

Two types of *wh*-dependencies: Same, but different

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Filler-gap dependencies (FGD) as in (1) have been extensively studied, but the superficially similar *wh*-dependency in (2) has not. (2) exemplifies backward sprouting (cf. forward sprouting (Chung et al. 1995), as in (3)) and contains a dependency between the “remnant” and the “correlate” hence a remnant-correlate dependency (RCD). This is a dependency in the sense that the remnant must find a correlate; if it cannot, as in (4), the sentence is unacceptable.

In grammatical terms, FGD and RCD are very different. FGD is traditionally described as the result of movement, but RCD cannot be (the remnant does not c-command the correlate, for instance). In processing terms, however, FGD and RCD would appear to be very similar. In both cases, the filler/remnant must apparently be stored in memory until the gap/correlate site is reached, and the filler/remnant must then be retrieved and integrated into the structure. This leads to two questions that can be answered in a straightforward acceptability experiment:

(I) Will long-distance FGD and RCD both show a similar decline in acceptability?

In formal acceptability experiments, long-distance FGDs are well known to result in substantial degradation (Cowart 1997), presumably due to demands on working memory. If RCDs place similar demands on working memory, we expect a similar degradation there.

(II) Will both FGD and RCD show island effects?

With FGDs, island effects are attributed to properties either of the grammar or of the processor. If the former, we would predict that RCDs would not show island effects, since the grammatical mechanisms responsible for FGDs and RCDs differ greatly. If islands result from properties of processing, though, then RCDs might be expected to show island effects, since FGDs and RCDs appear to be similar in the demands they place on processing.

EXPERIMENT: We address these questions in an acceptability experiment with eight conditions, as exemplified in (5)–(8), crossing DEPENDENCY DISTANCE (*short* vs. *long*), ISLANDHOOD (*non-island* vs. *island* (CNPC)), and DEPENDENCY TYPE (*FGD* vs. *RCD*), lexicalized into 32 sets. All *wh*-fillers/remnants were adjuncts. 89 native-speakers rated four tokens of each condition on a 7-point scale, across eight counterbalanced lists using a Latin square design, which were then pseudorandomized for each participant with 64 filler items of varying acceptability.

RESULTS: Analyses were done using the function “*clmm*” from the package “*ordinal*” in R 3.5.3. To address (I), we tested the responses with the NON-ISLAND conditions for the effect of DISTANCE. As in *Fig1*, both FGD ($p < .001$) and RCD ($p = .003$) showed a clear degradation in the LONG-dependency conditions, but FGD showed a greater degradation than RCD ($p = .009$). To address (II), we tested for island effects. As in *Fig2*, the super-additive interaction associated with islands—DEPENDENCY DISTANCE \times ISLANDHOOD (Sprouse et al. 2012)—was observed in FGD ($p < .002$), but not in RCD ($p = .953$). Also, there seemed to be a significant three-way interaction DEPENDENCY DISTANCE \times ISLANDHOOD \times DEPENDENCY TYPE ($p = .050$).

DISCUSSION: *Fig1* suggests a striking contrast: while both are sensitive to dependency distance, FGD is more so than RCD. This suggests that FGD makes some specific demands on working memory that RCD doesn’t make, despite their important similarities. *Fig2* suggests a further striking contrast: FGD is sensitive to islands but RCD is not. This suggests that minimally, island-sensitivity cannot be reduced to the types of working memory demands that FGD and RCD have in common. Instead, island-sensitivity must stem from something specific to FGD, whether that be a grammatical property or some specific working memory demand in FGD.

Taken together, our results point to working memory demands in FGD that are either non-existent or qualitatively different in RCD. We conjecture that this might originate from a structural difference that affects how the *wh*-phrase searches for a resolution to the *wh*-dependency. If the search is within the c-command domain, an FGD obtains, with all its familiar properties. If the search goes outside this domain, though (e.g., past the comma in (2)), it has qualitatively different properties, as we have seen with RCD (cf. Steinhauer & Friederici 2001).

- (1) We don't know **with whom** John had dinner ___. [FGD]
 (2) While we don't know **with whom**_{remnant}, John had dinner ____{correlate}. [RCD in backward sprouting]
 (3) John had dinner ___, although we don't know **with whom**. [forward sprouting]
 (4) a. While we don't know **what**, John ate ___ last night. [Successful RCD]
 b. *While we don't know **what**, John slept last night. [Failed RCD]
 (5) [SHORT |{NON-ISLAND/ISLAND}| FGD]
 It is unclear **at what meeting** Jack heard ___ {∅/the rumor} that Jill bought a Ferrari.
 (6) [LONG |{NON-ISLAND/ISLAND}| FGD]
 It is unclear **with what money** Jack heard {∅/the rumor} that Jill bought a Ferrari ___.
 (7) [SHORT |{NON-ISLAND/ISLAND}| RCD]
 While it is unclear **at what meeting**, Jack heard ___ {∅/the rumor} that Jill bought a Ferrari.
 (8) [LONG |{NON-ISLAND/ISLAND}| RCD]
 While it is unclear **with what money**, Jack heard {∅/the rumor} that Jill bought a Ferrari ___.

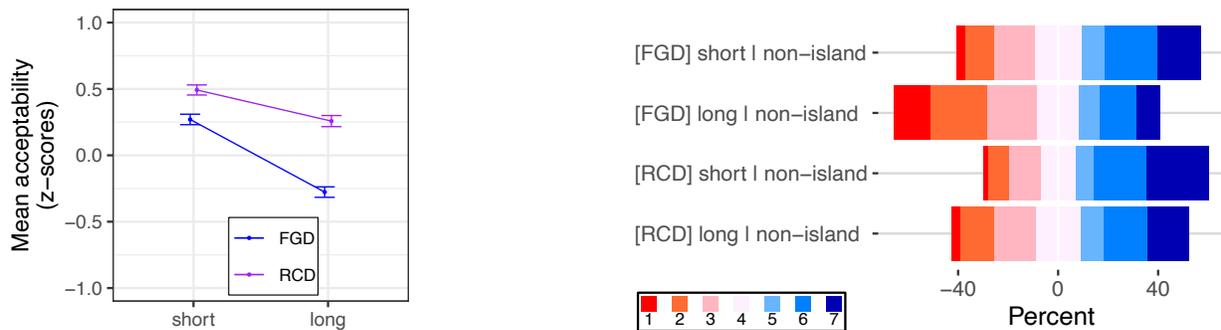


Fig1. [left] Mean acceptability of the NON-ISLAND conditions (z-scores; error bars indicate SE); [right] Distribution of responses by conditions (proportions (%); 1 = “very bad”, 7 = “very good”)

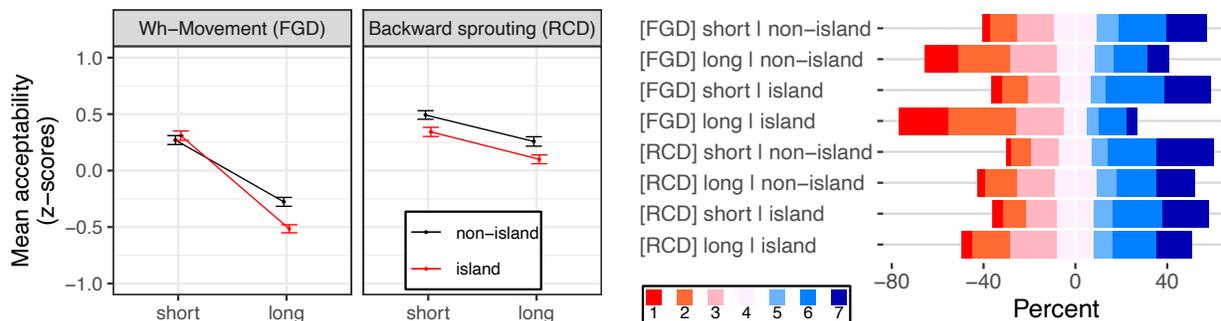


Fig2. [left] Mean acceptability of experimental conditions (z-scores; error bars indicate SE); [right] Distribution of responses by conditions (proportions (%); 1 = “very bad”, 7 = “very good”)

References Chung et al. 1995. Sluicing and logical form. Cowart 1997. *Experimental Syntax: Applying Objective Methods to Sentence Judgments*. Sprouse et al. 2012. A test of the relation between working memory capacity and island effects. Steinhauer & Friederici 2001. Prosodic boundaries, comma rules, and brain responses: The closure positive shift in ERPs as a universal marker for prosodic phrasing in listeners and readers.