Backward sprouting is not sensitive to islands

The study of possible island effects in ellipsis has been an active area of research for many decades. Sprouting (Chung et al. 1995), as in (1), in which a remnant *wh*-phrase is associated with a non-overt correlate (indicated by "__") in the antecedent clause, is thought to be sensitive to island constraints, but "backward sprouting," as in (2), in which the remnant *wh*-phrase precedes the antecedent clause, is less explored.

(1) John had dinner __ , although we don't know **with whom**.

(2) Although we don't know **with whom**, John had dinner __.

Backward sprouting is of special interest because superficially, it very closely resembles standard filler-gap dependencies, as in (3).

(3) I don't know **with whom** John had dinner __.

In both cases, the *wh*-phrase precedes the gap/correlate and there is a true dependency: if there is no gap/correlate, the dependency fails:

(4) *Although we don't know **who**, John saw Mary.

(5) *I don't know **who** John saw Mary.

The demands on working memory in the two structures would also appear to be very similar: the filler/remnant must be stored in memory while intervening elements are processed, the gap/correlate site must be detected, and the filler/remnant must be retrieved and integrated into the gap/correlate site. Backward sprouting thus presents an interesting test case for analyses of island effects. If islands result from capacity constraints on working memory (Kluender & Kutas 1993, Hofmeister & Sag 2010, etc.), and if working memory operates primarily in terms of surface linear order, then we would expect similar island effects in both types of dependencies.

EXPERIMENT: 40 native speakers of English participated in an acceptability experiment with a 2×2×2 design, crossing Dependency Distance (*short* vs. *long*), Structure (*non-island* (*that*-clause) vs. *island* (CNPC)), and Dependency Type (*Filler-Gap (FGD)* vs. *Remnant-Correlate (RCD)*).

(6) Sample stimuli:

a. No one knows **why** Joe believes __ {∅ / the report} that the frog will be extinct.
[SHORT | {NON-ISLAND/ISLAND} | FGD]

b. No one knows **how soon** Joe believes {∅ / the report} that the frog will be extinct __ .
[LONG | {NON-ISLAND/ISLAND} | FGD]

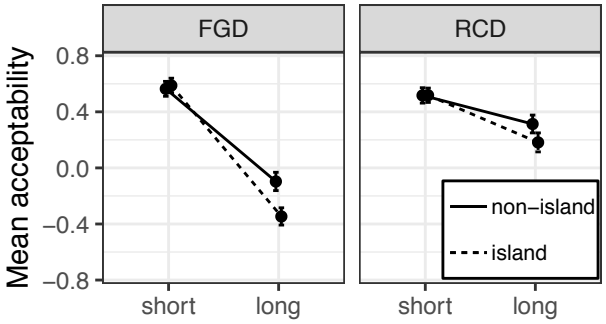
c. Although no one knows **why**, Joe believes __ {∅ / the report} that the frog will be extinct.
[SHORT | {NON-ISLAND/ISLAND} | RCD]

d. Although no one knows **how soon**, Joe believes {∅ / the report} that the frog will be extinct _ .
[LONG | {NON-ISLAND/ISLAND} | RCD]

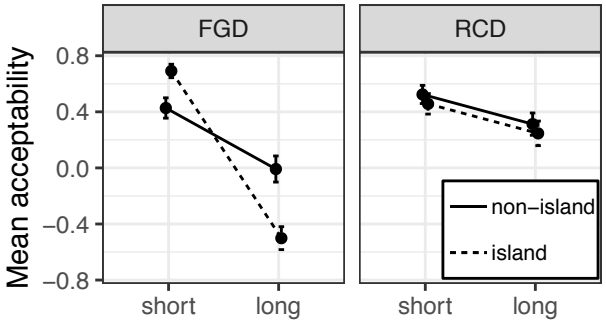
32 lexically matched sets of the 8 conditions were created. Participants rated 4 tokens of each condition on a 7-point scale, across 8 lists counterbalanced with a Latin Square and pseudorandomly presented with 64 filler items.

RESULTS: Mean ratings (transformed to z-scores) for each dependency type are presented in (7a). The interaction between Dependency Distance and Structure, which is the standard definition of an island effect (e.g., Sprouse et al. 2012), is significant with FGD ($p = .0427$), but not with RCD ($p = .3158$) (linear mixed effects model with Satterthwaite approximation for *p*-values), suggesting that the filler-gap dependency is sensitive to the presence of an island structure, but that backward sprouting is not.

(7a) Results for all 32 lexical sets



(7b) Results for 19 lexical sets with positive DD score in FGD



The finding of an island effect in the FGD case is noteworthy because, to our knowledge, this is the first time that such an effect has been demonstrated experimentally for extraction of an adjunct. The effect itself is not in doubt, but being able to demonstrate it experimentally in an acceptability study is difficult because it is hard to ensure that participants treat the filler in cases like (6b) as being associated with a gap in the embedded clause. We constructed the stimuli to favor this reading, and the fact that the interaction is significant for FGD suggests that we were successful. Nonetheless, the potential ambiguity as to the gap site in (6b) probably leads to a smaller effect size than is normally seen in islands. If we restrict our attention to those 19 lexical sets in the stimuli where there was a clear island effect for FGD, as evidenced by a positive DD score (in the sense of Sprouse et al. 2012), the difference between filler-gap dependencies and backward sprouting is even sharper, as seen in (7b). Here, we continue to find a significant interaction between Dependency Distance and Structure for FGD (p = .0004), but not for RCD (p = .9389), and moreover, there is now a significant 3-way interaction Dependency Distance × Structure × Dependency Type (p = .0017).

DISCUSSION: Our results show clear island sensitivity for filler-gap dependencies, as expected, but no such sensitivity for the remnant-correlate dependency in backward sprouting. This distinction is very striking, given the close superficial similarity between the two types of dependencies, and it argues against any analysis that reduces island effects to constraints on working memory operating on a linear representation of the sentence. Instead, island effects seem to arise only when the filler is in a position c-commanding the gap (i.e., in configurations that would be classically described as movement). In backward sprouting, the remnant does not c-command the correlate and the structure could not be derived by movement of the remnant from the correlate position, under any reasonable theory of movement.

It remains an open question for now whether forward sprouting is like filler-gap dependencies or like backward sprouting in terms of sensitivity to islands, and if it is more like the former, as the literature suggests (Chung et al. 1995, Merchant 2001, Yoshida et al. 2013), why forward and backward sprouting would differ in this way.

REFERENCES:

Chung, Ladusaw, & McCloskey (1995), Sluicing and logical form. Hofmeister & Sag (2010), Cognitive constraints and island effects. Kluender & Kutas (1993), Subjacency as a processing phenomenon. Merchant (2001), *The syntax of silence*. Sprouse, Wagers, & Phillips (2012), A test of the relation between working memory capacity and syntactic island effects. Yoshida, Lee, & Dickey (2013), The island (in)sensitivity of sluicing and sprouting.