# An experimental investigation into the placement of the verb in Japanese and Korean*

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In a head final language, the placement of the verb in the clause structure is hard to detect, since there is no evidence from the string to distinguish a verb-raising analysis from an INFL-lowering analysis. This is so both for children acquiring the language and for linguists developing an analysis of it. Could the lack of input data lead to a split in the population where some speakers acquire verb-raising and others do not? In this paper, I present evidence supporting such a split using experimental data concerning the scope of argument quantified phrases and negation in Japanese and Korean. The results from this work support that despite the restricted hypothesis space determined by Universal Grammar, insufficient input can lead to distinct grammars in a single speech community.

## 1. Introduction

Suppose that a grammatical phenomenon P in a language L is compatible with two possible analyses, A and B, which are independently known to be employed by other languages. Suppose further that there is no clear evidence in the input to the learners of L to distinguish the two analyses. In this situation, the speech community could acquire a single grammar regarding P, selecting one analysis over the other as a default, or it could acquire multiple grammars, some selecting A and others selecting B. In this paper, I examine the placement of the verb in the clause structure of two head-final languages, Japanese and Korean, as an example grammatical phenomenon that is compatible with two possible analyses, verb-raising and INFL-lowering. Using data obtained from a set of

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psycholinguistic experiments, I argue that the paucity of evidence for verb placement in Japanese and Korean leads to two grammars within a single speech community.

One of the most frequently used arguments for or against verb-raising to inflection (INFL) is the placement of the verb with respect to certain types of adverbs or negation (Emonds 1978, Pollock 1989). For example, the 'verb-adverb' order is taken to be evidence for verb-raising in French (1), and the 'adverb-verb' order is taken to be evidence for INFL-lowering in English (2).

(1) Jean embrasse souvent Marie / *Jean souvent embrasse Marie.
Jean kisses often Marie / Jean often kisses Marie

(2) John often kisses Mary. / *John kisses often Mary.

But in head-final languages like Japanese and Korean, the string order between the verb and such diagnostic elements is uninformative, as the verb will occur to their right whether it raises or not, as in (3).

(3) a. Toli-ga shibashiba biiru-o nom-u.
Toli-NOM often beer-ACC drink-PRES
'Toli often drinks beer.' (Japanese)

b. Toli-ka cacwu maykcwu-lul masi-n-ta.
Toli-NOM often beer-ACC drink-PRES-DECL
'Toli often drinks beer.' (Korean)

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 of Japanese and Korean. Arguments in both directions have been made, with some arguing that there is verb-raising in Japanese and Korean (Otani and Whitman 1991, Park 1992, Cho 1994, Yi 1994, Choi 1999, Koizumi 2000) and others arguing that verb-raising does not occur (Han and Park 1994, Yoon 1994, M.-K. Park 1998, Fukui and Sakai 2003), using data pertaining to a wide range of phenomena including coordination, scrambling, null objects, and NPI licensing. Han (2007) and Han, Lidz and Musolino (2007) re-evaluate these arguments for Korean and show that none of them are conclusive as all of the data intended to support a verb-raising analysis are compatible with an INFL-lowering analysis and vice-versa. A similar conclusion is reached in Storoshenko (2004) for Japanese.

Scope interaction between negation and argument quantified phrases (QPs), however, can potentially be a good test because (i) argument QPs in Japanese and Korean exhibit frozen scope (Kuroda 1970, Kuno 1973, Hoji 1985, Joo 1989, Ahn 1990, Sohn 1995, Hagstrom 2000), and (ii) negation in both Japanese and Korean has the status of a clitic/inflection and so it must occur with the verb, wherever the verb is (Han 2007, Han, Lidz and Musolino 2007, Han, Storoshenko and Sakurai, to appear). This makes the prediction that the scope of negation and an argument QP in a canonical position should directly reflect the height of the verb: that is, if the verb raises to INFL, 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 the verb 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. Even though such facts might be rare in the input to learners, they provide useful insights to syntacticians, as the predictions they make are clear. However, we cannot use the scope judgments reported in the existing literature, to draw any conclusions about verb placement. In the extant literature on the scope of negation in Japanese (Kuno 1980, Ota and Kato 1986, Kitamoto 1986, Kato 1988, Yatabe 1996, Miyagawa 2001) and Korean (Cho 1975, Song 1982, Suh 1989, H.-H. Park 1998, Baek 1998, Kim 2000, Hagstrom 2000), there is no consensus as to what the facts are. That is, judgments are often reported that conflict with each other (Han, Storoshenko and Sakurai 2004, Storoshenko 2004, Han, Lidz and Musolino 2007).

What could be the cause of this disagreement? It could be due to a limitation in the methodology employed to extract scope judgments, or it could reflect a real difference in the grammar of different speakers. To address this issue, I present data obtained from a set of psycholinguistic experiments using the Truth Value Judgment Task (TVJT, Crain and Thornton 1998).

The TVJT involves two experimenters. One experimenter acts out short stories in front of the participant using toys and props. The other experimenter plays the role of a puppet that watches the scenario alongside the participant. At the end of the story, the puppet (e.g., Mickey Mouse) makes a statement about the story, in the form of a sentence being tested. The participant's task is to determine whether the puppet told the truth or not about the story. The TVJT provides rich discourse contexts in a simple method, with little memory load on the participants. It has been successfully used in several languages (Lidz and Musolino 2002, Papafragou and Musolino 2003), and used with both adults and children as young as 4 years old (Crain and McKee 1985, Crain and Thornton 1998, Musolino, Crain and Thornton 2000, Lidz and Musolino 2002). It is an ideal tool for obtaining subtle interpretive judgments, which are difficult to obtain with a traditional method where native speakers are presented with a set of sentences taken out of context. For instance, to test how speakers interpret a sentence with negation and an object QP, such as *Cookie Monster didn't eat every cookie*, an experimenter enacts a story, using Cookie Monster and three cookies. Cookie Monster is hungry and finds three cookies. He eats only two cookies. After the enactment is over, the puppet says, "I know what happened. Cookie Monster didn't eat every cookie. Am I right?" In this story, the reading in which negation scopes over the object QP (neg>∀) is true, and the reading in which the object QP scopes over negation (∀>neg) is false. So if a participant accepts the test sentence in this context, then we can conclude that the grammar makes available the wide scope reading of negation. But if a participant rejects the test sentence, we can conclude that it must be because the grammar does not generate the neg>∀ interpretation.

The findings from the experiments on Japanese and Korean, conducted as part of this study, show a split in the population when it comes to judgments on the scope of negation and object QPs. This supports the hypothesis that the paucity of evidence concerning verb placement leads to two grammars in the Japanese and Korean speech communities: one that has verb-raising and another that does not.

The rest of the paper is organized as follows. In section 2, I present experiments conducted on adult and child speakers of Korean. In section 3, I present two experiments conducted on adult speakers of Japanese. I conclude in section 4 with a discussion on the

implications of the findings on the grammar of Japanese and Korean, and with questions for future research.

## 2. Korean

### 2.1. Adults

#### 2.1.1. Design of the experiment

Korean has two types of negation: long negation that occurs post-verbally, as in (4a) and (5a), and short negation that occurs pre-verbally, as in (4b) and (5b). In sentences with long negation, the main verb must be inflected with *-ci*, and tense and mood must be supported by *ha-* ('do'). The experiment was thus designed to test scope judgments of sentences containing subject universal QP and long negation (4a), sentences containing subject universal QP and short negation (4b), sentences containing object universal QP and long negation (5a), and sentences containing object universal QP and short negation (5b). For instance, in the scenarios that tested the neg>∀ reading with test sentences in (4) and (5), two out of three horses (i.e., not all horses) jumped over the fence, and two out of three cookies (i.e., not all cookies) were eaten. In the scenarios that tested the ∀>neg reading with (4) and (5), none of the horses jumped over the fence and none of the cookies were eaten.

(4) a. Motun mal-i wulthali-lul nem-ci **ani** ha-yess-ta.
Every horse-NOM fence-ACC jump.over-CI **NEG** do-PST-DECL
'Every horse didn't jump over the fence.' (subject QP, long negation)

b. Motun mal-i wulthali-lul **an** nem-ess-ta.
Every horse-NOM fence-ACC **NEG** jump.over-PST-DECL
'Every horse didn't jump over the fence.' (subject QP, short negation)

(5) a. Khwukhi monsute-ka motun khwukhi-lul mek-ci **ani** ha-yess-ta.
Cookie Monster-NOM every cookie-ACC eat-CI **NEG** do-PST-DECL
'Cookie monster didn't eat every cookie.' (object QP, long negation)

b. Khwukhi monsute-ka motun khwukhi-lul **an** mek-ess-ta.
Cookie Monster-NOM every cookie-ACC **NEG** eat-PST-DECL
'Cookie monster didn't eat every cookie.' (object QP, short negation)

The table in (6) summarizes the experimental design. For Korean adult participants, we tested three factors with two levels each: scope (neg>∀ vs. ∀>neg) x negation type (short vs. long) x grammatical function of the QP (subj. vs. obj.). The experiment was thus divided into 8 different conditions: each condition tested for the neg>∀ or ∀>neg reading in sentences containing either long or short negation, and either a subject QP or an object QP. We used a between-subjects design, and randomly assigned 20 participants to each condition.

(6) Design of experiment: Korean adults and universal QP

2x2x2 design: *Negation type* x *QP position* x *Scope*
(short vs. long) (subj. vs. obj.) (neg>∀ vs. ∀>neg)

| Grammatical function | Scope | **Short negation** | **Long negation** |
|---|---|---|---|
| **Subject QP** | **neg>∀** | n=20 | n=20 |
| | **∀>neg** | n=20 | n=20 |
| **Object QP** | **neg>∀** | n=20 | n=20 |
| | **∀>neg** | n=20 | n=20 |

In total, we tested 160 adult speakers of Korean, all undergraduate or graduate students recruited from universities in Seoul, Korea, in groups of 10 to 20 in classrooms. The participants watched video clips of the scenarios described above. They were first introduced to the task with 2 practice trials, followed by 4 test trials and 4 filler trials in a pseudo-random order.[1] They were given a score sheet and were instructed to indicate, for each story, whether the puppet, Mickey Mouse, spoke truthfully, with a brief justification for their answers.[2]

### 2.1.2. Findings

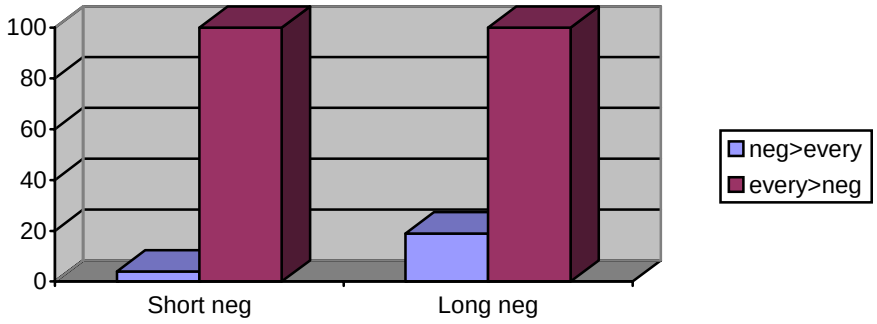
The table in (7) and the graphs in (8) and (9) show the mean percentage of acceptances by condition. Our major findings are: (i) regardless of negation type or grammatical function, speakers were more likely to accept the ∀>neg reading than the neg>∀ reading ($F(1,152)=267.44$, $p<.0001$ [according to ANOVA]); (ii) independently of negation type, speakers were significantly more likely to accept the neg>∀ reading on an object QP than they were on a subject QP ($F(1,152)=13.91$, $p<.0003$ [according to ANOVA]); (iii) although many participants accepted the neg>∀ reading in sentences with an object QP, over 50% of the participants did not; (iv) most speakers that were tested for the neg>∀ reading on an object QP either always accepted or always rejected the neg>∀ reading, giving rise to a bimodal distribution of responses, as shown in (10).

(7) Mean percentage of acceptances by condition: Korean adults and universal QP

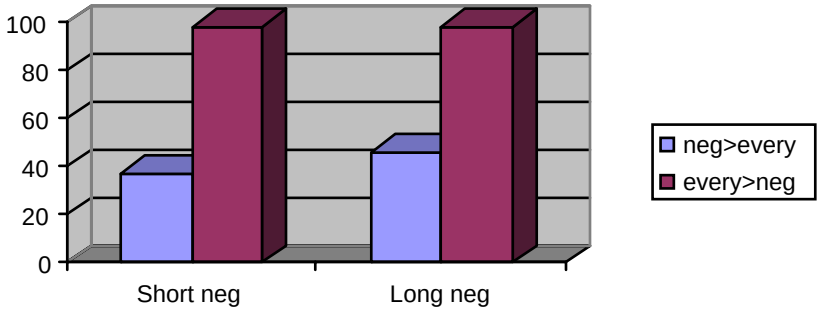
| Grammatical function | Scope | **Short negation** | **Long negation** |
|---|---|---|---|
| **Subject QP** | **neg>∀** | 4% | 19% |
| | **∀>neg** | 100% | 100% |
| **Object QP** | **neg>∀** | 37% | 46% |
| | **∀>neg** | 98% | 98% |

[1] The purpose of filler trials was to separately test the participants' comprehension of negation and of quantifiers, and to prevent any priming effects. The adult participants were near perfect on filler items, indicating that they had no difficulty with the task, or with negation or quantifiers in isolation.
[2] To prevent the participants from influencing each other's answers, we instructed them to not talk to each other and cover their score sheets during the entire session.

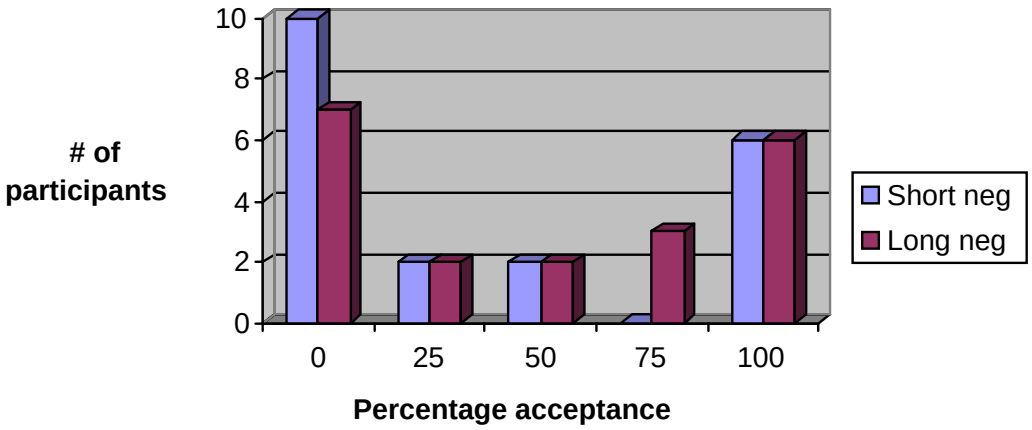
(8) Mean percentage of acceptances in subject conditions: Korean adults and universal QP




(9) Mean percentage of acceptances in object conditions: Korean adults and universal QP



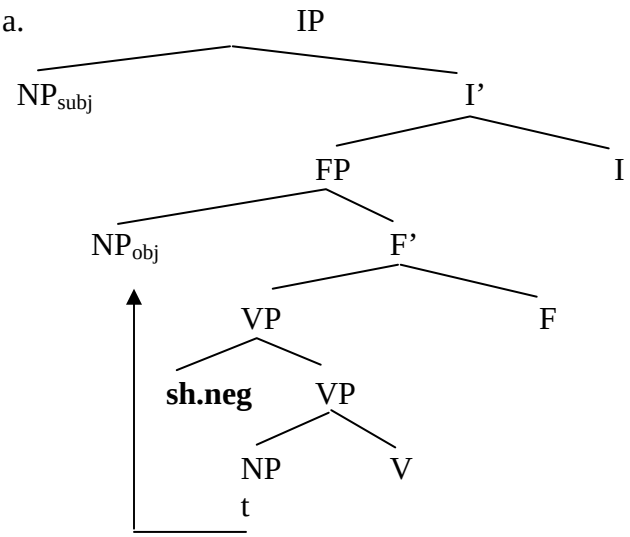

(10) Number of participants accepting the neg>∀ reading in object conditions: Korean adults and universal QP



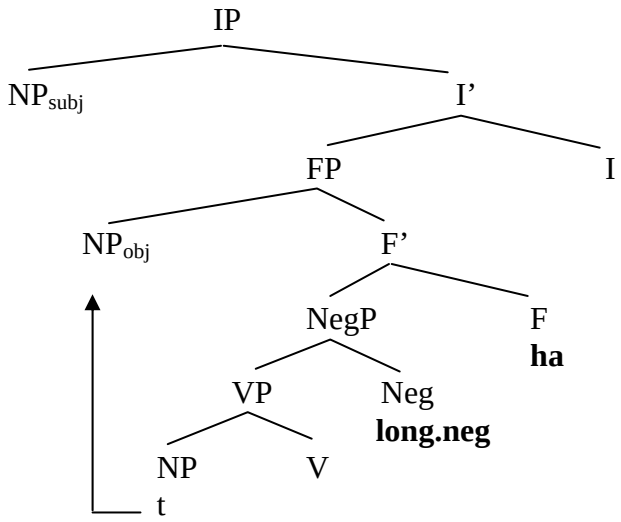
### 2.1.3 Discussion

Finding (i) suggests that a structure is available in which both the subject and the object QPs are hierarchically higher than and thus c-command both long and short negation. This supports the clause structure in (11a) for sentences containing short negation and (11b) for sentences containing long negation. I abstract away from the VP-internal subject hypothesis and the presence of *v*P in the lexical domain of the clause structure.

(11) a.




b.



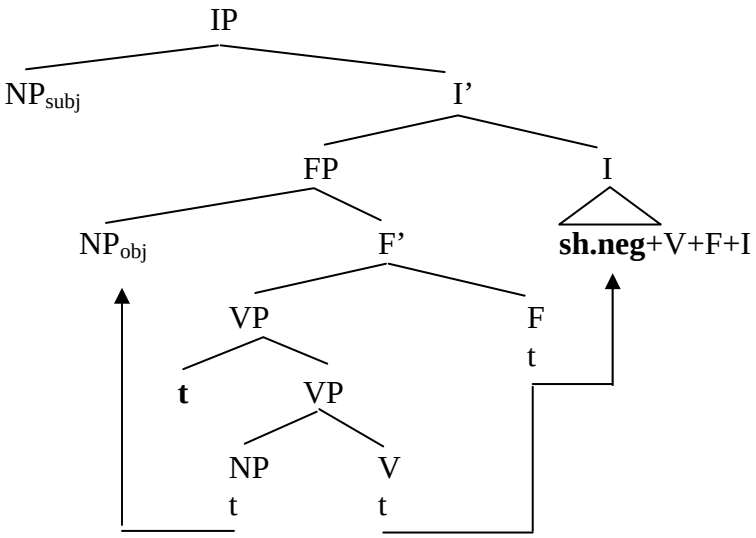

The fact that a sentence can contain both short and long negation, as in (12), supports two different positions for the two types of negation (Kim 2002). Positing a NegP and placing long negation as the head of NegP is motivated by the fact that the verb must be inflected with *-ci*, a selectional requirement of the Neg head on the verb, and that *ha*, which is similar to English *do*, is required to support tense and mood (Ahn 1991, Cho 1994, Yi 1994). Object-raising from the VP-internal position to a projection higher in the clause

structure guarantees the object QP to scope over both short and long negation. For lack of a better term, this projection is referred to as FP (for Functional Phrase).

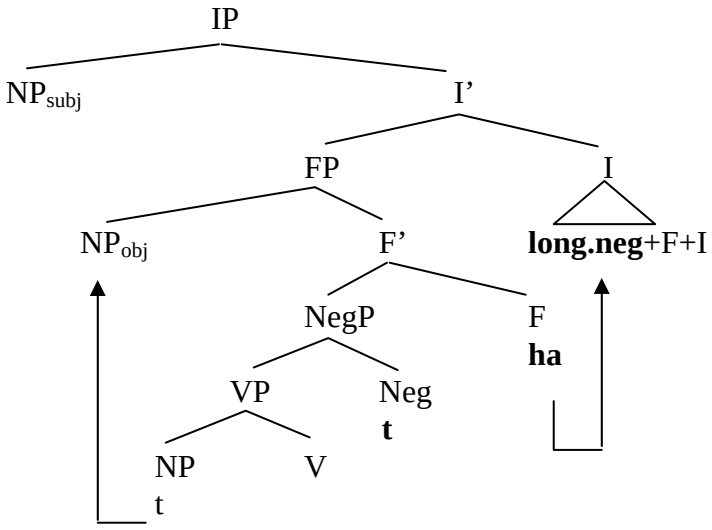
(12) Toli-ka maykcwu-lul **an** masi-ci **ani** ha-yess-ta
Toli-NOM beer-ACC **NEG** drink-CI **NEG** do-PST-DECL
'Toli didn't not drink beer.' (Toli drank beer.)

Finding (ii) suggests that a structure is available in which both long and short negation c-command the object QP. Such a structure becomes available if the verb undergoes movement to INFL, followed by the cliticization of negation (as in Romance neg-cliticization, Cinque 1999). In sentences with short negation, the verb raises to INFL and short negation cliticizes to the raised verb, as illustrated in (13a). In sentences with long negation, *ha-* raises to INFL, and long negation cliticizes to the raised *ha-*, as illustrated in (13b). In both structures, negation scopes over the object QP.

(13) a. Short neg cliticizes to V; V raises to INFL; short neg scopes over object.



b. Long neg cliticizes to *ha*; *ha* raises to INFL; long neg scopes over object.




Finding (iii), however, seems to contradict finding (ii). For nearly half of our participants, the neg>∀ reading is available with the object QP, suggesting that only about half of the population employ the verb-raising analysis. The two findings can be reconciled if we postulate a split in the population when it comes to the grammar of verb placement: the verb-raising analysis is available to only about half of the population.

The idea that there may be a split in the population is further supported by finding (iv). Most participants either always accepted the neg>∀ reading or never accepted the neg>∀ reading in the object conditions, as in (10). This bimodal distribution of responses strongly suggests that there are two groups of speakers: speakers who accept the test sentences belong to the group that has acquired verb-raising, and those who reject the test sentences belong to the group that has acquired a grammar without verb-raising.[3]

The Korean participants' near-perfect acceptance rate (98%) in the ∀>neg conditions on an object QP can be explained with the two-grammar hypothesis as well. This follows from the fact that the ∀>neg reading entails the neg>∀ reading. For instance, if none of the cookies were eaten, then in the same context, it is true to say that not all cookies were eaten. In the ∀>neg conditions with test sentences containing an object QP, speakers with the INFL-lowering grammar will accept the test sentences because their grammar generates the ∀>neg reading, and speakers with the verb-raising grammar will accept the test sentences because the scenarios in these conditions are consistent with the neg>∀ reading generated by their grammar.

The assumption that scope reflects structure in Korean, a language with frozen scope, is particularly supported by the finding that in the subject conditions, whether the test sentences contained long or short negation, the speakers virtually never accepted the

[3] A quarter of the participants showed mixed responses, sometimes accepting the neg>∀ reading and sometimes rejecting the neg>∀ reading. It may be that these speakers have acquired both the verb-raising and the INFL-lowering grammars and that they randomly choose between the two grammars in a given context. Employment of multiple grammars by a single speaker is often attested in the diachronic syntax domain (Kroch 1989, Pintzuk 1991, Santorini 1992, Taylor 1994).

neg>∀ reading while they always accepted the ∀>neg reading. This is expected because whether the verb (along with negation) raises or not, the subject is sitting high in the clause, outside the scope of negation. In contrast, according to Musolino, Crain and Thornton (2000), in a TVJT experiment on English that tested the scope of negation and a subject QP, almost all adult participants accepted both the neg>∀ reading and the ∀>neg reading, indicating that negative sentences with a subject QP are truly ambiguous in English, a language without scope freezing.

## 2.2. Children

If the two-grammar hypothesis is correct, then we should find the same split in the population among learners of Korean. To test this prediction, we tested 60 4 year-old Korean children, recruited from preschools in Korea. We chose 4 year-olds because Korean children at this age are old enough to have mastered both short and long negation forms (Park 1998), and cross-linguistically, 4 year-olds are able to handle the demands of the task (Musolino, Crain and Thornton 2000 for English, Lidz and Musolino 2002 for English and Kannada). The children were tested on sentences containing an object universal QP and either long or short negation.[4] We thus designed the experiment to test two factors with two levels each: scope (neg>∀ vs. ∀>neg) x negation type (short vs. long). This design divided the experiment into 4 different conditions, as in (14). As with adults, we used a between-subjects design, and randomly assigned 15 participants to each condition.

(14) Design of experiment: Korean children and universal QP

2x2 design: *Negation type* x *Scope*
(short vs. long) (neg>∀ vs. ∀>neg)

| Grammatical function | Scope | **Short negation** | **Long negation** |
|---|---|---|---|
| **Object QP** | **neg**>∀ | n=15 | n=15 |
| | ∀>**neg** | n=15 | n=15 |

The scenarios and test sentences used with the children were identical to those used with the adults in the object conditions. The child participants were given 2 practice trials, followed by 4 test trials and 4 filler trials in a pseudo-random order.[5] They were tested individually in a quiet room and an experimenter using toys and props acted out all the scenarios in front of them.[6] The children's responses were recorded on a score sheet by the experimenter at the end of each scenario. The experimenter also asked the children why they answered that Mickey Mouse was right or wrong, and recorded their responses.

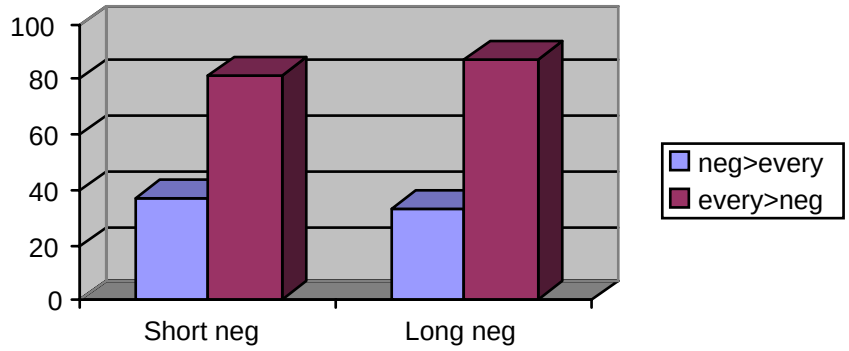
Just like the adult participants, while almost all child participants accepted the test

[4] Only sentences with object QPs were tested because these are the ones that are potentially informative about the height of the verb.
[5] Like the adult participants, the child participants were near perfect on filler items.
[6] Unlike the adults, the children were not tested in groups using video clips. We felt that young children would better concentrate on the story and thus better understand the story if the experimenter engaged with them individually using real toys and props.

sentences in the ∀>neg conditions, in the neg>∀ conditions, only about half of the child participants accepted the test sentences: the acceptance rate was 37% with short negation and 33% with long negation, as shown in (15). Further, just like the adults' responses, the children's responses were bimodally distributed in the neg>∀ conditions. Throughout the 4 test sentences, each child generally accepted the neg>∀ reading or generally rejected the neg>∀ reading, rarely showing mixed responses. The findings from our experiment with the Korean children thus further support the hypothesis that the Korean population actually manifests two distinct grammars: one with verb-raising and one without.

(15) Mean percentage of acceptances by condition: Korean children and universal QP

| Grammatical function | Scope | **Short negation** | **Long negation** |
|---|---|---|---|
| **Object QP** | **neg>∀** | 37% | 33% |
| | **∀>neg** | 82% | 87% |




Notably, when Lidz and Musolino (2002) conducted similar TVJT experiments with adult and child speakers of English and Kannada to test the scope of negation and an object QP, the pattern of responses was very consistent; that is, in conditions testing the availability of the neg>Q reading in sentences containing negation and an object QP, the adult and the child participants in both languages almost always accepted the test sentences. The fact that consistent responses were obtained from English and Kannada participants means that the split responses of Korean speakers on similar sentences are not a by-product of the task itself, or some random variation in perception or comprehension. Rather, it is a reflection of a real variation in the grammar of the speech community of Korean.

## 3. Japanese

Japanese is another head-final language with many similar syntactic properties as Korean. Japanese speakers are thus predicted to show a similar split in scope judgments on sentences containing negation and an object QP. In this section, I discuss data obtained from two experiments on Japanese that support this prediction. Section 3.1 presents an experiment that tested the scope of negation and an object universal QP.

Section 3.2 presents an experiment that tested the scope of negation and a subject numeral QP and the scope of negation and an object numeral QP.

### 3.1. Universal quantifier

The experiment was designed to test one factor (scope) with two levels (neg>∀ vs. ∀>neg) with sentences containing the negation *-na* (NEG) and an object universal QP, as in (16).

(16) Donald-ga oreNji subete-o tabe-**na**-katta.
Donald-NOM orange every-ACC eat-**NEG**-PST
'Donald did not eat every orange.'

We thus divided the experiment into 2 conditions, as in (17). We used a between-subjects design, and randomly assigned 12 participants to each condition. The experimental procedure and the scenarios that were used in this experiment were closely modelled after the ones used for Korean. The participants were 20-30 year-old Japanese native speakers living in Vancouver, Canada, at the time the experiment was conducted, who had spent no more than a combined span of 12 months in North America or any other English-speaking country. They were tested individually in a small classroom. After watching each scenario on a computer screen, they recorded their responses on a score sheet, with a brief justification for their answers.

(17) Design of experiment: Japanese adults and universal QP

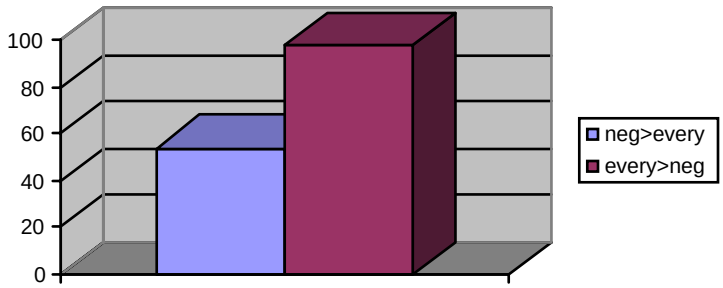
1x2 design: *Negation* x *Scope* (neg>∀ vs. ∀>neg)

| Grammatical function | Scope | Number of participants |
|---|---|---|
| **Object QP** | **neg>∀** | n=12 |
| | **∀>neg** | n=12 |

The results of the experiment are summarized in (18). We found that while almost all speakers accepted the ∀>neg reading, only about half of the participants accepted the neg>∀ reading. This is similar to what was observed with Korean speakers. Just as in Korean, we found a split in the population of Japanese when it comes to scope judgments concerning negation and the quantified object: that is, in the neg>∀ condition, roughly half of the population accepted the test sentences, and the other half rejected the test sentences.

(18) Mean percentage of acceptances by condition: Japanese adults and universal QP

| Grammatical function | Scope | Mean percentage of acceptances |
|---|---|---|
| **Object QP** | **neg>∀** | 54% |
| | **∀>neg** | 98% |




## 3.2. Numeral quantifier

This experiment was designed to determine whether the split we found depends on the type of quantifier. For this purpose, we used test sentences containing the negation *-na* (NEG) and the numeral *futa* ('two') in the subject or the object, as in (19) and (20). To test, for example, whether (19) 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. To test whether (20) can have the neg>2 reading, we used a scenario with 2 boys and 1 girl named Junko. Junko kicks one boy, but does not kick the other.

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

(20) JuNko-ga futa-ri-no otokonoko-o rooka-de kera-**na**-katta.
Junko-NOM two-CL-GEN boy-ACC hallway-in kick-**NEG**-PST
'Junko did not kick two boys in the hallway.' (object QP)

We designed the experiment to test two factors with two levels each: scope (2>neg vs. neg>2) x grammatical function of the QP (subj. vs. obj.). The experiment was thus divided into 4 conditions, as in (21). We used a between-subjects design and randomly assigned 32 participants to each condition. The participants were 20-30 year-old Japanese native speakers living in Vancouver at the time of the experiment.[7] Just as with the participants in the universal quantifier experiment described in section 3.1, they were required to have spent no more than a combined span of 12 months in North America or any other English-speaking country. They were tested in groups of 4 to 6 in a classroom. They watched a series of video clips on a white screen.

[7] There was no overlap between the set of participants in the Japanese universal quantifier experiment and the set of participants in the Japanese numeral quantifier experiment.

(21) Design of experiment: Japanese adults and numeral QP

2x2 design: *QP position* (subj. vs. obj.) x *Scope* (neg>2 vs. 2>neg)

| 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 |

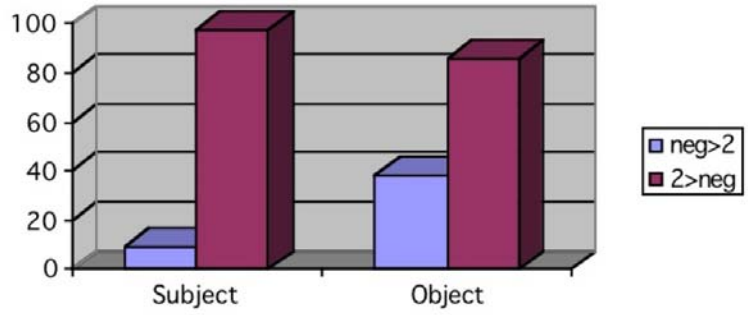
One important aspect that distinguishes the Japanese numeral experiment from all other experiments presented in sections 2.1, 2.2 and 3.1 is that in the numeral experiment, the test sentences were typed and shown to the participants on the screen right at the end of each story. The participants read each test sentence silently and wrote down their answers on a score sheet. This was intended to control for the possibility that prosody has something to do with the observed split. In the Korean experiments and the Japanese universal quantifier experiment, the participants heard the test sentences uttered by an experimenter. Even though an effort was made to keep the prosody of the test sentences as neutral as possible, the participants' answers may have been influenced by the experimenter's prosody. When the participants are reading the sentences silently, however, they are free to assign any prosody they want in their mind that would make the test sentence true in the given context.

The table and the graph in (22) show the mean percentage of acceptances by condition. The findings are very similar to what we saw in the Korean experiments and the Japanese universal quantifier experiment: (i) independent of grammatical function, speakers are more likely to accept the 2>neg reading than the neg>2 reading ($F(1,126)=9.433$, $p=.0026$ [according to ANOVA]); (ii) speakers are more likely to accept the neg>2 reading on an object QP than they are on a subject QP ($F(1,126)=16.810$, $p<.0001$ [according to ANOVA]); (iii) although many of the speakers accepted the neg>2 reading on an object QP, there were many that did not; (iv) most speakers that were tested for the neg>2 reading on an object QP either always accepted or always rejected the neg>2 reading, giving rise to a bimodal distribution of responses, as shown in (23).[8]

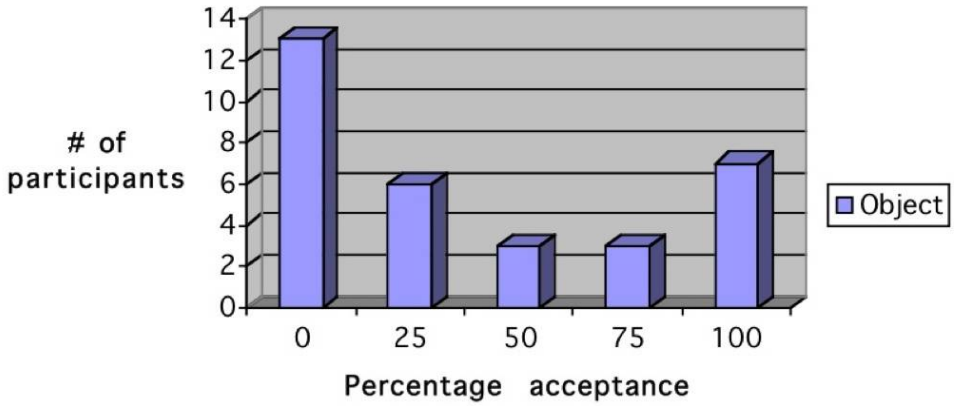
[8] As in the Korean adult universal quantifier experiment, some participants in the Japanese adult numeral quantifier experiment showed mixed responses in the neg>2 object condition. Just as was done for the Korean speakers that showed mixed responses, we can speculate that some Japanese speakers may have acquired both the verb-raising and the INFL-lowering grammars and that they randomly choose between the two grammars in a given context.

(22) Mean percentage of acceptances by condition: Japanese adults and numeral QP

| Grammatical function | Scope | Mean percentage of acceptances |
|---|---|---|
| **Subject QP** | **2>neg** | 98% |
| | **neg>2** | 9% |
| **Object QP** | **2>neg** | 86% |
| | **neg>2** | 38% |




(23) Number of participants accepting the neg>2 reading in the object condition: Japanese adults and numeral QP




A question arises though for the object condition that tests the 2>neg reading. Under the two-grammar hypothesis, the 2>neg reading should be available only to the group that has not acquired verb-raising, and so the acceptance rate in this condition should be around 50%. But the acceptance rate is 86%. A likely explanation comes from the fact that 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 quantifier 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.

In sum, in the Japanese population, in addition to a split in scope judgments regarding negation and the object universal QP, we found a split in scope judgments

regarding negation and the object numeral QP. Further, we found that prosody is not a determining factor in the observed split. Whether the prosody is given with the test sentences or not, the Japanese population splits into two when it comes to scope judgments concerning negation and the quantified object.

## 4. Conclusion

The findings obtained from the TVJT experiments on Japanese and Korean suggest that there is a split in the population of both languages in scope judgments concerning negation and the quantified object. Only about half of the participants accepted the neg>∀ reading in negative sentences containing an object with a universal quantifier and only about half of the participants accepted the neg>2 reading in negative sentences containing an object with a numeral quantifier. I have attributed the split in scope judgments to a split in the acquisition of verb-raising: the wide scope reading of negation is available to speakers who have acquired verb-raising, but unavailable to those who have not acquired it. The paucity of evidence concerning verb placement in Japanese and Korean leads to a situation in which there are multiple grammars within a single speech community: one that has verb-raising and another that does not.

This proposal is consistent with claims from the diachronic syntax literature (Kroch 1989) that, even given the restricted innate hypothesis space determined by Universal Grammar, insufficient input can result in grammar competition between distinct grammars within a single population, ultimately bringing about language change when one grammar wins over the other competing grammars. It is also consistent with the claims in language acquisition literature (Roeper 1999, Yang 2003) that all language acquisition involves grammar competition, where learners consider multiple grammars simultaneously before settling on a single grammar. Crucially, in both the diachronic syntax domain and the acquisition domain, at the end point of a grammar competition, speakers converge on a single grammar, thereby producing a homogeneous linguistic population. However, in the case of grammar competition in verb placement in Japanese and Korean, I have observed a stable co-existence of two grammars in the population. Further, I did not find any correlation between the distribution of speakers' responses and dialectal variation. In fact, twin sisters in our Japanese universal quantifier experiment split in their responses on the scope of negation and an object QP. This seems to suggest that the choice of the grammar for verb placement that a speaker acquires is random in the absence of the relevant input data. Whether the split is truly random, how stable the split is, and whether there are any other syntactic/semantic phenomena that correlate with the split are some of the questions that remain as future work.

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