

Cross-linguistic Priming of the Passive in Mandarin and English Bilinguals

Claire Stabile, Nian Liu, Victoria Chen, and Kamil Ud Deen

1. Introduction

Mandarin *bei* construction is controversial. Some claim it is a passive, involving movement (Travis, 1984; Koopman, 1984), while others claim it is a biclausal structure (Hashimoto, 1987; Wei, 1994; see Huang, 1999 for an overview). We investigate this issue using cross-language priming in adult Mandarin-English bilingual/L2 speakers. It is commonly accepted that if a pattern can be primed then an abstract representation of that pattern exists (Bock, 1986; Bencini & Valian, 2008). However, priming may also occur because of other factors, e.g., phonology, or (most relevant for our purposes) thematic-role ordering.

In this paper, we investigate the status of Mandarin *bei* using the technique of cross-language priming. Following Hartsuiker, Pickering, & Veltkamp (2004), who tested bilingual English-Spanish speakers and found that passives in the two languages prime each other (see below for details), we test bilingual/L2 Mandarin-English participants. We attempt to prime Mandarin *bei* with English passives, and vice versa, on the hypothesis that priming should only obtain if Mandarin *bei* and the English passive share the abstract structure of true passives. We show that while priming does indeed take place, there are other factors that may have caused priming to occur, which we address in a second experiment.

2. Previous research

2.1. Cross-linguistic Priming

Priming is a well-accepted technique that allows researchers to identify abstract representations. Bock (1986) showed that participants primed with the dative variant of dative-ditransitive sentence pairs (e.g., dative: the boy gave the book to the girl; ditransitive: the boy gave the girl the book) described a subsequent picture more often with the dative pattern, and when primed with the ditransitive variant, they described the picture more often with the ditransitive variant. This has generally been taken to indicate that when a particular pattern is primed, what is being primed is the abstract structural representation of a sentence, amongst other things. In the case of bilinguals, priming across two languages indicates that the respective sentences in the two languages share an underlying abstract representation. This therefore serves as a useful tool for cross-linguistic comparison.

Hartsuiker et al. (2004) tested cross-linguistic syntactic priming of the passive in Spanish-English bilingual adults. A researcher described pictures to the subject, using Spanish, and the subject described subsequent pictures in English. Three types of Spanish primes were given: active sentences, passive sentences, and object-verb-subject constructions. Subjects produced more passives after being primed with a passive, than with active sentences. There was no statistical difference between the active sentences and the OVS constructions, suggesting simple noncanonical ordering is not enough to cause priming of the passive; the prime and the target must share an abstract syntactic structure. Through this study and others, cross-linguistic priming has been established as a method for eliciting equivalent syntactic structures across languages.

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2.2. The Mandarin *bei* construction: Two analyses

Mandarin active sentences are canonically SVO (1a). The basic passive structure in Mandarin employs the periphrastic strategy, using the passive markers *bei*, *gei*, *rang*, and *jiao*. The current study focuses on the usage and structure of the passive marker *bei* in Mandarin, easily the most common and prototypical passive in the language. Mandarin passives occur in both short (1b, in which the agent is omitted) and long forms (1c, in which the agent occurs overtly), similar to English.

- | | | |
|-----|---|--|
| (1) | a. Lisi da-le Zhangsan
Lisi hit-PERF Zhangsan
“Lisi hit Zhangsan.” | Mandarin Active |
| | b. Zhangsan bei da-le
Zhangsan BEI hit-PERF
“Zhangsan was hit.” | Mandarin Short Passive (Data from Her, 2009) |
| | c. Zhangsan bei Lisi da-le
Zhangsan BEI Lisi hit-PERF
“Zhangsan was hit by Lisi.” | Mandarin Long Passive (Data from Her, 2009) |

The *bei* construction has been analyzed in several ways, the two most common of which are discussed below.

2.2.1. The movement analysis of *bei*

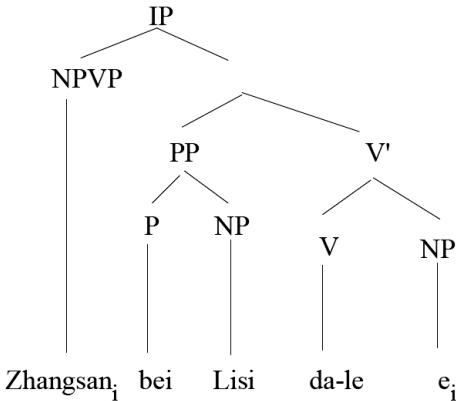
Bei is analyzed as a true passive by some researchers (Her, 2009; Koopman, 1984; Travis, 1984). One criterion for passives is that there must be a corresponding active sentence which is its thematic paraphrase as in (2a,b) below.

- | | | |
|-----|---------------------------------|---------------------------------------|
| (2) | a. Vader killed Obi-wan. | English active |
| | b. Obi-wan was killed by Vader. | English passive (thematic paraphrase) |

The *bei* construction in Mandarin is also a thematic paraphrase of the canonical active sentence, as shown in (3) below. In both sentences, Lisi is the agent, and Zhangsan is the theme. In (3a), Lisi is in subject position and Zhangsan functions as the object, while in (3b), Zhangsan has been promoted to subject position and Lisi has been downgraded. As with example 2 above, while the theme and agent NP's occupy different structural positions in (3a) and (3b), the overall meanings of the sentences have not changed, and they are direct thematic paraphrases of one another.

- | | | |
|-----|---|--|
| (3) | a. Lisi da-le Zhangsan
Lisi hit-PERF Zhangsan
“Lisi hit Zhangsan.” | Mandarin active (Data from Her, 2009) |
| | b. Zhangsan bei Lisi da-le
Zhangsan BEI Lisi hit-PERF
“Zhangsan was hit by Lisi.” | Mandarin passive (Data from Her, 2009) |

Huang (1999, p. 4), in his review of arguments for the passive analysis of *bei*, provides the structure in Figure 1 below. He shows that the moved theme NP is associated with an empty category in the object position, and thus a pronoun in that position is ungrammatical, as shown in (4) below. Under this analysis, the *bei*+NP sequence functions as a constituent (a Prepositional Phrase), as with the *by* phrase in English passives.

Figure 1. Passive analysis of *bei* (Data from Huang, 1999)

- (4) a. *Zhangsan bei Lisi da-le ta
 Zhangsan BEI Lisi hit-PERF him
 “Zhangsan was hit (*him) by Lisi.”

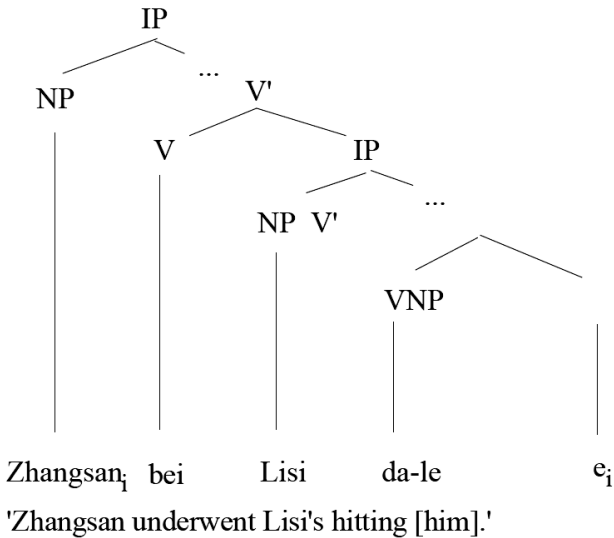
2.2.2. The biclausal analysis of *bei*

An alternative view is that *bei* is a biclausal structure where *bei* is the main verb (meaning something akin to “undergo” or “experience”). This main verb takes an event complement and an experiencer external argument (Hashimoto, 1987; Wei, 1994; see Huang, 1999 for an overview). As Huang (1999, p. 5) points out, there are several issues with the passive analysis detailed in section 2.2.1. One such issue is the lack of evidence that the *bei*-NP sequence functions as a PP, or as a constituent at all, as predicted by the movement analysis. The *bei*-NP sequence does not move as a constituent across a time phrase, or to sentence-initial position (unlike the English PP *by Bill*), as demonstrated in (5).

- (5) a. Zhangsan zuotian *bei* Lisi da-le (Data from Huang 1999)
 Zhangsan yesterday BEI Lisi hit-PERF
 (cf. John was hit by Bill Yesterday).
- b. *Zhangsan *bei* Lisi zuotian da-le
 Zhangsan BEI Lisi yesterday hit-PERF
 (cf. John was hit yesterday by Bill).
- c. **bei* Lisi Zhangsan zuotian da-le
 bei Lisi Zhangsan yesterday hit-perf
 (cf. It was by Bill that John was hit yesterday).

According to Huang (1999, p. 8), these issues with the movement analysis of *bei* point towards a complementation approach. In this complementation analysis, *bei* is a main verb, and selects an experiencer subject, and event complement, as illustrated in figure 2 below.

Figure 2. Complementation analysis (data from Huang, 1999)



Under this approach, *bei*+NP does not need to function as a PP, as with the movement analysis. As demonstrated in figure 2 above, the *bei*+NP sequence need not function as a constituent, consistent with the analysis in figure 1.¹

3. Experiment one

Given the assumption that primable structures share abstract structure, the current experiment investigates whether the English passives prime Mandarin *bei*, and whether Mandarin *bei* primes English passives. The logic is that if the Mandarin *bei* is a genuine passive, along the lines sketched in section 2.2.1, then a priming effect should be obtained. If no priming effect is obtained, we can conclude that the two structures (English passive and Mandarin *bei*) do not share abstract structure.

3.1. Methods

The procedure we used (discussed in more detail below) is similar to that used by Messenger et.al. (2012), except it involved two languages. Broadly speaking, participants were shown a picture involving a reversible event (e.g., a zebra pushing a giraffe) and the picture was described to them in either English or Mandarin, using either the active voice or passive/*bei*. Participants described the next picture (also depicting a reversible event, but different from the first) in any way they wanted. Different conditions required them to respond in different languages such that all four permutations of language were obtained (English prime and Mandarin target, Mandarin prime and English target, English prime and English target, and Mandarin prime and Mandarin target). The dependent measure was the rate of passive / *bei* produced in response to active or passive/*bei* primes.

3.2. Participants

Participants were 29 bilingual Mandarin-English speakers recruited at the University of Hawaii and University of Oklahoma. They were L1 Mandarin, L2 English speakers, and are Mandarin dominant. Self-reported language history and proficiency data was collected from the participants.

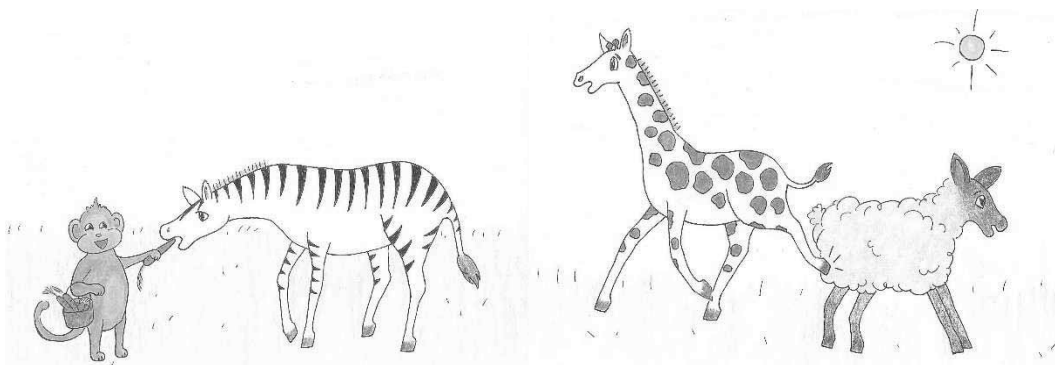
¹As noted in Huang (1999), the NP (Lisi, in figure 2) and the rest of the VP is a constituent, consistent with this analysis.

3.3. Stimuli

This study used a total of twenty-four sentences, each associated with a picture. All of the sentences involved reversible transitive verbs, with two animal characters. Care was taken to avoid scenarios which could be influenced by real world knowledge (such as a lion frightening a monkey). The sentences and corresponding pictures were developed and translated with the aid of a native speaker of Taiwanese Mandarin, with attention to naturalness and the ability of the verb to function as a passive. All pictures and sentences were normed with native English and Mandarin speakers for naturalness.

These items were then arranged into pairs: one prime and one target picture. Of these twelve pairs, six of the primes were active sentences such as “the bear hugged the monkey”, and six were passive sentences such as “the giraffe was washed by the bear.” Of the six passive primes, three were actional verbs (theme-agent constructions such as kick, hug, etc.) and three were non-actional verbs (experiencer-theme constructions such as see, hear, etc.). Care was taken in the selection of pairs so as not to have the same or similar verb as both the prime and the target. In keeping with Messenger et al. (2012) none of the target pictures depicted any experiencer-theme (non-actional) scenarios.

Figure 3. Sample Test Item



Prime: The zebra was fed by the monkey.
Banma bei houzi wei-le.
Zebra BEI monkey feed PERF

Target Image

3.4. Procedure

The test item pairs were arranged semi-randomly into a “storybook” for presentation to the participants. Different storybooks were developed for the different language contexts, in order to provide participants with item pairs which were more natural in the target language, as well as to avoid item repetition and participant boredom. The story was presented as “Yesterday at the Zoo”, in order to place the task in a past tense context and avoid the infelicitous use of the present progressive passive “the cat is being fed by the dog”, which was judged to be unnatural in Mandarin.

The experiment was arranged into two blocks: Mandarin response, and English response. The Mandarin response block consisted of the Mandarin Prime-Mandarin Response, and English Prime-Mandarin Response conditions of the experiment, while the English response block consisted of the English-English and Mandarin-English conditions. All subjects participated in both blocks of the experiment, and the order of the blocks was counterbalanced among the participants. Participants were instructed to respond in the target language. The images were presented one at a time to the participants, while the researcher gave the corresponding prime sentence (active or passive).

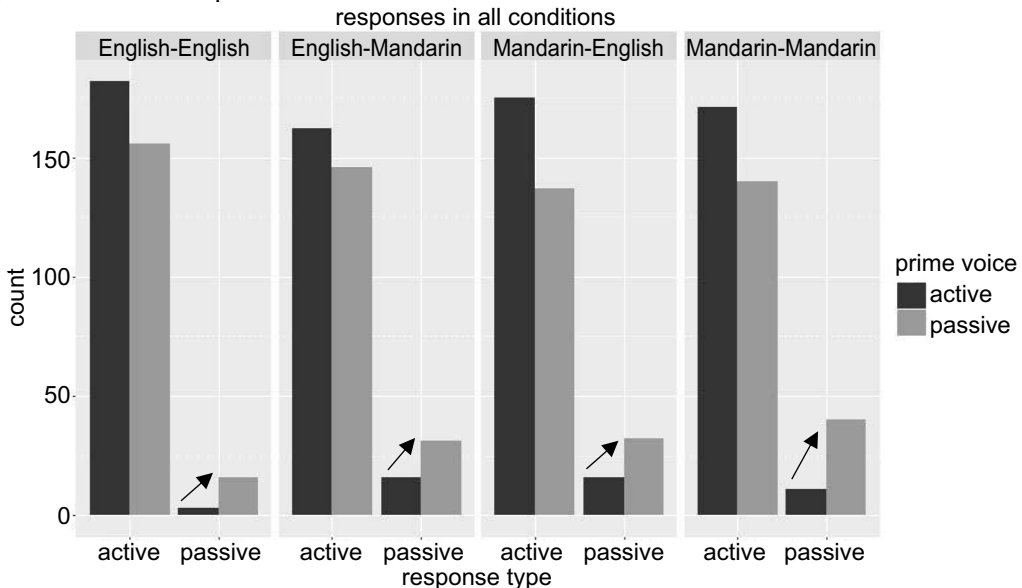
Responses were coded as active, passive, or other. Mandarin responses were only coded as passive if they included use of the *bei* form. Sentences which were neither active nor passive (sentences containing only the copula, incomplete sentences, etc.) were coded as “other”.

3.5. Results

A binary mixed effects model was fit by hand to accuracy in R, with by-subject random slopes for response voice, and by-subject random intercepts. Prime voice, prime language, and response language were tested as predictors in the model. A second model was fit using only random intercepts. An ANOVA was used to compare the two models. It was determined that inclusion of slopes did not significantly improve fit of the model.

All factors reached significance and were included in addition to the dependent variable (response voice). Participants were more likely to respond with a passive when the prime was a passive ($p < .0001$), when the prime was in Mandarin ($p < .01$), and when the response was given in Mandarin ($p < .01$). In addition to these main effects of prime voice, prime language, and response language, there was an interaction effect of prime language and response language. When both the prime and response were given in Mandarin, participants were more likely ($p < .01$) to respond with a passive. We suspect this is due to the fact that the participants are Mandarin dominant and may be more comfortable producing complex syntactic structures such as the passive in their native language. Taken together, these results show that the Mandarin *bei* construction can indeed prime and be primed by English passives. This may be taken as evidence that the English passive and Mandarin *bei* share an underlying structure, and therefore the *bei* construction may indeed be a genuine passive.

Figure 4. Results of experiment one



3.6. Interim Discussion

We obtained a robust priming effect between English passives and Mandarin *bei*, in both directions. As noted earlier, this result is in line with the findings from Hartuiker et.al. (2004), who found similar effects between Spanish and English passives. Their conclusion was that Spanish and English passives share underlying structures, and hence priming was possible. However, we note that there is at least one additional source for priming between these patterns, namely the order of thematic roles. While Hartuisker et.al. included an OVS pattern to control for the possibility that noncanonical word order primed noncanonical word order, they did not control for other permutations of thematic roles. We were concerned that what was responsible for the priming effect was not shared syntactic structure, but rather shared thematic role order. In both the Mandarin *bei* construction and the English passive, the theme precedes the agent, as shown in (6) below.

- (6) a. Mandarin: yang bei daxiang ti-le
 Sheep BEI elephant kick-ASP
 theme agent
- b. English: The elephant was kicked by the sheep
 theme agent

Thus it may be that the elevated rate of passive/*bei* observed in experiment 1 is due not to shared abstract structure, but to similar ordering of thematic roles. Theme-first sentences are noncanonical, and may prime other theme-first patterns – a process we refer to as *thematic priming*. This alternative explanation of the results from experiment 1 is investigated in experiment 2.

4. Experiment two

Experiment 2 tests priming between the *bei* construction and other theme-agent constructions. We selected topicalized structures as our alternative construction (clefts are also possible, although felicitously presenting clefts is significantly more difficult than topicalized sentences). If *bei* is a true syntactic passive, then other theme-agent constructions such as topicalization should not prime, or be primed by, *bei*. If, however, the results of our first experiment are due to thematic priming, then we expect to see priming between *bei* and constructions involving a fronted, topicalized theme.

4.1. Methods

The method was identical to that employed in experiment one, except the prime sentences involved either active, passive/*bei*, or topicalized sentences (see below).

4.2. Participants

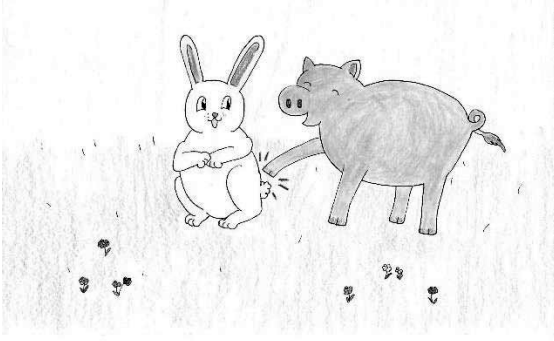
Twenty-four adult participants were recruited for experiment 2. Participants were recruited in Taipei, and were native speakers of Mandarin and second language speakers of English. Participants each took part in one block of the experiment, either Mandarin to English, or English to Mandarin. Self-reported language history and proficiency data was collected from the participants.

4.3. Stimuli

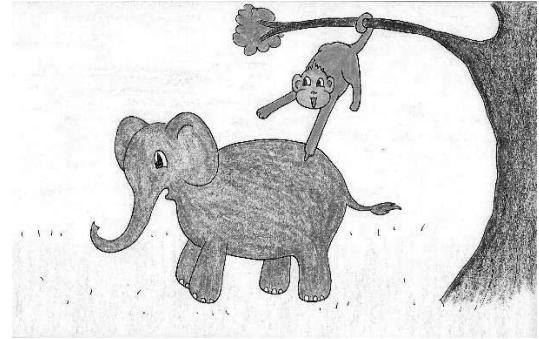
Part one of the second experiment used three types of sentences, each with a matching picture. All of the sentences involved reversible transitive verbs, with two animals. Care was taken to avoid scenarios which could be influenced by real world knowledge (such as a tiger frightening a monkey). The sentences were then translated by a native speaker of Taiwanese Mandarin, with attention to naturalness and passivizability.

These items were then arranged into twenty four triplets consisting of two prime images followed by one target image. Of these twenty four sets, twelve of the primes were filler sentences consisting of prepositional phrases such as “the monkey poked the zebra with an umbrella.” These fillers served to break up the pattern of structures used for the critical items. Of the twelve critical items, six were active sentences, and six were presented as a topicalized theme-agent construction. When presenting the critical topicalized primes, the prime stimuli consisted of one active prime, followed by the topicalized prime, as illustrated in figure 5 below. This was done to increase the felicity of the topicalized sentence.

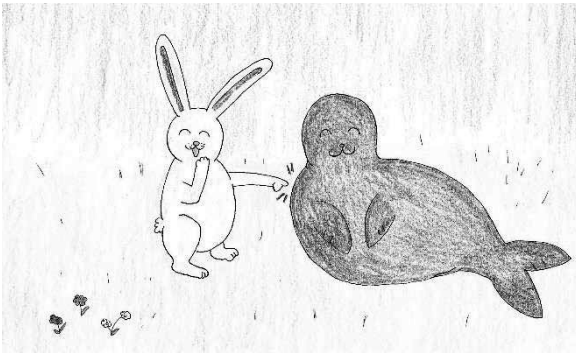
Figure 5. Sample test item



Prime 1: The pig poked the rabbit
 zhū chuō-le tùzi
 pig poke-PERF rabbit



Prime 2: The elephant, the monkey poked
 dà xiàng hóuzi chuō-le
 elephant monkey poke-PERF



Target Image

In the active condition, both prime images were accompanied by an active sentence. In all conditions, the two prime images depicted different sets of animals engaging in the same action (hugging, kicking, etc.), and the target image included a third set of animals performing the same action. Part two of the study involved the use of one block of items from experiment 1, as a measure of whether the participants in experiment 2 were on par with those in experiment 1 with respect to the priming effect of *bei* on English passives.

4.4. Procedure

The pictures were arranged semi-randomly into a “storybook” for presentation to the participants. The story was again presented as “Yesterday at the Zoo”, in order to place the task in a past tense context. The experiment was divided into two blocks: English-Mandarin and Mandarin-English. Participants in the English-Mandarin block were given primes in English, and instructed to respond only in Mandarin, while the Mandarin-English participants were primed in Mandarin and responded in English.

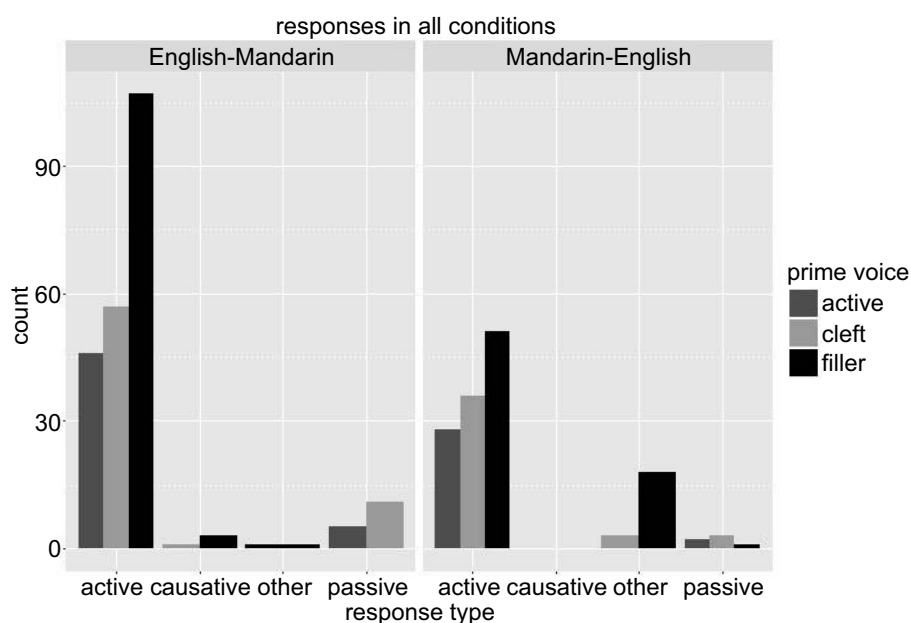
Primes were displayed to each participant one at a time, with the accompanying sentence spoken by the researcher. Two prime images and sentences were presented to the participant, followed by a third target image, which they were instructed to respond to in any way they chose, provided they did so in the stipulated language. After participants finished the first part of the experiment (consisting of the twenty four sets of items described in 3.3 the experimenter asked the participant to take a break and chat for a while. During this time, self-reported language dominance, history, and usage data was collected. This was done in the style of an informal sociolinguistic interview in order to put the participant at ease and clear their mind of the structures used in part one of the experiment.

After this break, participants were given part two of the experiment. Part two consisted of the relevant block of Experiment one (Mandarin-English or English-Mandarin). Sessions were recorded and later coded for response type (active, passive, topicalized, and other).

4.5. Results

In part two of experiment two (identical to the task in experiment one) participants produced more passives/*bei* in response to passives/*bei* than in response to actives. From this we can conclude that our participants in experiment two behave similarly to those in experiment one with regards to passive priming, and we can compare the two populations with regards to priming of theme-agent constructions. In part one of experiment two, (active, filler, and topicalized primes) participants produced mainly active structures in response to active and filler primes. When presented with topicalized primes, participants showed an elevated rate of passive/*bei* sentences as compared to the rate of passive/*bei* sentences produced in response to active primes.

Figure 6. Results of experiment two



5. Discussion and Conclusion

The results from experiment two show that Mandarin topicalized sentences, rather unexpectedly, primed Mandarin *bei* sentences. That is, when presented with a Mandarin topicalized sentence, participants were more likely to describe the subsequent picture with a Mandarin *bei* sentence. This suggests that what is being primed here may not be abstract syntactic structure, but rather the order of thematic roles. Recall that Hartsuiker et.al. (2004) included an OVS control sentence in their experiment, and no priming effect was found. This was taken as evidence that the order of thematic roles was not the key in the English-Spanish case.

In Mandarin, however, the facts are different. We find that priming of *bei* occurs both when the prime is *bei* itself, but also when it is a topicalized sentence. This suggests that in Mandarin, theme-first order is more salient than any abstract structure, and it seems to override the shared abstract structure that may exist, if any. One question one might ask is why topicalized sentences don't directly prime topicalized sentences, and instead prime Mandarin *bei*. We do not have an answer to this question at this point, and can only speculate. One possibility is that theme-first sentences prime noncanonical word order, and Mandarin *bei* is perhaps the most canonical of the noncanonical orders. But this issue remains the focus of future research.

Finally, where does this leave our results from experiment one? Unfortunately, the interim conclusion presented in 3.6 must be amended. While it is possible that Mandarin *bei* and English passives share an underlying abstract syntax, we cannot claim this conclusively. In order to do this, we must first address the role of thematic priming in experiment one. This may be done by including other theme-first sentences, both as primes and as targets, to better understand the strength of thematic priming. Furthermore, if Mandarin *bei* is not in fact a true passive, it is likely a biclausal structure, and so we might include biclausal primes as a way of priming this alternative syntax. If priming does not occur in that case, then we might be able to conclude that Mandarin *bei* is a true passive. These questions are currently being investigated, and will be presented in future work.

References

- Bencini, Giulia. M. L., & Virginia. Valian, (2008). Abstract sentence representation in 3-year olds: Evidence from comprehension and production. *Journal of Memory and Language*, *59*, 97-113.
- Bock, J. Kathryn. (1986). Structural persistence in language production. *Cognitive Psychology*, *18*, 355–387.
- Hartsuiker, Robert. J., Pickering, Martin. J., & Weltkamp, Eline. (2004). Is syntax separate or shared between languages? Cross-linguistic syntactic priming in Spanish/English bilinguals. *Psychological Science*, *15*, 409-414.
- Hashimoto, M. (1987). Hanyu Beidongshi de Lishi Quyu Fazhan [The Historical and Geographical Development of Chinese Passive Constructions], *Zhongguo Yuwen* *196*, 36-49.
- Her, One-Soon. (2009). Unifying the long passive and the short passive: On the *bei* construction in Taiwanese Mandarin. *Language and Linguistics*, *10*(3), 421-470.
- Huang, C-T. James, (1999). Chinese passives in comparative perspective. *Tsing Hua Journal of Chinese Studies*, *29*, 423-509.
- Koopman, Hilda. (1984). *The syntax of verbs*. Dordrecht: Foris Publications.
- Messenger, Katherine., Branigan, Holly. P., McLean, Janet. F., & Sorace, Antonella. (2012). Is young children's passive syntax semantically constrained? Evidence from syntactic priming. *Journal of Memory and Language*, *66*, 568–587.
- Travis, Lisa. (1984). *Parameters and effects of word order variation*. Doctoral Dissertation, MIT.
- Wei, Pei-Chuan. (1994). Guhanyu Beidongshi de Fazhan yu Yanbian Jizhi. *Chinese Languages and Linguistics*, *2*, 293-319. Institute of History & Philology, Academia Sinica, Taipei.

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