

## Islandhood of Japanese Complex NPs and the Factorial Definition of Island Effects

Shin Fukuda (University of Hawai‘i at Mānoa) and Jon Sprouse (University of Connecticut)

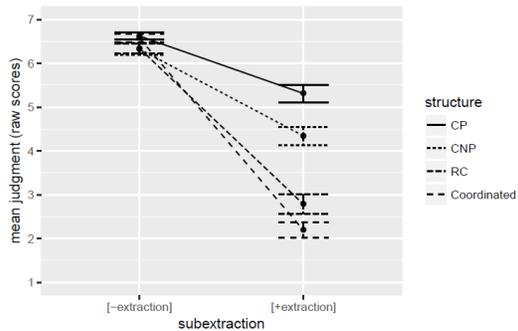
**INTRODUCTION:** The factorial definition of island effects (Sprouse et al. 2011, 2012) has inspired many experimental studies on island constructions across languages, and has generated novel empirical data with important empirical and theoretical implications. For instance, some of the structures that were previously claimed to be non-islands have been shown to exhibit island effects with experiments with a factorial design (e.g., Almeida 2014; Kush et al. 2018; Tanaka and Schwartz 2018; Keshev & Meltzer-Asscher 2019). This study examines whether or not different types of complex NPs (CNPs) in Japanese show island effects with respect to scrambling. Two acceptability judgment experiments were conducted to examine effects of scrambling on sentences with: (i) CP, (ii) CNPs with a complement headed by *to yuu* ‘that say’, (iii) Relative Clause (RC), and (iv) Coordinated Structure (CS). Experiment 1 (Exp1) uses CP as a baseline for exploring the islandhood of CNP, RC, and CS, while Experiment 2 (Exp2) uses a separate (more specific) baseline for CNP, RC, and CS. The findings from both experiments suggest that CNP is not an island, but offer clues to why this judgment has been controversial in the literature. Both experiments confirm that RC and CS are islands in Japanese. These findings demonstrate the value of the factorial definition of islands for increasing the accuracy of the data for island effects, and for increasing the accuracy of the theories of island effects.

**CNPs IN JAPANESE:** The island-status of CNPs in Japanese has been controversial (e.g., Ross 1967; Haig 1976; Saito 1985). Haig (1976) argues that scrambling out of a CNP is acceptable (1a), while scrambling out of a RC is not (1b). Saito (1985) claims that both CNP and RC are islands in Japanese, though he does report the same gradient judgment as Haig (1976) – (2a) is more acceptable than (2b).

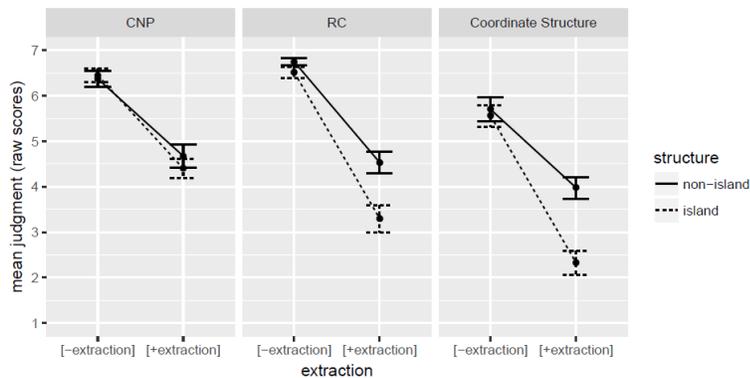
- (1) a. Mary-o<sub>i</sub> watashi<sub>k</sub>-wa [<sub>CNP</sub> e<sub>k</sub> Bill-ni t<sub>i</sub>] shookaishi ta-i to.yuu kiboo]-o  
M-ACC<sub>i</sub> I-TOP [<sub>CNP</sub> e B-DAT t<sub>i</sub> introduce want-NPST that.say desire]-ACC  
mot-te i-ru.  
have-GER be-NPST  
‘Mary, I have a desire such that I want to introduce her to Bill.’
- b. \*Ano hon-o<sub>i</sub> watashi-wa [<sub>RC</sub> e<sub>j</sub> t<sub>i</sub>] kai-ta hito<sub>j</sub>]-ni ai-ta-i  
that book-ACC<sub>i</sub> I-TOP [<sub>RC</sub> e<sub>j</sub> t<sub>i</sub> write-PST person<sub>j</sub>]-to meet-want- NPST  
(‘That book, I want to meet the person who wrote.’) (Haig 1976)
- (2) a. ?Bill-o<sub>i</sub> John-ga [<sub>CNP</sub> Mary-ga t<sub>i</sub>] sake-te i-ru to.yuu uwasa]-o kii-ta  
B-ACC<sub>i</sub> J-NOM [<sub>CNP</sub> M-NOM t<sub>i</sub> avoid-GER be-NPST that.say rumor]-ACC hear-PST  
‘John heard a rumor that Mary is avoiding Bill’
- b. ?\*Ano hon-o<sub>i</sub> John-ga [<sub>RC</sub> e<sub>j</sub> t<sub>i</sub>] kat-ta hito<sub>j</sub>]-o sagashi-te i-ru rasii  
That book-ACC<sub>i</sub> J-NOM [<sub>RC</sub> e<sub>j</sub> t<sub>i</sub> buy-PST person<sub>j</sub>]-ACC search-GER be-NPST seem  
‘It seems that John is looking for the person who bought that book.’ (Saito 1985)

We tested these judgments in factorial definitions in two logically possible ways. In Exp 1, we used CP complements of bridge verbs of speaking (e.g., *yuu* ‘say’, *hanasu* ‘tell’) as the non-island baseline for CNP, RC, and CS. The benefit of this design is that it matches the typical examples in the literature, in addition to isolating the factorial island effects. The drawback of this design is that the non-island control conditions for CNP and RC are not lexically matched to the island conditions, and the control condition for CS is not structurally matched. This means the main effect of structure in this experiment will be slightly larger. This will not impact the island effect, since the island effect is defined as the interaction term, which by definition excludes the main effects. In Exp2, we created lexically matched non-island conditions for each of the three islands (CNP, RC, CS) in a typical factorial definition. This means that CNP and RC sentences used verbs that alternate between CP and NP complements (e.g., *higansuru* ‘criticize’, *uso-o tsuku* ‘lie’, and *homeru* ‘praise’) and CS sentences used an NP followed by a PP (e.g., *musuko-o tomodachi-to* ‘a son with friends’) and coordinated NPs (e.g., *musuko-to tomodachi-o* ‘a son and friends’). As we will see in the results, the differences between the two experiments allow us to see the impact of different control conditions, and potentially explain why CNP judgments have been controversial in the literature.

**EXP1:** Exp1 had a 2 x 4 design with EXTRACTION (no-scrambling vs. scrambling) and STRUCTURE (CP, CNP, RC, and CS). While CP is assumed to allow scrambling, CS is assumed to disallow it. Four lexicalizations were created for each of the four structures with no-scrambling and scrambling conditions ( $4 \times 4 \times 2 = 32$ ). The resulting 32 sentences were split into two lists and mixed with 24 filler sentences with various levels of acceptability. Their order was pseudo-randomized. 32 university students in Japan participated. They were instructed to judge naturalness of each sentence with a 7-point scale. Figure 1 shows



**Figure 1: Raw mean acceptability from Exp1** EXTRACTION (no-scrambling vs. scrambling) and STRUCTURE (non-island vs. island). The islands tested were the same as Exp1: CNP, RC, and CS. Their non-island counterparts were lexically matched CPs with CNPs and RCs, and lexically matched NP-PP with CS. Eight lexicalizations were created for each of the factorial quadruples for the three potential island structures ( $4 \times 3 \times 8 = 96$ ). They were distributed into 8 lists with a Latin Square procedure. The resulting eight lists of 12 sentences were combined with 40 filler sentences. The experimental procedures and the statistical analysis were the same as Exp1. Forty university students in Japan participated. Figure 2 shows the mean raw ratings and estimated standard errors. Linear mixed effects models show that EXTRACTION is significant with all three islands while STRUCTURE (non-



**Figure 2: Raw mean acceptability from Exp2** island vs. island) is not. The interaction between EXTRACTION and STRUCTURE is significant with CS ( $p = .01$ ) and marginally significant with RC ( $p = .07$ ). It is not significant with CNP ( $p = .48$ ). **DISCUSSION:** First, the results of Exp1 and 2 both suggest that CNP is not an island with respect to scrambling, as there was no significant interaction between EXTRACTION and STRUCTURE. That said, we did see a difference in the means between extraction out of a CNP and extraction out of a (non-lexically matched) CP in Exp1 (Figure 1). It is possible that this difference may have led to the disagreements about the judgments in the literature. In this case, using the full factorial design allows us to see that this difference is driven primarily by the structural difference between CP and CNP when typical bridge verbs are used, and not by the interaction of that structural difference with extraction (i.e., an island effect). Second, the results suggest that RC is an island, given the significant interaction between EXTRACTION and STRUCTURE in Exp1 and the nearly significant effect in Exp2 ( $p = .07$ ). Third, the results suggest that CS is an island, and that the island-violating condition is rated lower than the island-violating condition in the RC island case. We further see that the size of the island effect (the interaction term) is larger for CS than RC by about .5 points on the scale (1.5 versus 1.0 in Exp2). These two facts corroborate the claim in the literature that extraction out of CS is more severe than extraction out of RC. Taken as a whole, these results demonstrate how the factorial definition of islands can help resolve judgment debates in the field, both by establishing new results, and by offering potential explanations for the debates surrounding previous results.

## REFERENCES

- Almeida, D. 2014. Subliminal *wh*-islands in Brazilian Portuguese and the consequences for syntactic theory. *Revista da ABRALIN* 13: 55–93.
- Haig, J. 1976. Shadow pronoun deletion in Japanese. *Linguistic Inquiry* 7: 363-371.
- Keshev, K. and A Meltzer-Asscher. A processing-based account of subliminal *wh*-island effects. *Natural Language Linguistic Theory* 37:621–657
- Kush, D., T. Lohndal and J. Sprouse. 2018. Investigating variation in island effects: A case study of Norwegian *wh*-extraction. *Natural Language and Linguistic Theory* 36:743–779.
- Ross, J. R. 1967. Constraints on variables in syntax. Ph.D. dissertation, MIT.
- Saito, M. 1985. *Some asymmetries in Japanese and their theoretical implications*. Ph.D. dissertation, MIT.
- Sprouse, J., S. Fukuda, H. Ono and R. Kluender. 2011. Reverse island effects and the backward search for a licensor in multiple *wh*-questions. *Syntax* 14: 179-203.
- Sprouse, J., M. Wagers, and C. Phillips. 2012. *A test of the relation between working memory capacity and syntactic island effects*. *Language* 88: 82-123.
- Tanaka, N. and B. D. Schwartz. 2018. Investigating relative clause island effects in native and nonnative adult speakers of Japanese. In A. B. Bertolini and M. J. Kaplan (eds.), *Proceedings of the 42nd annual Boston University Conference on Language Development*, 750-763. Somerville, MA: Cascadilla Press.