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Mismatches in the interpretation of sentences with multiple negative expressions in Mandarin Chinese. An experimental investigation

Introduction. Mandarin Chinese (MC) has been characterized as a double negation (DN) language in the literature (Cheng and Li 1991, Ding 1961, Lü 1985). In so-called DN languages the combination of multiple negative expressions within the boundaries of a sentential domain is expected to yield a DN reading, by which two negative elements cancel each other out and convey an affirmative proposition (*Law of Double Negation,* cf. Horn 1989). However, certain mismatches have been described in a DN language such as modern Dutch (Zeijlstra 2010, de Swart & Fontville 2014) by which at the output of the interaction of syntax and prosody a single negation (SN) reading can be inferred.

Goals. This study aims at exploring experimentally whether a SN reading is ever possible in MC when multiple negative expressions combine in a sentence. If so, is this possibility dependent on whether the stress occurs in Word1 (i.e., *cóngláiméi* 'never', *cóngláibù* 'never', *méiyǒurén* 'no one', *méiyǒudōngxi* 'nothing', *méiyǒu* 'not', *bù* 'not'), or in Word2 (i.e., *méiyǒu*, *bù*)?, and is this possibility dependent on the type of the negative expressions involved and the combination thereof?

Methods. We designed an online perception experiment consisting of a judgment task in which 114 native speakers of MC (mean age 27.57, SD=5.97), after reading a question and listening to the recordings of an answer to this question, were asked to choose between one of two interpretations: one corresponds to a DN interpretation and the other to a SN interpretation. The audio-recordings combined ten syntactic patterns (with different distributions of two negative expressions) with four stress patterns (u+u, S+u, u+S, S+S) applied to each pair of negative expressions. By way of illustration, (1) provides an example (in English, for convenience) of a test item like those used in the experiment.

(1)

Context: Every year the students in your school have the opportunity to attend a summer camp abroad. Today there is a new teacher in your class. During the class, the new teacher asks you:

Question

Is there anybody in the class who hasn't been to America?

Answer

Méi(yǒu)rén *méi(yǒu)* qù guò Měiguó.
not.have.people not.have go PART America
'No one hasn't been to America.'

Interpretation

Interpretation 1: Everyone has been to America.
Interpretation 2: No one has been to America.

A total of 40 sentences were provided in a random order to each participant. 4,560 responses were analyzed using a Generalized Linear Mixed Model.

Results. Our results show that the choice of SN readings reached, overall, 7.06%, a percentage that is nonetheless statistically significant when analyzing the main effects of the type of negative element ($p < .001$) and the stress on the second negative expression ($p < .001$). This means that the participants' SN interpretation associated with multiple negative expressions is not randomly distributed, but caused by a series of (combinations of) factors. **First,** of all the

fixed factors, only STRESSED1 was not found to be significant (F= .518, p= .472). By contrast, STRESSED2 was significant (F = 16.297, p < .001), indicating that utterances got more SN readings when the second negative element was produced with stress than when it was not (p= .001). The effect of stress on the second negative expression is significant when the first negative element is unstressed (p < .001), but not when the first element is stressed (p = .302) (see Table1). **Second,** *cóngláiméi/cóngláibù* obtained more SN readings than both *méiyǒu/bù* (p = .008) and *méiyǒurén/méiyǒudōngxi* (p= .001), the latter also being significantly different such that more SN readings were obtained for *méiyǒu/bù* compared to *méiyǒurén/méiyǒudōngxi* (p< .001) (see Table2). **Third**, concerning the interaction ELEMENTTYPE ×STRESSED1, stressed *cóngláiméi/cóngláibù* received more SN readings than unstressed ones (p=.002) (see Table3). **Fourth,** concerning the interaction ELEMENTTYPE ×STRESSED2**,** when *méiyǒu/bù* occupied the first position, utterances with stress in the second expression received more SN readings than those with an unstressed Word2 (p<.001) (see Table4).

	Proportion single negation (SD)		
	W2 unstressed	W2 STRESSED	Sig.
W1 unstressed	**.0090 (.0030)**	**.0397 (.0087)**	***p* < .001**
W1 STRESSED	.0189 (.0053)	.0244 (.0062)	p = .302

Table1

ElementType, W1	Proportion of single negation (SD)
cóngláiméi/cóngláibù	.0483 (.0120)
méiyǒu/bù	.0228 (.0050)
méiyǒurén/méiyǒudōngxi	.0073 (.0024)

Table2

	Proportion of single negation (SD)		
ElementType, W1	W1 unstressed	W1 STRESSED	Significance
méiyǒurén/méiyǒudōngxi	.0092 (.0033)	.0059 (.0022)	p = .221
méiyǒu/bù	.0248 (.0057)	.0210 (.0052)	p = .377
cóngláiméi/cóngláibù	**.0299 (.0091)**	**.0772 (.0190)**	***p* = .002**

Table3

	Proportion of single negation (SD)		
ElementType, W1	W2 unstressed	W2 STRESSED	Significance
méiyǒurén/méiyǒudōngxi	.0052 (.0022)	.0105 (.0033)	p = .080
méiyǒu/bù	**.0105 (.0030)**	**.0491 (.0112)**	***p* < .001**
cóngláiméi/cóngláibù	.0407 (.0118)	.0573 (.0149)	p = .162

Table4

Discussion. We argue that **(i)** the interaction of syntax and prosody (stress in particular) makes possible the emergence of SN readings in MC; **(ii)** when two negative markers combine and Word2 is stressed, the latter is the one taken to express sentential negation (interpretive effect of the violation of the expected declination of the fundamental frequency contour, Pierrehumbert 1979, Belotel-Grenié & Grenié 2003); and **(iii)** when Word1 is a preverbal adjunct, it merely modifies the negative sentence rather than negating it (vs. argumental negative quantifiers).

Selected references: Belotel-Grenié, Agnès, and Grenié, Michel, 2003. Declination line and tones variations in standard Chinese. In: Solé, M. J., Recasens, D., Romero, J. (Eds.), 15th International Congress of Phonetic Sciences, Barcelona, pp. 1281-1284. **Cheng, Lisa L.-S., and Yafei Li,** (1991). Double negation in Chinese and multi projections. Paper presented at the North America Conference on Chinese Linguistics, Cornell University. **Lü, Shuxiang**, (1985). Yiwen, fouding, kending (Question, negation and affirmation). Zhongguo Yuwen 4:241–250. **Zeijlstra, Hedde**, (2010). Emphatic Multiple Negative Expressions in Dutch. The Linguistic Review, 27: 37-73.