Development of Scopal Ambiguities in L1-Japanese Interlanguage English

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1. Introduction

In this paper I will report on the first stage of a semi-longitudinal study that investigates development of scopal ambiguities with the existential quantifier *a/someone* in the subject and the universal quantifier *every* in the object position in L2-English.

Following the lead of Marsden (2009) who investigated the same phenomena with L1-English L2-Japanese and L1-Korean L2-Japanese adults, the current study focused on L1-Japanese L2-English children. Considering the fact that Japanese and English differ with respect to scope rigidity, the current stage of the study examines Japanese children's interpretation of ambiguous doubly-quantified sentences in English early on in their L2 development when such ambiguity is ungrammatical with an equivalent sentence in a canonical word order in Japanese. The results are interpreted within Full Transfer/Full Access model (FT/FA) (Schwartz & Sprouse 1996) and the study raises conceptual issues for the direction of transfer. The study contributes to a relatively uninvestigated area in the acquisition of quantifiers as a syntax-semantics phenomenon in child L2 acquisition.

The paper is organized as follows: Section 2 introduces scope in English and Japanese and briefly reviews relevant studies in L1 and L2 acquisition of scope. Section 3 introduces methodology. Section 4 presents the results and Section 5 briefly discusses the study and transfer effects within proposals raised in literature on bilingualism and concludes the paper.

2. The Phenomenon

2.1. Syntactic and semantic account of scope in English and Japanese

In English, an SVO language with quantifier raising (QR) at the LF, the sentence in (1) is ambiguous between the surface scope interpretation (S>O; ∃>∀) and inverse scope interpretation (O>S; ∀>∃). The corresponding LF representations for (1a) and (1b) are given in (1'):

(1) Someone read every book.

a. S>O;∃>∀ (there is a person x, such that x read every book)

b. O>S;∀>∃ (for every book x, there was someone who read x)

(1') a. $[_{IP}[_{DP}$ someone$]_i[_{IP}[_{QP}$ every book$]_j[_{IP}\, t_i[_{VP}$ read $t_j]]]]$

b. $[_{IP}[_{QP}$ every book$]_j[_{IP}[_{DP}$ someone$]_i[_{IP}\, t_i[_{VP}$ read $t_j]]]]$

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In Japanese, a rigid scope SOV language, the sentence in (2), which is equivalent to the English sentence in (1), allows only the surface scope in canonical word order. The corresponding LF representations to (2) are given in (2'). The representation in (2'b) derived by QR, shows a trace of *dareka* 'someone' asymmetrically c-commanding the trace of *dono-N-mo* 'every-N' and, therefore, preventing *dono-N-mo* from taking a wide scope over *dareka,* which causes scope rigidity (Sano 2004 following Murasugi & Saito 1992).[2]

(2) Dareka-ga someone-Nom dono-hon-mo every book yonda. read

a. S>O;∃>∀

b. *O>S;∀>∃

(2') a. $[_{IP}$ dareka-ga$]_i[_{IP}$dono-hon-mo$_j[_{IP}t_i[_{VP}t_j$yonda$]]]]$

b.*$[_{IP}$ dono-hon-mo$]_i[_{IP}$ dareka-ga$_j[_{IP}t_j[_{VP}\ t_i$yonda$]]]]$

However, the representation equivalent to (1'b) becomes available in Japanese with an object scrambled over the subject as in OSV in (3):

(3) Dono-hon-mo$_i$ every book dareka-ga someone-Nom t_i read yonda.

a. S>O;∃>∀

b. O>S;∀>∃

To sum up, the difference between English and Japanese is that the inverse scope achieved in English via QR (covert movement) is enabled in Japanese by scrambling (overt movement).

If the two languages of an L2er differ in the type of movement to obtain inverse scope as is the case with Japanese and English, could, computationally, the type of movement itself be related to the (un)availability of the inverse scope in L2 English?

Syntactically and computationally, the main difference between covert and overt movement is the following: (a) they have different derivational outcomes and (b) they are motivated by similar underlying feature-checking mechanisms (Roeper 1999 following Chomsky 1995). As for (a), the derivational outcome for the overt movement is audible, visible at PF, whereas effects of the covert movement do not appear at PF and remain at LF since they come late in derivation (i.e. after Spell Out) (Chomsky 1995; Polinsky & Potsdam 2013).

As for (b), under one analysis (Miyagawa 2004), scrambling in Japanese, as overt movement is motivated by checking EPP features on I. This is given in representation (3'):

(3') $[_{IP}$ dono hon-mo$_i][_{I'}[_{I\ [+EPP]}[_{VP}$ dareka-ga$_j][_{VP}\ t_i[_{VP}\ t_j$ yonda $t_i]]]]]]$

On the other hand, in English, a covert V to I movement at the LF in (4) is motivated by features on I that are checked and become visible at PF as tense and agreement morphology on thematic verbs whereas overt raising of the same type of verbs, given in (5) is ungrammatical (Fanselow 1990; Pesetsky 1995):

[2] α asymmetrically c-commands β iff
(i) α c-commands β
(ii) β doesn't c-command α

(4) [$_{IP}$A girl [$_{I[+Tns][+Agr]}$ reads$_i$[$_{VP}$ usually [$_{VP}$ t_i [$_{VP}$ every book]]]]]

(5) *A girl reads$_i$ usually t_i every book

There are different views as to whether there is a computational difference between the two types of movement that will not be explored here (Hornstein, Nunes & Grohmann 2005; Chomsky 1995; Roeper 1999). However, what is relevant for the current study is how QR, as a type of covert movement compares to other types of covert movement, such as covert feature checking in (4).

From the Minimalist perspective on derivational economy[3], QR is a computationally costly movement since it increases the number of interpretations of a single PF and has no other function but to (invisibly) change scope (Fox 1995; Reinhart 2006). If QR goes against the economy principle of a computational system, the same principle (Reinhart 2006) could be taken to explain why in English an inverse scope interpretation in English is generally harder to access even for native adult speakers, and it is reasonable to expect that the surface scope will be more available in child L2 English as well without necessarily resorting to the learners' L1.

2.2. Previous L1 and L2 studies in the acquisition of universal and existential quantifiers

Previous studies with adult monolingual English and Japanese speakers generally confirm the analysis for the quantified sentences of the type in (1) and (2). For instance, Han, Storoshenko & Sakurai's (2009) study with adult monolingual Japanese speakers confirmed scope rigidity in Japanese with various quantifiers in combination with *dareka* in object position, although some quantifiers, namely *futa* 'two' and *subete* 'all' allowed inverse scope in the canonical object position.

It is less clear whether Japanese monolingual children in Sano's (2004) study (age 4;1-6;5) have the rigid scope since they allowed both surface and inverse scope. Furthermore, individual data showed that 90% (5/6) of the children who correctly rejected ∀>∃ in a sentence similar to (2), also rejected ∀>∃ in a scrambled sentence, which means that they did not change scope due to scrambling as is the case in adult Japanese (Sano 2004). Allowing inverse scope in Japanese SOV is problematic from the learnability perspective (the Subset Principle). Specifically, how does a system which initially allowed a superset option, i.e. both surface and inverse scope, settle on the subset option surface scope when there is nothing in the input that directs a child towards the target-like interpretation (Sano 2004; Manzini & Wexler 1987)? Such questions have repercussions for a clear prediction of transfer and the course of development of scopal ambiguities in L1-Japanese child L2 English.

Rakhlin (2007) in her Experiment 1 showed that monolingual English adults allowed inverse scope whereas children generally disallowed it, ascribing the difficulty to 'establishing a discontinued dependency between the moved constituent and its trace' that is too abstract for children before a certain age (Philip 1995).

In L2 acquisition of scope, Marsden (2009) showed that adult advanced L1-English L2ers of Japanese can overcome the poverty-of-stimulus problem (POS) with sentences such as (2) and (3) whereas intermediate learners still resorted to transfer and allowed inverse scope in SOV. On the other hand, L1-Korean L2ers of Japanese transferred rigid scope from their rigid scope L1 and were more target-like at lower proficiency levels than English L2ers of Japanese.

Berent et al. (2009) showed that irrespective of the amount of exposure (L2ers of English and deaf monolingual native English speakers) and the learners' L1 (L2ers of English), both scope interpretations are available to the adult L2ers of English with doubly quantified sentence similar to (1). Access to interpretations followed the order of difficulty as predicted by the economy principle: QP non-subject and QP subject collective the least costly as in (O>S): *Each dog is lying on a rug* and (S>O): *A woman is smelling every flower* and QP non-subject distributive most costly as in (O>S): *A woman smelled every flower*. The authors concluded that both populations whose exposure to the target

[3] 'If a derivation D converges without application of some operation, then that application is disallowed.' (Chomsky 1992 as cited in Reinhart 2006: 102). 'Convergence' here means feature checking and 'operation' stands for movement that is allowed only for 'formal morphological reasons of checking features' (Reinhart 2006: 37; 102).

input was reduced were similarly constrained by universal principles of grammar (Berent et al. 2009: 284). Along the similar lines, it is reasonable to expect that not only the type of knowledge but computational and derivational mechanisms that underlie such knowledge bring forward interpretations that are constrained by principles of UG. For instance, availability only of the inverse scope in an interlanguage where no such option is permitted either in the L1 or L2, would be a violation of the economy principles, and, therefore, most probably not a natural language option.

Two issues considered in the current study emerge from both L1 and L2 literature overview with respect to acquisition of scope with existential and universal quantifier: (a) scope transfer (b) scope availability in child Japanese and English and its compatibility with UG.

Under a FT/FA model (Schwartz & Sprouse 1996), the initial stage in the L2 acquisition is the last state of L1 acquisition, therefore, it is expected that interpretations in the L1 Japanese with all its abstract properties will constitute the first stage in L2 English. In order to be able to empirically argue for transfer, the child L2ers of English in the current study were tested in Japanese as well.

The study addresses the following question: Do L1 Japanese child L2ers of English transfer scopal interpretations at the initial stage?

There are two possible outcomes based on L1 transfer and previous studies:(a) similar performance in child Japanese and English and (b) different performance in child Japanese and English. In the case of (a), child L2ers could allow both surface and inverse scope in both Japanese and English, which would be compatible with Sano's (2004) study with L1-Japanese children and L1 transfer. They could also allow only surface scope in both languages, which is compatible with L1-English children of the same age and L1-Japanese adults. Availability of surface scope is compatible with the economy principles (Fox 1995). The third possibility would be the availability of only inverse scope, which has not been attested in previous studies and is unlikely from UG principle of economy. In the case of (b), child L2ers could allow inverse scope in English, but not in Japanese, which is compatible with L1-English adults. Or they could allow inverse scope in Japanese but not in English, which would be a violation of rigid scope in Japanese, and for which there would be no theoretical or computational explanation.

3. Method

3.1. Participants and tasks

A total of six L1-Japanese child L2ers of English (two boys and four girls) participated in the study between the ages 4;3-7;5 (mean age=5;4) Participant information is given in Table 1. All participants were preschool children recruited in Hawaii by the word of mouth and they were all naturalistically exposed to English. None of the children were significantly exposed to English prior to their arrival to the U.S. even in cases where one of the parents was a native English speaker (2 children). Considering the range of the age of arrival for all participants (3;3-6;8), the length of residence in the U.S. (0;9-1;0), the amount and type of exposure to English and Japanese prior to full immersion in English, they were considered to be child L2ers of English rather than sequential or simultaneous bilinguals (Schwartz 2004). Their English proficiency was measured by a picture-narration task (Whong-Barr & Schwartz 2002)[4] and the availability of scope was probed by a Truth-Value Judgment Task (TVJT; Crain & Thornton 1998).

[4] The picture-narration task consists of three sets of four pictures. Each set was shown to participants in sequential order with Power Point. The participants were asked to describe the events in the pictures orally. Their utterances were recorded and manually transcribed. The basic unit of proficiency measurement was the T-unit. A T-unit consists of a main clause and subordinate clauses embedded within it (Hunt 1970). In order to determine proficiency, both accuracy and complexity measure were calculated. First, complexity measure was calculated by dividing the total number of words with the number of T-units per participant. The accuracy was then calculated by dividing the total number of error-free T-units with the total number of T-units. Then the range was calculated for each participant for both complexity and accuracy, which gave a number showing which range was greater and for what numerical value. Finally, complexity measure was multiplied by the difference in range between the two measures and added to accuracy measure per each participant. The final calculation was a relative L2 proficiency score.

	P1	P2	P3	P4	P5	P6
Age of English onset	**4;9**	**6;8**	**4;0**	**5;3**	**3;6**	**3;3**
Length of residence in US	**0;9**	**0;9**	**0;8**	**0;11**	**0;10**	**1;0**
Age at time of testing	**5;6**	**7;5**	**4;8**	**6;2**	**4;4**	**4;3**
English proficiency	**139,8**	**212,2**	**40,72**	**34,52**	**0**	**0**

Table 1. Participants' (P) language-background data

3.2. Materials

The TVJT consisted of two conditions: a surface true (Condition 1) and inverse true (Condition 2). The administration of the TVJT included two experimenters, a non native speaker of English who tested participants in English, and a native Japanese speaker who tested participants in Japanese on the same experimental items by using a hand puppet (a Disney character Nemo). Each experimenter played both the role of a puppet and the narrator.

One sentence with existential quantifier *a* and *someone/dareka* in subject and universal quantifier *every/dono N-mo* in object position as in (1) and (2) was used in both conditions. An example of sentences in Condition 1 is given in Table 2 and Condition 2 in Table 3. Fillers were unambiguous sentences with universal quantifier *all/subete*, and numerals in subject and object position. Examples of filler sentences are given in Table 4.

Examples of sentences for surface scope
A girl liked every flower.
Someone ate every cake.
A girl took every strawberry.
Someone read every book.

Table 2. Puppet's statement in Condition 1

Examples of sentences for inverse scope
A boy read every book.
Someone played with every teddy bear.
A girl took every strawberry.
Someone picked every flower.

Table 3. Puppet's statement in Condition 2

Examples of filler sentences
All dogs chased the mouse.
Four bears climbed the tree.
Mickey found all the puppies

Table 4. Puppet's statement on fillers

The sample context and the picture that summarizes the story for Condition 1 are given in (6) and Figure 1, and those for Condition 2 are given in (7) and Figure 2:

(6) Sample item and picture for surface true (S>O;*O>S)

Context: Mary, Anna and Sally love apples. Look! A red apple. Anna likes eating the red apple, Mary likes eating the red apple and Sally likes eating the red apple. Look! A yellow apple and a green apple! Mary likes eating the yellow apple, and Anna likes eating the green apple. But Sally, she likes eating the green apple and the yellow apple. Look! A purple apple! Tina doesn't like eating the purple

apple, yuck! Mary doesn't like eating the purple apple either. And Sally, she already ate three apples, and she is thinking now. But she likes eating purple apples, and decides to eat it after all. She is such a greedy girl!

Nemo: 'This was a hard story, but I think I know what happened: A girl ate every apple.'

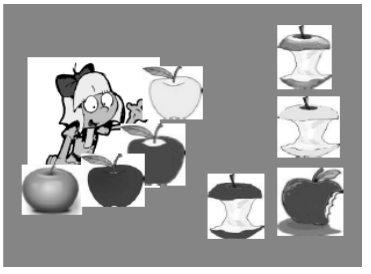

Figure 1. Felicitous surface scope reading

(7) Sample item and picture for inverse true (O>S; *S>O)

Context: Mary, Sandy and Tina love cats. Mary likes touching the white cat, but she is scared of the yellow cat and the black cat. She won't touch them. Sandy likes touching the yellow cat. She is scared of the white cat but when she saw the black cat, she thought of touching that one as well. But when the black cat came closer, she got scared of its long, black tail and decided she won't touch it after all. Tina likes touching the black cat, but she is scared of a white cat and a yellow cat. She doesn't like touching them.

Nemo: 'This was a hard story, but I think I know what happened: A girl touched every cat.'

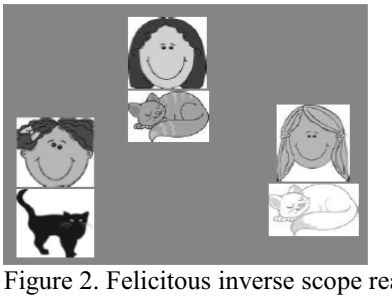

Figure 2. Felicitous inverse scope reading

The experiment was such that one scope reading of the sentence in (1) was targeted in each condition. There were three experimental and three filler items in each condition. The items in Condition 1 were constructed as to make surface scope true in a context that supports surface scope and denies inverse scope. The items in Condition 2 were constructed as to make inverse scope true in a context that supports inverse scope and denies surface scope. Participants' responses of YES or NO on puppets' statements were taken as a measure of ability to access particular scope. The fillers contained mismatch items and participants were asked for justification on their answers on all experimental items.

3.3. Procedure

Prior to experiment, each participant was tested on the meaning of quantifiers *all, every, some, somebody, a* in English and *dono-N-mo, subete, dareka* in Japanese by asking questions about various cartoon characters involved in different actions by using toys.

Participants individually attended at least two experimental sessions (one in English and one in Japanese) separated by about seven days, and did minimally one experimental item and minimally one filler in each language and each condition. They were tested for proficiency in English prior to the TVJT in the first session. All contexts were presented in a randomized order. Each participant listened to the contexts followed by a sequence of pictures on a laptop computer. At the end of each story, a

context summary picture appeared on the screen supporting either surface or inverse scope, and the participants were asked to say whether the puppet's statement was silly or smart by feeding it, respectively, a coin as punishment or a cookie as a reward.

4. Results

The participants' performance in the two experimental conditions of the TVJT was measured by the percentage of YES responses to surface true (ST) and inverse true (IT). At the group level, all children reliably accepted surface scope in both languages (83% in Japanese and English) as opposed to inverse scope (44% in Japanese and 16% in English), which is compatible with L1 data for both languages.

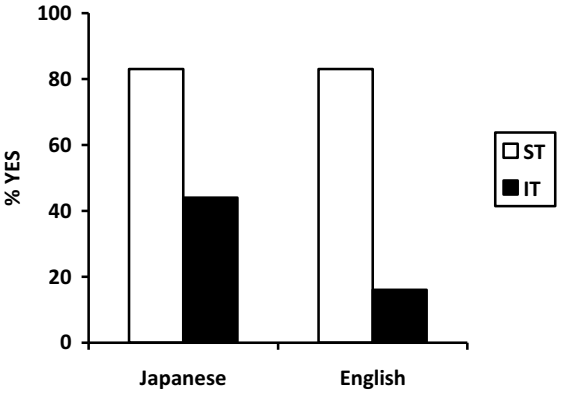

Figure 3. YES response (%) to ST and IT

Individual data in Figure 4 for Japanese and Figure 5 for English show that a larger acceptance of inverse scope in Japanese is due to two youngest participants, namely, those who accepted both surface and inverse scope in all cases (100%) (Participant 5) and in 66% of the cases (Participant 6). The same two participants could not be tested in English due to insufficient production.

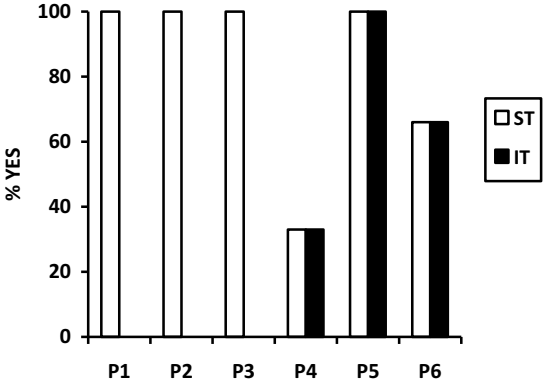

Figure 4. Individual results of YES response (%) to ST and IT in Japanese

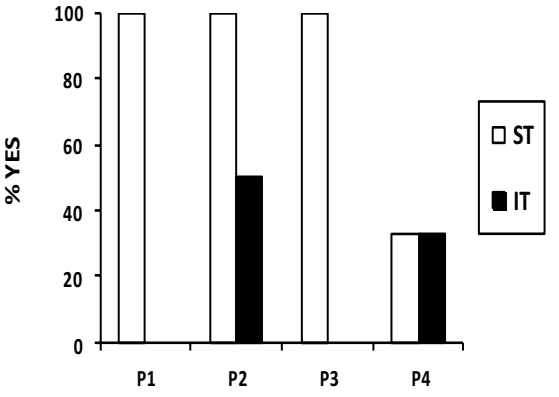

Figure 5. Individual results of YES response (%) to ST and IT in English

Individual data on filler items show generally good performance in both languages for participants 1-4, whereas participants 5 and 6 were around chance level in Japanese.

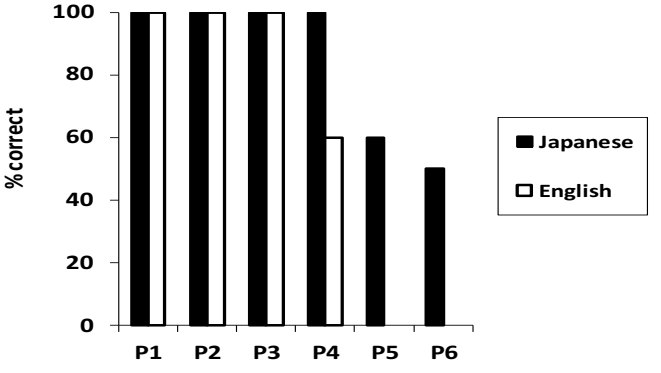

Figure 6. Individual correct answers (%) on fillers

The data generally show parallel performance in Japanese and English irrespective of their proficiency level in English or any other variable in Table 1, except maybe age of onset since participant 5 and 6 had also the lowest one and their performance differed the most from the rest of the participants when tested in Japanese. Although the results tentatively support the L1 transfer, this cannot be stated firmly at this stage of the study.

5. Discussion and conclusion

In order to know what data should constitute a strong evidence of L1 transfer under FT/FA in the acquisition of scope ambiguities in L1 Japanese child interlanguage English, it is necessary to understand how scope ambiguity is expected to develop or what scope is available to transfer from L1 Japanese. These questions raise some conceptual issues that will be briefly discussed in what follows.

First, it is not clear when L1-Japanese child L2ers of English with a reduced input to Japanese (i.e. full immersion in English) develop (if at all) Japanese rigid scope in their L1, if both scopes are supposedly available in child L1 Japanese (Sano 2004). If scope rigidity is something that a child does not fully acquire by the time his or her L1 is expected to be completely in store (around the age of three), interdependence of child's L1 and L2 could occur in a situation in which a child starts acquiring an L2 before a complete acquisition of all the subtle aspects of the L1. In that case, proposals on cross-linguistic (and systemic) influence as discussed in bilingual literature and briefly addressed in what follows, could be helpful in order to create a possible scenario for the direction and type of transfer (Paradis & Genesee 1997; Kupisch 2007; Hulk & Müller 2000).

According to Hulk and Müller (2000), cross-linguistic influence is most likely to occur at the interfaces irrespective of language dominance if language A instantiates wider options for analysis of a certain phenomenon, one of which (but not both) is instantiated in a language B.[5] This could be exemplified with Japanese and English in the following way: with regard to scope of universal quantifier *every*/*dono* N-*mo* and existential *a*/*someone*/*dareka*, Japanese and English overlap at the level of interpretation; that is, both existential and universal wide interpretations are possible. The two interpretations in the two languages differ at the level of derivation: universal wide interpretation is derived by scrambling in Japanese (at the PF) and by QR in English (at the LF). Since English has both surface and inverse scope available at the LF, it provides a wider set of options as opposed to Japanese at the level of representation. That is, following Hulk and Müller (2000), QR would be adopted as a default in L1-Japanaese child interlanguage English. In that case, however, the child L2ers in the present study would be expected to have shown a higher acceptance of inverse scope in Japanese and English. The problem with taking QR as a default is the economy principle, which possibly leaves scrambling as a less costly default since it yields two different interpretations by overt movement and thus obviates positing long-distance covert chains (Roeper 1999). In that case, L1 Japanese children would be expected to accept ungrammatically scrambled sentences in English, and change scope respectively. Yet, that would be a separate research question and a separate condition should be added to the present study. Finally, the most economical option at the initial stages of L2 development coming from UG irrespective of L1 or L2 would be access to only surface scope. It is the least costly interpretation since it does not involve movement at all. From the perspective, surface scope availability in L2 English in the current data may not be a result of L1 transfer, but computationally the least costly UG option.

Systemic influence could also delay or accelerate development of scope in child L2ers in comparison to English and Japanese monolinguals (Genesee & Paradis 1997). Under that scenario, it could be expected for one language, the one in which a child is more proficient, to accelerate scope interpretations in a less proficient language (Paradis & Genesee 1997). However, if the more proficient language is Japanese, as is the case with the present study, it is not clear how a rigid scope language would facilitate development of scope ambiguities in English, a free scope language. Also, it is unclear to what extent could cases of acceleration in the area of a morphosyntactic phenomenon such as finiteness (Gawlitzek-Maiwald & Tracy 1994) be compared to a potential systemic influence in development of scope ambiguities, i.e. a syntax-semantics phenomenon.

Finally, L1 transfer in the sense of FT/FA cannot be ruled out completely since all participants but two are not tracked in their L2 English development from its very beginnings. Therefore, that transfer may have occurred prior to the onset of the study cannot be ruled out. In that respect, the two participants who have not been able to be tested in English in the first stage of the study could be most revealing in regard of some issues raised above.

In the vein of the previous proposals, the current findings are inconclusive and raise many theoretical and conceptual questions. However, there are possible ways of attending to the problems in the future study. For instance, monolingual Japanese children should be tested on the same TVJT as used in the current study in order to assess the scope availability in their L1. Relying only on Sano's (2004) study is neither methodologically sufficient nor entirely valid. Also, the children in the current should be tested on scrambling in Japanese in order to observe whether they indeed change scope in their Japanese, which would enable clearer basis for positing transfer. Furthermore, testing the L2 children on different tasks could be more telling as to the type of scope access. Finally, closely monitoring the development in L2 proficiency and eventual changes in scope availability in both child L1 and L2 through several experimental sessions in early L2 development could be helpful in resolving the issues of the direction and type of transfer as well as teasing apart L1 transfer from the possible effects of computational economy principles.

However, the methodological and conceptual issues raised here show how complex the L2 acquisition of a phenomenon that lies at the interface of different modules of language, logic and cognition is. As such, the current study constributes to a relatively new area of quantifier acquisition in

[5] Hulk & Müller (2000) talk about the overlap of two systems at the surface level. The phenomenon they use is object-drop in Dutch-French and German-Italian bilinguals.

child L2, and fits well with a growing area of studies in child acquisition of phenomena at syntax-semantics interface and is a fruitful ground for some thorough interdisciplinary research.

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