{EXH} [\text{John BELIEVE}_{[+\sigma, +F]} \text{it is raining}]$

b. $\mathcal{A}lt(\text{bel}_{[+\sigma, +F]}\phi) = \{\text{bel}\phi \vee \text{bel}\neg\phi, \text{bel}\phi, \boxed{\text{know}\phi}\}$

c. $\neg \text{EXH}(\text{bel}_{[+\sigma, +F]}\phi) = \neg[\text{bel}\phi \wedge \neg\text{know}\phi] = \neg\text{bel}\phi \vee \text{know}\phi$

TO TAKE AWAY: Non-NR readings are derived via double or local exhaustification.

3. NEGATIVES AND ASPECTS IN MANDARIN

SLOGAN: The LF of a *bu*-sentence can NOT take double or local exhaustification.

3.1. Reason # 1: The bare *bu* is a local negation

- Fact 1:** Distributional patterns of aspectual markers and negatives: (See also Wang 1965, Huang 1988, Ernst 1995, Lee and Pan 2001, Lin 2003)

(17) a. *Ta **bu**₁ dai {-zhe/ -guo/ -le} maozi.

3SG NEG wear -DUR -EXP -PERF hat

b. Ta **mei** (you) dai {-zhe/ -guo/ *-le} maozi.

3SG NEG PERF wear -DUR -EXP -PERF hat

‘He is not wearing a hat./...’

c. Ta **bu**₂ **shi** dai {-zhe/ -guo/ -le} maozi.

3SG NEG FOC wear -DUR -EXP -PERF hat

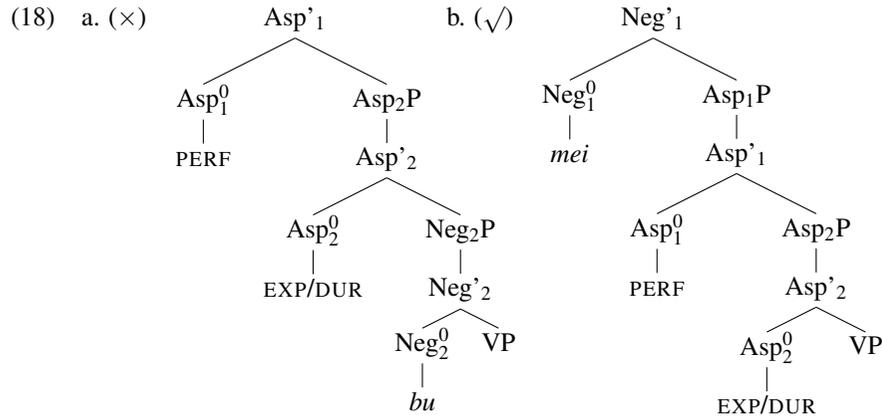
‘It isn’t the case that he is wearing a hat./...’

- *bu*₁ cannot co-occur with any aspectual maker;
- *mei* can co-occur with all aspectual markers except the perfective *-le*;²
- *bu*₂-*shi* can freely co-occur with any perfective marker.

• **Explaining Fact 1** (distributional patterns of negatives and aspectual markers):

To check off aspectual features, either aspectual affixes hop to verb stems, or verb stems move to Asp⁰, realizing the linear order [V-Asp].

*Bu*₁ can't co-occur with any aspectual marker, because its presence intervenes the affix-hopping or violates the Head Movement Constraint (HMC, Travis 1984). Cf. Gu (1993) and Ernst (1995)³



• **Fact 2:** In absence of aspectual markers, dynamic verbs give rise to generic or habitual readings. This generic reading survives under *bu* but not under *mei* (Lin 2003).

- (19) a. Yuehan chouyan.
John smoke
'John smokes' (= 'John has the habit of smoking.')
- b. Yuehan **bu** chouyan.
John NEG smoke
'John doesn't smoke.' (= 'John doesn't have the habit of smoking.')
- c. Yuehan **mei** chouyan.
John NEG smoke
'John didn't smoke.' (≠ 'John didn't have the habit of smoking.')

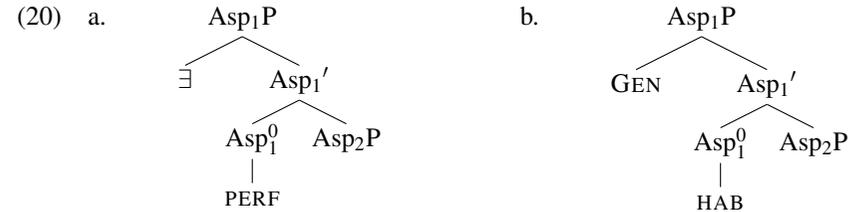
²*Mei* originates from the verb *mei* 'not have', the antonym of the possessive predicate *you*. Hence its co-occurring morphological variant of perfective is *you*, although the perfective flavor with *you* can sometimes be very weak. This fact explains why *mei* is complementarily distributed with *-le*. See also Wang (1965) and Ernst (1995).

³The existence of aspectual clusters (e.g. *chi-guo-le* 'eat-DUR-PERF') suggests that Mandarin has multiple projections of Asp, and that *-le* c-commands the others.

• **Explaining Fact 2** (persistence of generic/habitual reading under *bu*):

The Neo-Davidsonian approach requires event variables to be closed by an \exists -closure or a generic operator GEN (Krifka 1989, 1990, Parsons 1990, Chierchia 1995 a.o.).

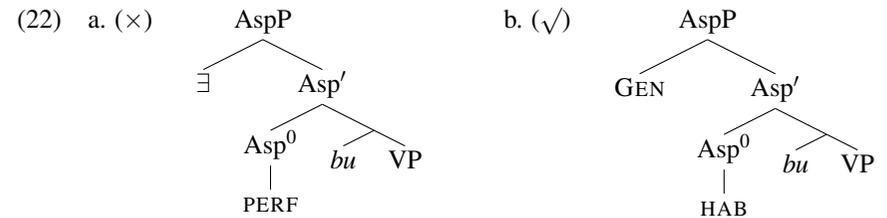
I assume that \exists -closure and GEN are both introduced at [Spec, AspP], agreeing with PERF and HAB, respectively.



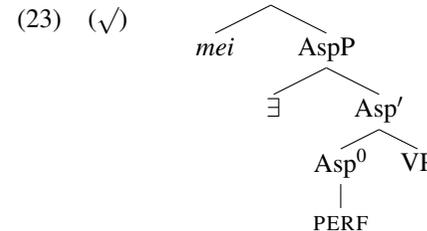
Champollion (2011): the \exists -closure of event variables cannot scope over negation.

- (21) John didn't laugh.
a. $\neg \exists e$ [laugh(e \wedge Ag(e) = j]
'There was no event in which John laughed.'
b. $*\exists e \neg$ [laugh(e) \wedge Ag(e) = j]
'There was an event in which John doesn't laugh.'

Since the bare negative *bu*₁ takes scope below Asp, I conjecture that it cannot co-occur with an \exists -closure, ruling out (22a); *bu*₁ can only co-occur with a GEN as in (22b), admitting generic readings.



Compare: *mei* scopes above Asp, and hence it can co-occur with an \exists -closure.



3.1.1. Reason # 2: Stressing *bu* doesn't signal [+F]

- **Fact 3:** Intuitively, the stressed *bu* in (24) suggests only a weak contrast like either (25a) or (25b), instead of an emphatic denial.

(24) # Yuehan **BU** juede zai xiayu, ta qishi bu queding.
 John NEG think PROG rain he actually NEG sure

- (25) a. John thinks the weather is bad, but he BU thinks it is raining.
 b. Mary thinks it is raining, but John BU thinks so.

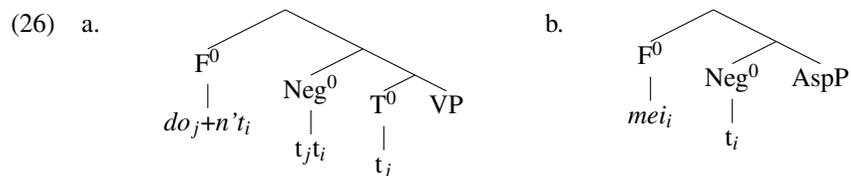
• Explaining Fact 3:

I propose that stressing *bu* does NOT signal an [+F] feature.

1. *bu* vs *mei* *n't*

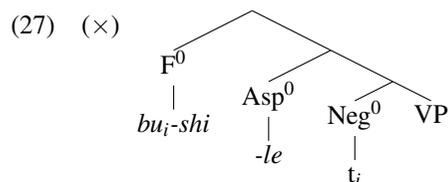
In absence of an overt focus-marker, an F-marked negation must check off its [+F] feature by moving to F⁰ at LF. According to the HMC, this movement cannot be intervened by any syntactic or semantic material at a head node. The bare *bu* is too low to undertake this movement and hence cannot be F-marked.

Cf. English *n't* and Mandarin *mei*: they can be F-marked because they can take the Neg-to-F movement to check off [+F].



2. *bu* vs *bu-shi*

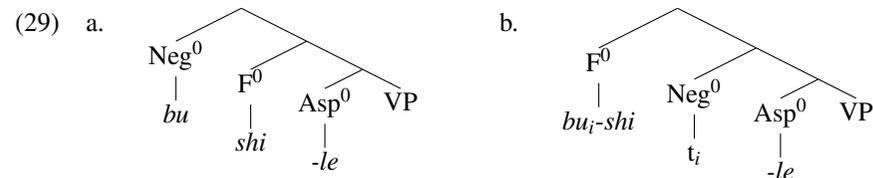
Bu-shi can be F-marked. However, the negative morpheme in *bu-shi* does NOT come from the bare *bu*.



(27) must be excluded, because it incorrectly predicts that *bu-shi* can't co-occur with aspectual markers: moving *bu* to F⁰ over Asp⁰ violates HMC.

- (28) a. * Ta **bu** dai {-zhe/ -guo/ -le} maozi.
 3SG NEG wear -DUR -EXP -PERF cap
 b. Ta **bu shi** dai {-zhe/ -guo/ -le} maozi.
 3SG NEG FOC wear -DUR -EXP -PERF cap

Alternatively, we can say that the negative morpheme in *bu-shi* is generated above FP as in (29a), or that it is moved from a Neg⁰ between FP and AspP, as in (29b).



SUMMARY

- The bare *bu* always takes scope under aspect:

Explanation: the bare *bu* cannot co-occur with any aspectual marker because: (i) the presence of *bu* blocks the affix-hopping or head movement, (ii) negation cannot take scope below an \exists -closure.

- Stressing *bu* doesn't signal an [+F] feature:

Explanation: the [+F] feature has to be checked via an LF movement to F⁰; however *bu* is too local to take such an LF movement.

4. OBLIGATORY NR WITH *bu*

- (1) A proposition is closed at Asp. Hence, an EXH, as a propositional operator, must scope above Asp (EXH > Asp). (2) Asp > *bu*.

⇒ EXH > *bu*; a *bu*-sentence can't take local or double exhaustification.

⇒ a *bu*-sentence is obligatorily NR!

- In (30), stressing the NRP is odd. Because the only syntactically well-formed LF is global exhaustification, which, however, makes the F-mark on the NRP meaningless (no excludable alternative is activated by the [+F] feature).

(30) ? Yuehan **bu** XIANGXIN zai xiayu.
 John NEG believe PROG rain

(31) $Alt(\neg \mathbf{bel}_{[+\sigma, +F]}\phi) = \{ \neg[\mathbf{bel}\phi \vee \mathbf{bel}\neg\phi], \neg \mathbf{bel}\phi, \neg \mathbf{know}\phi \}$

- In (32), *bu* doesn't have an [+F] feature. Hence the LF of (32) is as (33), where the EXH-operator scopes above negation, yielding an NR.

(32) Yuehan **BU** juede zai xiayu, # ta bu queding.
 John NEG think PROG rain he NEG sure
 'John thinks that it isn't raining, # he isn't sure.'

(33) EXH $bu_{[-F]}$ [John believes_[+\sigma] it's raining]

5. CONCLUSIONS

- This paper offers an explanation to the obligatory NR with Mandarin negative *bu*, following the EXH-based theory in Xiang (2014).
- To receive a non-NR paraphrase, a negative sentence with an NRP must take local or double exhaustification.
And to create a local or double exhaustification structure, the negative negating the NRP has to scope over aspect or be able to check off an [+F] feature via head movement.
- The Mandarin negative *bu*, however, does not satisfy any of these requirements, and hence is obligatory NR.

6. APPENDIX: SOME SIDENOTES ON XIANG (2014)

- Local exhaustification is untenable for (14), because it violates the SMH.

Strongest Meaning Hypothesis (SMH) (Chierchia et al 2013, a.o.):

An occurrence of EXH is marked if it gives rise to a reading that is equivalent to or weaker than what would have resulted in its absence.

$$(34) \quad *_{\neg\text{EXH}}[\mathbf{bel}\phi] = \neg\mathbf{bel}\phi$$

- Global exhaustification is untenable for (15). If [+F] and [+σ] were checked by a single global EXH, this EXH negates both the affirmed and the negated EM, yielding a contradiction.

$$(35) \quad \begin{array}{l} \text{a. } \mathcal{A}It(\neg_{[+F]}[\mathbf{bel}_{[+\sigma]}\phi]) = \{\mathbf{bel}\phi, \neg\mathbf{bel}\phi, \boxed{\mathbf{bel}\phi \vee \mathbf{bel}\neg\phi}, \boxed{\neg[\mathbf{bel}\phi \vee \mathbf{bel}\neg\phi]}\} \\ \text{b. } *_{\text{EXH}}[\neg_{[+F]}[\mathbf{bel}_{[+\sigma]}\phi]] = \perp \end{array}$$

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