

An experimental investigation into the placement of the verb in the clause structure of Japanese^{*}

Chung-hye Han, Dennis Ryan Storoshenko and Yasuko Sakurai
Simon Fraser University
{chunghye,dstorosh,ysakurai}@sfu.ca

Noting that in a head final language, verb-raising is hard to detect since there is no evidence from the string to support a raising analysis, Han, Lidz and Musolino (2007) use data from Korean to argue that this paucity of evidence leads to distinct grammars in a single speech community: one with verb-raising and one without. In this paper, we present evidence that the same kind of split is attested in the speech community of Japanese, using experimental data concerning the scope of argument quantified phrases and negation in Japanese obtained with the Truth Value Judgment Task.

Keywords: verb-raising, head final language, scope of negation and argument QP, Truth Value Judgment Task, Japanese

1. Introduction

Han, Lidz and Musolino (2007) observe that in a head-final language like Korean, verb-raising is hard to detect since there is no evidence from the string to support a raising analysis. Whether the verb raises or not, it will occur at the end of the sentence. Since string order is uninformative, syntacticians have had to resort to other ways to make the case for the placement of the verb in the clause structure. Arguments in both directions have been made, with some arguing that there is verb-raising in Korean and others arguing that verb-raising does not occur, using data pertaining to a wide range of phenomena including coordination, scrambling, null objects, and NPI licensing. Han (2007) and Han et. al. reevaluate these arguments and show that none of them are conclusive as all of the data intended to support a verb-raising analysis are compatible with a non-verb-raising analysis and vice-versa. A similar conclusion is reached in Storoshenko (2004) for Japanese, another head-final language. Storoshenko shows that the arguments for neither a raising analysis (Otani and Whitman 1991; Koizumi 2000) nor an analysis without

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raising (Fukui and Sakai 2003) in Japanese are definitive.

Han et. al. argue that scope of negation and argument quantified NPs (QPs) is potentially a good test for verb placement in Korean because argument QPs in Korean exhibit frozen scope, and negation in Korean has the status of a clitic and so it must occur with the finite verb, wherever the verb is. This makes the following prediction: if the verb raises, the negation will end up high in the clause structure and will scope over the object QP, giving rise to a Neg>Q reading, and if it does not raise, the negation will be low in the clause structure and will not scope over the object QP, failing to generate the Neg>Q reading. To test this prediction, Han et. al. extracted native speaker judgments on the relative scope of negation and universal quantifiers in argument positions, using Truth Value Judgment tasks (Crain and Thornton 1998), from both adult and 4:5 year-old Korean speakers. They found that when it comes to scope of negation and an object QP, for both adults and children, the Neg>every reading was available to only about half of the participants, suggesting that verb-raising is employed in only about half of the cases. Further, these participants rarely showed mixed responses, giving a bimodal distribution of responses. That is, the Neg>every reading was in general either always available to a participant or never available to a participant. Han et. al. propose that this split in the results is a reflection of a split in the population. They argue that even though scope facts concerning negation and argument QPs provide good evidence for the height of the verb for linguists, such facts are rare in the input to children. This may result in a situation where not all speakers of Korean acquire the same grammar when it comes to verb-raising. The paucity of evidence for the placement of the verb therefore can lead to distinct grammars in a single speech community: one with verb-raising and one without.

In this paper, we present evidence that the same kind of split is attested in the speech community of Japanese, using a similar experimental design that was used in Han et. al. for Korean. In section 2, we justify the use of scope judgments concerning negation and argument QPs as a test for verb placement in Japanese, and our use of the experimental methodology for obtaining these scope judgments. We present the experiment and the findings in section 3. Section 4 contains a discussion on the implications of our findings for the grammar of Japanese.

2. Extracting scope judgments

Scope facts concerning argument QPs and negation are informative in Japanese, just as in Korean, because of two independently motivated properties of Japanese. First, negation *-na* is an inflection on the verb and so it is located wherever the verb is, and second, scope for argument QPs is fixed before LF in Japanese, as motivated by scope rigidity (Kuroda 1970, Kuno 1973, Hoji 1985, and others). As shown in (1a), negation *-na* is placed between the verbal stem and the past tense inflection. It cannot be separated from the verbal stem by another independent lexical item, as in (1b).

- (1) a. Ken-ga orenji-o shokudoo-de tabe-na-katta.
Ken-NOM orange-ACC cafeteria-in eat-NEG-PST
'Ken did not eat an orange in the cafeteria.'
- b. *Ken-ga orenji-o tabe shokudoo-de na-katta.
Ken-NOM orange-ACC eat cafeteria-in NEG-PST
'Ken did not eat an orange in the cafeteria.'

As argument QPs exhibit scope rigidity, a sentence with the canonical SOV word order containing quantifiers in both subject and object NPs only exhibits the reading in which the subject scopes over the object, as in (2). The relative scope of the argument QPs is determined by surface c-command relationship, without recourse to QR or reconstruction to generate an inverse scope.

- (2) Dareka-ga ooku-no hitobito-o hianshi-ta.
someone-NOM many-GEN people-ACC criticize-PST
'Someone criticized many people.' ($\sqrt{\text{some}} > \text{many}$, $*\text{many} > \text{some}$)

Putting the two properties of Japanese together, the scope of negation and an argument QP in a canonical position should directly reflect the height of the verb. The scope of the QP will be fixed by its surface position, given scope freezing, and so the relative scope of negation and the QP will be determined by the position of negation in the clause structure. Given a negative sentence with an object QP, if the verb raises, the negation will be high in the clause and so the Neg > object QP reading should be available, and if it does not raise, negation will be low in the

clause and so the Neg>object QP reading will not be available. Given a negative sentence with a subject QP, whether the verb raises or not, the Neg>subject QP reading should not be available, if the subject is sitting in [Spec,TP] and the highest position to which the verb can raise is T. The predictions are clear, but the data is not.

As surveyed in Storoshenko (2004), in the extant literature on the scope of negation (Kuno 1980; Ota and Kato 1986, 1988; Kitamoto 1986; Yatabe 1996; Miyagawa 2001), there is no consensus as to what the facts are, often conflicting with each other (Fukui and Sakai 2003). Given the conflicting claims in the literature on scope judgments, we cannot use them as they are reported to make any conclusions. What could be the source of the disagreement in the literature? This disagreement could be due to a limitation in the methodology employed to extract scope judgments. Some speakers may have difficulty in identifying a reading associated with a sentence without a sufficient discourse context. Or the disagreement could actually reflect speakers' grammars. It is possible that difference in speakers' grammars result in the apparent disagreement in scope judgments. To address these issues, we designed an experiment using the Truth Value Judgment Task (Crain and Thornton 1998) and extracted scope judgments that should reflect speakers' grammars.

The TVJT involves two experimenters. One experimenter acts out short stories in front of the participant using toys. The other experimenter plays the role of a puppet who watches the scenario alongside the participant. At the end of the story, the puppet makes a statement about the story. The participant's task is to determine whether the puppet understood the story and say whether it told the truth or not. This task provides rich discourse contexts in a simple method, with little memory load on the participants. It has been shown to work in several languages (Lidz and Musolino 2002, Papafragou and Musolino 2003, and Han et. al. 2007), and to work with both adults and children as young as 4 years old (Crain and McKee 1985; Crain and Thornton 1998; Lidz and Musolino 2002; Han et. al. 2007). The robustness of the task makes it an ideal tool for obtaining interpretive judgments that have proven to be difficult to get a clear picture of with a traditional method where native speakers are presented with a test sentence out of context.

3. The experiment

We tested 128 adult speakers of Japanese on the scope of negation and argument QPs. The participants were 20-30 year old Japanese native speakers living in Vancouver at the time of the testing, who had spent no more than combined span of 12 months in North America or any other English-speaking country.

The participants were asked to watch a series of video clips on a white screen in which a short story is acted out using small toys and props. At the end of each story, they were presented with a sentence that describes what happened. They were asked to indicate whether they thought the sentence was True or False, with a brief justification for their answers. These test sentences contained *-na* (NEG) and numeral *futa* ('two') in the subject or the object, as in (3) and (4).

(3) *Futa-ri-no otokonoko-ga suika-o shokudoo-de tabe-na-katta.*
two-CL-GENboy-NOM watermelon-ACC cafeteria-in eat-NEG-PST
'Two boys did not eat a watermelon in the cafeteria.'

(4) *Junko-ga futa-ri-no otokonoko-o rooka-de kera-na-katta.*
Junko-NOM two-CL-GENboy-ACC hallway-in kick-NEG-PST
'Junko did not kick two boys in the hallway.'

To test whether (3) can have the 2>Neg reading, we used a scenario with 4 boys, in which 2 boys each eat a watermelon, but the other 2 do not. The picture in (5) is the scene at the end of the scenario.

(5) Scenario in which there are two boys that do not eat a watermelon



Neg>2 = False 2>Neg = True

To test whether (4) can have the Neg>2 reading, we used a scenario with 2 boys, and 1 girl named Junko. Junko is showing off her karate moves. She kicks one boy, but does not kick the other. The picture of the scene at the end of the scenario is given in (6).

(6) Scenario in which Junko kicks one boy, not two



Neg>2 = True
2>Neg = False

To control for prosody, the test sentences were typed and shown to the participants on the screen right after a story completed. The participants read each test sentence silently, and wrote down their answers on a score sheet. We reasoned that when the participants are reading the sentences silently, they will freely assign a prosody in order to make the sentence true. This reasoning relies on the assumption that listeners follow the Gricean Maxim of Quantity, and will give the speaker the benefit of the doubt. Thus, if a participant rejects a statement as false, we conclude that his/her grammar simply cannot generate the reading under investigation.

We designed the experiment to test two factors with two levels each: scope (2>Neg vs. Neg>2) and grammatical function (subject QP vs. object QP). The experiment was thus divided into 4 different conditions: each condition tested for the 2>Neg or Neg>2 reading in negative sentences containing *-na* and a numeral quantifier *two* in the subject or the object. We used a between-subjects design, and randomly assigned 32 participants to each condition. The participants were given 4 test trials and 5 filler trials in a pseudo-random order, and were tested in groups of 4 to 6 in classrooms. The design is summarized in table (7).

(7) Experimental design

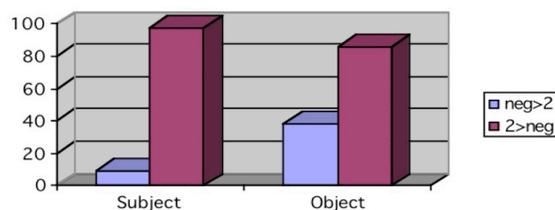
Grammatical function	Scope	Number of participants
Subject QP	2>Neg	N=32
	Neg>2	N=32
Object QP	2>Neg	N=32
	Neg>2	N=32

The table in (8) and the graph in (9) show the mean percentage acceptance by condition. Our findings are: (i) independent of grammatical function, speakers are significantly more likely to accept the 2>Neg reading than the Neg>2 reading ($F(1,126)=9.433, p=.0026$); (ii) speakers are significantly more likely to accept the Neg>2 reading on an object QP than they are on a subject QP ($F(1,126)=16.810, p<.0001$); (iii) although many of the speakers accepted the Neg>2 reading on an object QP, there were many that did not; (iv) speakers that were tested for the Neg>2 reading on an object QP in general either always accepted or always rejected the Neg>2 reading, giving rise to a bimodal distribution of responses, as shown in (10).

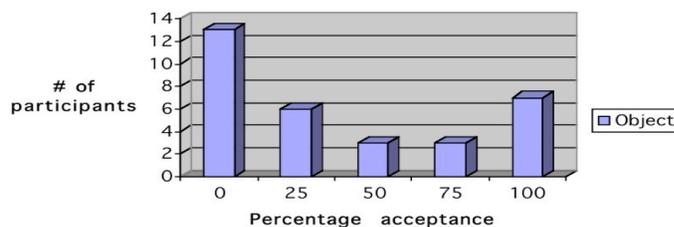
(8) Mean percentage acceptance by condition

Grammatical function	Scope	Mean percentage acceptance
Subject QP	2>Neg	97.66%
	Neg>2	9.38%
Object QP	2>Neg	85.94%
	Neg>2	38.28%

(9)



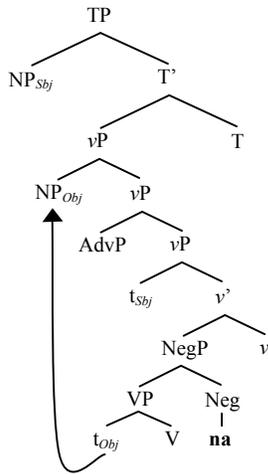
(10)



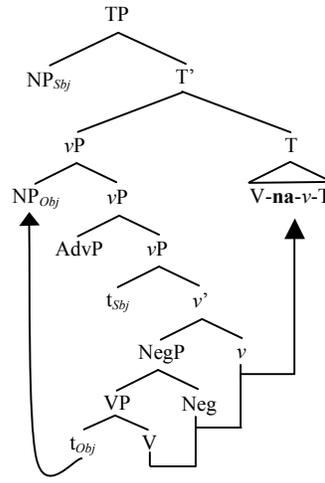
4. Implications for the grammar

Finding (i) suggests that a structure is available in which both the subject and the object QPs are hierarchically higher than negation, c-commanding it. We take this finding to argue for a clause structure along the lines of (11a). The subject starts in [Spec,vP] and ends up in [Spec,TP]. All our test sentences contain an adverb between the object QP and the verb. Assuming that the adverb adjoins to vP, this forces the object to undergo a clause-internal scrambling across the adverb to end up high in the structure. We postulate that negation projects to NegP and place it within vP, following Han, Storoshenko and Sakurai (2004) and Storoshenko (2004). The data in this paper, however, can also be accounted for with an alternative structure where NegP is placed above vP, as is standardly assumed in many languages. In this alternative structure, the adverb and the scrambled object would be placed higher than NegP.

(11) a.



b.



The fact that in subject conditions, the speakers virtually never accepted the Neg>2 reading, while they almost always accepted the 2>Neg reading particularly supports our assumption that scope reflects structure. Whether the verb (along with negation) raises or not, the subject is sitting

high in the clause in [Spec,TP], outside the scope of negation.

Finding (ii) suggests that a structure is available in which negation c-commands the object QP. Given that the object is sitting high in the structure, above vP , forced by the fact that in all our test sentences an adverb follows the object, we are led to the conclusion that the verb along with negation has raised out of the vP domain for the speakers who accept the Neg >2 reading in the object condition, as in (11b). But finding (iii) suggests that this analysis is not available to all the speakers, as more than half of the speakers rejected test sentences containing an object QP in the Neg >2 condition. So, finding (ii) seems to contradict finding (iii): only about half of the time, the structure is available in which negation is hierarchically higher than the object QP and thus the verb-raising analysis, as in (11b), is employed in only about half of the time. The conflict can be resolved if we postulate a split in the population when it comes to the grammar of verb placement: verb-raising analysis is available to only half of the population.

The idea that there may be a split in the population is supported by finding (iv). The speakers in general either always accepted the Neg >2 reading or never accepted the Neg >2 reading, as in (10). This bimodal distribution of responses strongly suggests that there are two groups of speakers: one who accepts the test sentences belongs to the group that has acquired verb-raising, and the one who rejects the test sentences belongs to the group that has not acquired verb-raising.

An apparent complication arises in the object condition testing for the 2 $>$ Neg reading. In this case, the 2 $>$ Neg reading should be available only to the group that has not acquired verb-raising, as only in this structure, as in (11a), the object QP scopes over negation. If half of the population has acquired verb-raising, shouldn't the mean percentage acceptance in this condition be roughly 50%? Instead, the acceptance rate is 85.94%. This is actually not surprising. Numerals are typical indefinites that can take scope using the choice function strategy (Reinhart 1997). An indefinite as a choice function can take scope over any other quantifiers in the same sentence. As the object QP in our test sentences contain a numeral, some of the speakers who have acquired the verb-raising grammar could have generated the 2 $>$ Neg reading by using the choice function strategy. Thus, the speakers could have accepted the 2 $>$ Neg reading because they have not acquired the verb-raising grammar or because they were using the choice function strategy. This then is why the acceptance rate in this case is far above 50%.

5. Conclusion and future directions

The results we obtained from our TVJT experiment on Japanese is very similar to the situation reported in Han et. al. (2007) for Korean. Just as in Korean, there is a split in the population in Japanese when it comes to scope judgments concerning negation and the quantified object. Only about half of the participants accepted the Neg>2 reading in negative sentences containing an object with a numeral quantifier. We attributed the split in scope judgments to a split in the acquisition of verb-raising. Our results from Japanese further support the proposal put forth by Han et. al. that the paucity of evidence concerning verb placement in a head-final language can lead to multiple grammars in a single speech community: one that has verb-raising and another that does not. This proposal is consistent with the claims from the diachronic syntax and language acquisition literature (Kroch 1989, Roeper 1999, Yang 2003) that even given the restricted hypothesis space determined by UG, insufficient input can lead to grammar competition between distinct grammars in a single population. Some questions that arise from the postulated split in the population regarding verb-raising are how stable the split is, whether the split is predictable, and whether there are any other syntactic/semantic phenomena that correlate with the split. Addressing these questions remains as future work.

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