

## The relation between processing costs and wh-island effects: An experimental syntax study of Hebrew

**Background.** Wh-island effects are notorious for their cross-linguistic variation (Rizzi, 1982; Sportiche, 1981; Torrego, 1984). However, recent studies, based on a new experimental syntax paradigm (Sprouse et al., 2012), suggested a wider incidence of wh-island effects than previously thought, showing that they exist in languages previously argued to be immune to them (Almeida, 2014; Sprouse et al., 2016; Kush et al., 2015). The current study uses Sprouse's paradigm to investigate Hebrew, another language believed to allow wh-islands (Reinhart, 1981). Its results suggest that the apparent cross-linguistic resemblance in the existence of wh-island effects might reflect similar processing costs, rather than similar grammatical constraints. The study highlights the importance of considering processing factors in the search for cross-linguistic differences and similarities between grammars.

**Experiments 1 & 2.** Using Sprouse's design, Exp. 1 (N=33) and 2 (N=32) tested for the wh-island effect in Hebrew sentences with either a gap or a resumptive pronoun (RP). The logic of the paradigm is as follows: low acceptability ratings of wh-island structures (1a) might be influenced by factors other than the grammatical island constraint itself, such as dependency length (embedded gaps [1b] might be less acceptable than matrix gaps [1d]) and complexity of the embedded structure (embedded questions [1c] might be less acceptable than embedded declaratives [1d]). Thus, to isolate the reduction in acceptability induced by the island itself, Sprouse proposes testing for super-additivity (interaction) in a factorial design (Table 1).

Table 1: Sprouse et al.'s (2012) Factorial design for testing wh-island effects:

(1) a. Filler <sub>i</sub> [RC that ..... [when <sub>j</sub> ..... _i _j]]	wh-island
b. Filler <sub>i</sub> [RC that ..... [that ..... _i]]	long dependency, no island
c. Filler <sub>i</sub> [RC that _i ..... [when <sub>j</sub> ..... _j]]	embedded question, no island
d. Filler <sub>i</sub> [RC that _i ..... [that ..... ]]	short dependency, embedded declarative

Results of the current experiments revealed a super-additive effect in the gap version (DD=0.46, interaction  $p < .001$ ), and marginally in the RP version (DD=0.14, interaction  $p = .14$ ), suggesting the existence of a wh-island effect in Hebrew, seemingly contrary to previous claims in the linguistic literature.

**Experiments 3 & 4.** We hypothesized that the effect observed above did not arise (only) from the grammatical island constraint, but also from increased costs for retrieving and maintaining the filler in the island condition relative to the other conditions, due to interference caused by the embedded wh-phrase. To test this, we applied the super-additivity design to dependencies that involve retrieval or maintenance but are not constrained by islands, i.e. binding relations. To simulate retrieval, we used anaphors in Exp. 3 (N=32), and for maintenance we used cataphors in Exp. 4 (N=32). Results revealed a significant super-additive effect in cataphora dependencies (DD=0.3,  $p = .04$ ), and a small super-additive effect for anaphors (DD=0.17,  $p = .08$ ) suggesting that maintenance interference underlies much of the super-additive effect in wh-islands, possibly with a contribution of retrieval interference.

**Experiment 5.** Finally, we wanted to test whether the effect observed in Exp. 1 is eliminated when increased costs of maintaining two fillers are minimized. Exp. 5 (N=56) tested this by placing the embedded relativization site at the subject position, while also controlling for retrieval costs by including binding conditions. No super-additive effect was found for the extraction (DD=0.05,  $p = .7$ ) or the binding (DD=0.12,  $p = .34$ ) conditions (three-way interaction:  $p = .52$ ), suggesting that indeed, the wh-island effect in Exp. 1 can be attributed to processing, rather than grammatical, factors.

## References

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