

Scope of Logical Connectives in Second Language Acquisition

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English and Japanese show contrasting scope interpretations in sentences with negation and disjunction ([1]). In English, the disjunction *or* is interpreted under the scope of negation, yielding the interpretation “ $\neg P$ AND $\neg Q$ ”, as in (1). In contrast, the Japanese disjunction *ka* in (2) is interpreted outside the scope of negation, yielding the interpretation “ $\neg P$ OR $\neg Q$ ”. [2] investigated adult L2 learners’ interpretation of sentences with negated disjunction, and found that English-speaking learners of Japanese converged on the target interpretation more successfully than Japanese-speaking learners of English. [2] accounted for these differing outcomes in terms of L1 transfer and learnability. Considering the English and Japanese interpretation, the English interpretation can be conceived as a “subset” interpretation of the Japanese interpretation. Therefore, English-speaking learners of Japanese transferring their L1 interpretation can learn the target interpretation solely on the basis of positive evidence. In contrast, Japanese-speaking learners of English adhering to their L1 interpretation face a serious learnability problem, because they have to expunge their weak interpretation, which presumably requires negative evidence.

We expand this line of research by examining L2 learners’ interpretations of negated conjunction, in comparison with their interpretations of negated disjunction. Interestingly, with negated conjunction, the subset-superset relation between Japanese and English interpretations is the opposite from the pattern observed in negated disjunction ([3]): the Japanese conjunction *...mo...mo* is interpreted outside the scope of local negation, resulting in a strong interpretation (see (3)); conversely, English conjunction *both...and...* is interpreted in the scope of negation, yielding a weak interpretation (see (4)). Consequently, the learnability account predicts that for Japanese-speakers learning English, negated conjunction is easier to learn than negated disjunction, because positive evidence suffices for learning the target interpretation of the former. Similarly, English-speaking learners of Japanese are expected to have more difficulties acquiring the target interpretation of negated conjunction than that of negated disjunction.

Experiment 1 tested Japanese-speaking learners of English (N=53). They participated in a truth value judgment task in a written format. The target response (i.e., judgments based on the target-language interpretations) rates were 20% for test sentences with negated disjunction (e.g., (1)), and 3.6% for sentences with negated conjunction (e.g., (4)). That is, the participants showed strong adherence to the L1 interpretation. Furthermore, we found no evidence that negated conjunction is easier for them than negated disjunction.

Experiment 2 used the same material translated into Japanese (e.g., (2) and (3)), and tested English-speaking learners of Japanese (N=29). The target response rates were 47.9% for negated disjunction, and 92.6% for negated conjunction. Thus, the English-speaking learners mastered the target interpretation of negated conjunction, even though they still had difficulty with negated disjunction. Again, this does not support the predictions of the learnability account.

Our results partly replicated [2]’s findings in that English-speaking learners showed better performance than Japanese-speaking learners. However, the comparison between negated disjunction and negated conjunction suggests that the learnability account does not provide a comprehensive explanation for the differential success in the two L2 groups, which underscores the need for further research.

Examples: [Note: TOP = topic marker; ACC = accusative marker]

(1) The dog will *not* eat the carrot *or* the pepper.

→ “The dog will not eat the carrot, AND will not eat the pepper”

(2) Inu-wa ninjin *ka* piiman-o tabe-*nai*

dog-TOP carrot-*or* green pepper-ACC eat-neg

→ “The dog will not eat the carrot, OR will not eat the pepper”

(3) Inu-wa ninjin *mo* piiman *mo* tabe-*nai*

dog-TOP carrot-*mo* green pepper-*mo* eat-neg

→ “The dog will not eat the carrot, AND will not eat the pepper”

(4) The dog will *not* eat *both* the carrot *and* the pepper

→ “The dog will not eat the carrot, OR will not eat the pepper”

References:

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[2] Grüter, T., Lieberman, M., and Gualmini, A. (2010). Acquiring the scope of disjunction and negation in L2: A bidirectional study of learners of Japanese and English. *Language Acquisition* 17(3), 127-154.

[3] Goro, T. (2007) *Language-specific constraints on scope interpretation in first language acquisition*. Unpublished dissertation, University of Maryland at College Park.