Negative islands do not block active gap filling

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While constraints on long distance dependencies are often syntactic in nature, they may also arise from semantic considerations. Negative islands, a type of weak island, selectively constrain certain wh-dependencies that violate Dayal's (1996) maximal informativity presupposition on questions, i.e., that the answer set contains a true answer entailing all the other true ones (Fox & Hackl, 2007; Abrusán, 2011). Negative degree questions like *How tall isn't John?* are judged to be unacceptable because they ask for the minimal height interval that does <u>not</u> contain John's height, even though such an interval does not exist because the true answer set contains two mutually exclusive subsets that do not entail one another, i.e. all intervals below John's height, $(0, \text{height}_{John})$, and all intervals above John's height, $(\text{height}_{John}, \infty)$.

In general, island constraints have been found to constrain long distance dependency formation in real time. Stowe (1986) showed that comprehenders actively posits gaps for wh-phrases in grammatical positions, demonstrating that filled-gap effects emerged when gaps are grammatically licensed but not when they are grammatically inaccessible, e.g., inside subject islands. Further research has found that comprehenders respects strong wh-island constraints (Traxler & Pickering, 1996; Wagers & Phillips, 2009), reflecting the parser's rapid use of syntactic constraints to avoid positing illicit dependencies in real-time.

Whether comprehenders can use semantic constraints, such as negative islands, in real-time is unclear. Compared to syntactic constraints, it may take comprehenders more time to use presupposition violations to block dependency formation, as their calculation may be more complex. We examined whether negative islands are as effective as wh-islands at blocking illicit gaps in real-time. If comprehenders respect presuppositional dependency constraints, then we expect negative islands (2b) to be as effective as wh-islands (2c) in blocking a filled-gap effect (at *famous*). However, if comprehenders are unable to rapidly use presuppositional constraints to prevent illicit gaps, then we expect to see a filled-gap effect for negative islands, but not for wh-islands. Experiment 1 examined offline acceptability of negative islands with (un)reduced relative clauses, setting up Experiment 2 to use online filled-gap effects to investigate whether comprehenders posit illicit gaps inside negative islands compared to wh-islands.

Experiment 1 acceptability judgements. (N=51, Items=24) We manipulated POLARITY (Positive, Negative) and STRUCTURE (No, Reduced, Unreduced RCs), shown in (1). Results are shown in Figure 1/Table 1. While the presence of negation reduced acceptability overall (*Est.*=0.37, *t*=5.16), there was a significant interaction with structure (*Est.*=0.45, *t*=4.23). NoRC sentences (corresponding incrementally to a potential temporary gap in RRCs) were rated much lower when negation was present, compared to difference in R/URCs (Table 2), suggesting that participants use negative island constraints offline.

Experiment 2 self-paced reading. (N=63, Items=24) We manipulated ISLAND type (No-, Neg-, Wh-Island) in (3) to examine whether comprehenders actively posit a (temporary) gap inside islands. A filled-gap effect emerged in the first spillover region between No-Island and Wh-Island conditions (*Est.*=46.0, *t*=3.12, *p*=.007), showing that Wh-Islands blocked dependency formation relative to No-Islands, but no significant difference was found between No-Islands and Neg-Islands (*Est.*=28.8, *t*=1.87, *p*=.157).

Discussion. Although comprehenders are aware of negative islands offline, online results showed that they were unable to use them to block active dependency formation. This asymmetry suggests that the effects of weak (semantic) islands take time to emerge, unlike strong (syntactic) islands which are more immediate.

(1) Example item in Experiment 1 acceptability judgments
    a. How tall did Mary think the girl hoped to be?   (NoRC, Positive)
    b. How tall did Mary think the girl hoped **not** to be?   (NoRC, Negative)
    c. How tall did Mary think the girl hoped to be to be famous by her   (RRC, Positive)
       parents was?
    d. How tall did Mary think the girl hoped **not** to be to be famous by   (RRC, Negative)
       her parents was?
    e. How tall did Mary think the girl <u>who was</u> hoped to be to be famous by   (URC, Positive)
       her parents was?
    f. How tall did Mary think the girl <u>who was</u> hoped **not** to be to be   (URC, Negative)
       famous by her parents was?

Table 1: Model summary for Experiment 1

	Est.	t	p
Polarity	0.37	5.16	<.001
NoRC v RCs	0.86	8.43	<.001
RRC v URC	0.24	2.70	.007
Polarity:NoRC v RCs	0.45	4.23	<.001
Polarity:RRC v URC	-0.05	-0.59	.556

Table 2: Effect of polarity within sentence structures for Experiment 1

Positive – Negative	Est.	t	p
No RC	1.48	10.56	<.001
Reduced RC	0.27	1.94	.053
Unreduced RC	0.38	2.46	.014

(2) Example item in Experiment 2 self-paced reading
    a. How tall did Mary think the girl hoped to be **famous** by her parents was   (No-Island)
       before she went to college?
    b. How tall did Mary think the girl hoped <u>not</u> to be **famous** by her parents   (Neg-Island)
       was before she went to college?
    c. How tall did Mary think the girl <u>who was</u> hoped to be **famous** by her   (Wh-Island)
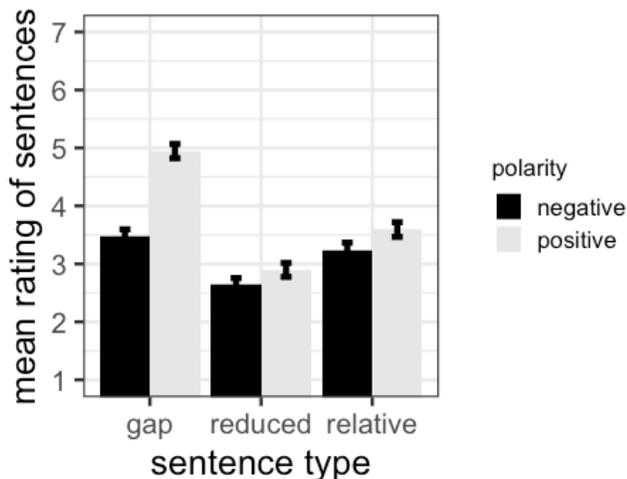   parents was before she went to college?
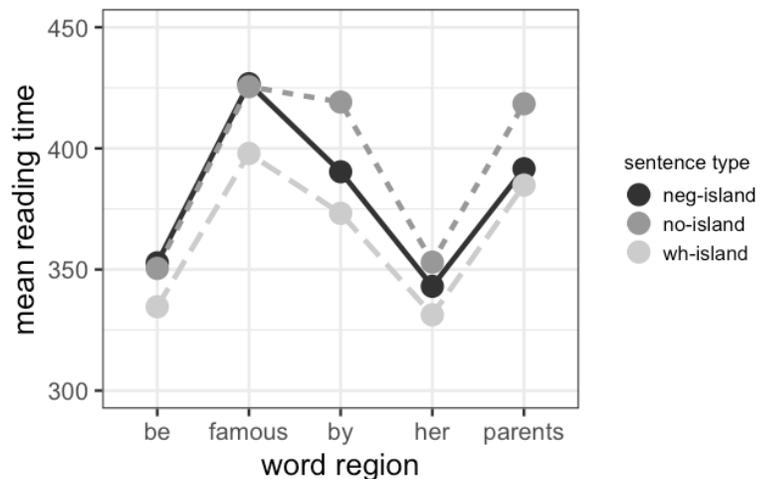

Figure 1. Acceptability task

Figure 2.Self-paced reading task

Selected Reference:
Abrusán, M. (2011). Presuppositional and negative islands: A semantic account. *Natural Language Semantics, 19*(3), 257-321.
Stowe, L. A. (1986). Parsing WH-constructions: Evidence for on-line gap location. *Language and Cognitive Processes, 1*(3), 227-245.