Obligatory Neg-raising in Mandarin: Negatives and Aspects

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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. ¬belφ
b. John believes that it isn’t raining. bel¬φ

Non-neg-raising predicates (Non-NRPs)

(2) a. John isn’t certain that it is raining. ¬belφ
b. John is certain that it isn’t raining. bel¬φ

• 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’ belφ
‘either John believes φ or John believes ¬φ.’ belφ ∨ bel¬φ

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. John believes it isn’t raining.

(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 (≈ only), which affirms the prejacent and negates all the alternatives not entailed by the prejacent.

(9) \[ \text{EXH}(p) = p \land \forall q \in \phi \text{Ir}(p) [p \not\subseteq q \rightarrow \neg q] \]

(p is true, and any alternative of p that is not entailed by p is false.)

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2.3. Xiang (2014)

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

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

\[ b. \ \text{EXH}(\phi_{\text{SOME}}) = \phi_{\text{SOME}} \land \neg\phi_{\text{ALL}} \]

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.

\[ (12) a. \ \text{EXH}(\neg\phi_{\text{ALL}}) = \neg\phi_{\text{ALL}} \land \neg\phi_{\text{SOME}} = \neg\phi_{\text{ALL}} \land \phi_{\text{SOME}} \]

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 \(\mathcal{A}lt_F(p)\).

\[ \mathcal{A}lt_F(p): \text{A subset of } [p]^{[F]} \text{ (the focus value of } p) \text{ containing } p \text{ and particular contextually selected elements.} \]

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

2. The SI feature \([+\sigma]\) in the lexicon of an NRP activates an EM alternative.

\[ (13) a. \mathcal{A}lt(\neg\phi_{[+\sigma]})(x) = \{\neg\phi_{[+\sigma]}(x) \mid \lambda x \lambda \phi \cdot P(\phi)(x) \} \quad \text{Non-NRs} \]

\[ b. \mathcal{A}lt(\neg\phi_{[+\sigma]})(x) = \{\neg\phi_{[+\sigma]}(x) \mid \lambda x \lambda \phi \cdot P(\phi)(x) \land P(\neg\phi)(x) \} \quad \text{NRs} \]

\[ \text{NR: global exhaustification} \]

\[ (14) \text{John doesn’t believe that it is raining.} \]

\[ a. \ \text{EXH}(\neg\phi_{[+\sigma]}(x)) = \neg\phi_{[+\sigma]}(x) \]

\[ b. \mathcal{A}lt(\neg\phi_{[+\sigma]}(x)) = \{\neg\phi_{[+\sigma]}(x) \mid \lambda x \lambda \phi \cdot P(\phi)(x) \land P(\neg\phi)(x) \} \]

\[ c. \text{EXH}(\neg\phi_{[+\sigma]}(x)) = \neg\phi_{[+\sigma]}(x) \land \neg\phi_{[+\sigma]}(x) = \neg\phi_{[+\sigma]}(x) \land \phi_{[+\sigma]}(x) = \phi_{[+\sigma]}(x) \]

\[ \text{Non-NR} \]

A. F-marked negation: double exhaustification

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

\[ (15) \text{John DOESn’t believe that it is raining.} \]

\[ a. \ \text{EXH}(\neg\phi_{[+\sigma]}(x)) = \neg\phi_{[+\sigma]}(x) \]

\[ b. \mathcal{A}lt(\neg\phi_{[+\sigma]}(x)) = \{\neg\phi_{[+\sigma]}(x) \mid \lambda x \lambda \phi \cdot P(\phi)(x) \land P(\neg\phi)(x) \} \]

\[ c. \text{EXH}(\neg\phi_{[+\sigma]}(x)) = \neg\phi_{[+\sigma]}(x) \land \neg\phi_{[+\sigma]}(x) = \neg\phi_{[+\sigma]}(x) \land \phi_{[+\sigma]}(x) = \phi_{[+\sigma]}(x) \]

B. F-marked NRP: local exhaustification

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

\[ (16) \text{John doesn’t BELIEVE that it is raining, he KNOWS it.} \]

\[ a. \ \text{EXH}(\neg\phi_{[+\sigma]}(x)) = \neg\phi_{[+\sigma]}(x) \]

\[ b. \mathcal{A}lt(\neg\phi_{[+\sigma]}(x)) = \{\neg\phi_{[+\sigma]}(x) \mid \lambda x \lambda \phi \cdot P(\phi)(x) \land P(\neg\phi)(x) \} \]

\[ c. \text{EXH}(\neg\phi_{[+\sigma]}(x)) = \neg\phi_{[+\sigma]}(x) \land \neg\phi_{[+\sigma]}(x) = \neg\phi_{[+\sigma]}(x) \land \phi_{[+\sigma]}(x) = \phi_{[+\sigma]}(x) \]

\[ \text{TO TAKE AWAY: Non-NR readings are derived via double or local exhaustification.} \]

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

\[ \text{Fact 1: Distributional patterns of aspectual markers and negatives: (See also Wang 1965, Huang 1988, Ernst 1995, Lee and Pan 2001, Lin 2003)} \]

\[ (17) a. * Ta \ bu_1 \ \text{dai } \{-zhe/-guo/-le\} \ \text{maozi.} \]

\[ 3SG \text{ NEG wear } \neg \text{-DUR-EXP-PERF hat} \]

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

\[ 3SG \text{ NEG PERF wear } \neg \text{-DUR-EXP-PERF hat} \]

'He is not wearing a hat/...'

\[ c. Ta \ bu_2 \ \text{shi } \{-zhe/-guo/-le\} \ \text{maozi.} \]

\[ 3SG \text{ NEG FOC wear } \neg \text{-DUR-EXP-PERF hat} \]

'Isn’t the case that he is wearing a hat/..."
– bu₁ cannot co-occur with any aspectual maker;
– mei can co-occur with all aspectual markers except the perfective -le;
– bu₂-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].
Bu₁ 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).

\[
\begin{align*}
\text{Explaining Fact 1} & : \\
\text{To check off aspectual features, either aspectual affixes} & \text{hop to verb stems, or verb stems move to Asp⁰.} \\
\text{Bu₁ cannot co-occur with any aspectual maker; mei} & \text{can co-occur with all aspectual markers except the perfective -le.} \\
\text{bu₂-shi can freely co-occur with any perfective marker.}
\end{align*}
\]

\[
\begin{align*}
\text{Fact 2: In absence of aspectual markers, dynamic verbs} & \text{give rise to generic or habitual readings. This generic reading} \\
& \text{survives under bu but not under mei (Lin 2003).}
\end{align*}
\]

\[
\begin{align*}
\text{(18) a. (x) } & \text{Asp} \rightarrow \text{Neg} \rightarrow \text{Asp} \rightarrow \text{VP} \\
\text{b. (√) } & \text{Asp} \rightarrow \text{Neg} \rightarrow \text{Asp} \rightarrow \text{VP}
\end{align*}
\]

\[
\begin{align*}
\text{Champollion (2011): the ∃-closure} & \text{of event variables cannot scope over negation.}
\end{align*}
\]

\[
\begin{align*}
\text{(21) John didn’t laugh.} & \\
\text{a. } & \neg \exists e [\text{laugh}(e \land \text{Ag}(e) = j)] \\
& \text{‘There was no event in which John laughed.’} \\
\text{b. } & \exists e \neg [\text{laugh}(e) \land \text{Ag}(e) = j] \\
& \text{‘There was an event in which John doesn’t laugh.’}
\end{align*}
\]

Since the bare negative bu₁ takes scope below Asp, I conjecture that it cannot co-occur with an ∃-closure, ruling out (22a); bu₁ can only co-occur with a GEN as in (22b), admitting generic readings.

\[
\begin{align*}
\text{(22) a. (x) } & \text{AspP} \\
\text{b. (√) } & \text{AspP}
\end{align*}
\]

\[
\begin{align*}
\text{Compare: mei} & \text{scopes above Asp, and hence it can co-occur with an ∃-closure.}
\end{align*}
\]

\[
\begin{align*}
\text{(23) (√) } & \text{mei AspP} \\
\text{AspP} & \text{AspP}
\end{align*}
\]

\[
\begin{align*}
\text{Mei} & \text{originates from the verb mei ‘not have’, the antonym of the possessive predicate you. Hence its co-occurring morphological variant of perfective} \\
& \text{is you, although the perfective flavor with you can sometimes be very weak. This fact explains why mei} \\
& \text{is complementarily distributed with -le. See also Wang (1965) and Ernst (1995).}
\end{align*}
\]

\[
\begin{align*}
\text{The existence of aspectual clusters (e.g. chi-guo-le ‘eat-DUR-PERF’) suggests} & \text{that Mandarin has multiple projections of Asp, and that -le c-commands the others.}
\end{align*}
\]
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 (25) or (25), instead of an emphatic denial.

(24) # Yuehan BU jue 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.

  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

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) \( \phi \) = \( \{ \neg \text{bel} \lor \sigma \land \phi \} \)

- 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 jue 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*- [John believes; [+σ] 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.

\[ \neg \text{EXH} [\phi] = \neg \phi \]

- 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.

\[ \text{EXH}[\neg F \cdot [\phi] \cdot [\neg \phi]] = \bot \]

REFERENCES