Prepositional phrase attachment ambiguities in declarative and interrogative contexts: Oral reading data

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Abstract

Abstract is a work in progress. This paper reports a study on the effect of interrogativity on the oral reading of temporarily ambiguous prepositional phrases (PPs). Specifically, it looks at sentences ending in a of two PPs, where the first is interpretable as the goal argument of the preceding verb, and the status of the second (PP2 Status) is manipulated to either necessarily be the goal argument of that verb (Arg), forcing reanalysis, or not (Mod), allowing the original parse to stand. No evidence is found that interrogativity impacts the difficulty of understanding the Arg-type sentences, despite an intuitive decrease in difficulty when those sentences are presented in an interrogative context. A double-reading protocol is employed, where participants are asked to read a sentence first without preview (Reading 1), and then after unlimited preview (Reading 2).A robust effect of PP2 Status is found for the prosodic phrasing of the target sentences, and an effect of interrogativity on the study time between Readings, Inter-Reading Time (IRT), is reported.

Acknowledgements

TBD

About this draft

This represents the document that will be defended on August 29th. The goal is to deposit before September 16, after incorporating whatever revisions are requested.

Chapter 1

Introduction and background

This section represents a combination of what was the start of chapter 1 (introduction) and the start of chapter 2 (background). It is mostly text you've read, but substantially reorganized, and should be skimmed and discussed.

This paper presents a study on human sentence processing, or parsing, and on the parsing of a particular sort of ambiguity. Parsing is assumed to be the projection of structure by a reader or listener over a string (which obviously lacks inherent structure). Following the sort of model of parsing put forward by, e.g., Kimball (1973), Frazier & Fodor (1978), and Frazier & Clifton (1996), this study assumes that parsing is done online and that most material must be incorporated into the structure being built as soon as it is encountered. This can lead to mis-parses, where the parser has guessed wrong about how to incorporate a given phrase with a temporarily ambiguous structure, and then encounters material that cannot be incorporated into the current structure. When this happens, the parser must reanalyze the material that had so far been processed, in order to come upa structure that can accomodate both the new and old material grammatically~~discard~~

[1]: This paragraph was ¶1 chapter 1

~~part or all of its pending structure and try again to incorporate the material encountered so far~~. This sort of parser crash is ~~often~~ called a garden path.

~~As briefly mentioned earlier,~~ "Ggarden path effects" occur when a temporarily ambiguous sentence resolves in such a way that the structure initially preferred by the parser is incompatible with how the sentence actually continues. These parsing errors have traditionally been attributed to structurally-focused parsing preferences (Frazier, 1979; Frazier & Fodor, 1978; Kimball, 1973) that ignore semantic content on the first pass. Frazier (1979) formulates several of these, including the following two which are widely accepted in one form or another:

[2]: From here until next note, was introductory section of chapter 2

(1) *Minimal attachment* Attach incoming material into the phrase-marker being constructed using the fewest nodes consistent with the well-formedness rules of the language under analysis (Frazier, 1979, p. 24)

(2) *Late closure* When possible, attach incoming material into the clause currently being parsed (Frazier, 1979, p. 20)

Because these strategies ignore semantic and pragmatic plausibility and the parser typically does not know what material might be further on in the string, mis-parses at temporarily ambiguous regions can occur, resulting in garden paths. *Minimal Attachment* is important to this study and will be revisited later on.

An example is the commonly studied garden path sentence, "The horse raced past the barn fell" (Bever, 1970). Here, the initial parse incorrectly assumes that the matrix subject is the unmodified NP the horse, per Minimal Attachment, and takes the matrix verb to be raced, as in the sentence, "The horse raced past the finish line."

(3) The horse raced past the barn fell (Bever, 1970)

a) [$_{S}$ [$_{NP}$ The horse] [$_{VP}$ raced past the barn]] ??? [$_{VP}$ fell]

b) [$_{S}$ [$_{NP}$ The horse raced past the barn] [$_{VP}$ fell]]

An attempted parse resulting in structure (41 a) crashes, as it is not possible to incorporate the final word fell in a grammatical way. Reanalysis is required, with the grammatical parse being (41 b) where the matrix subject is *the horse raced past the barn*, a noun phrase (NP) containing a reduced relative clause *raced past the barn*. Thus *fell* can be incorporated as the matrix verb, with a structure comparable to, “The horse (that was) raced past the barn was hungry.”

~~There is an ongoing debate in the literature about what parsing model best fits the empirical facts. This study follows [@frazier1996construal] in assuming that structure-first parsing strategies are at play, in addition to a primary vs. non-primary relation distinction that determines how immediately a phrase must be incorporated into a parse, allowing for some material to be incorporated later and thereby make use of additional information that is not available for immediate parsing decisions.~~

[3]: Back to what was chapter 1, ¶ 2

The study being reported is concerned with certain sentences that contain ~~such~~ a temporarily ambiguous prepositional phrase (PP1), followed by another (PP2) which causes the expected parse to crash~~interferes with what is assumed to be the default interpretation of PP1~~ Specifically, it is expected that PP1 in (4) will initially be interpreted as the goal of *cram, but that parse will fail when it is realized that PP2 cannot plausibly modify* drawer.

[4]: examples moved up slightly

(4) He had planned to cram the paperwork [$_{PP1}$ in the drawer] [$_{PP2}$ in~~to~~ his briefcase].

(5) He had planned to cram the paperwork [$_{PP1}$ in the drawer ~~]~~ [$_{PP2}$ of his filing cabinet]].

This contrasts with the similar sentence in (5) where PP2 can plausibly modify *drawer* and so the parse where *in the drawer* is the goal argument is accepted and *of his filing cabinet* is incoporated as a modifier within PP1.}{: as an argument of

the verb. The reasons for that assumption are discussed in Section 2.1, but for now it suffices to understand that (4) represents a difficult to comprehend sentence (a garden path), while (5) presents no such difficulty.}

((examples were here))

~~Before the details of the current research can be outlined, it is first necessary to explain some of the terms and mechanisms involved. This chapter is concerned with doing so.~~

\begin{note} Sections 1.1 and 1.2 are redundant and have been removed. They are incorporated into the above. \end

1.1 Motivations for the current

[5]: Adapted from what was §1.3

The current study was initially motivated by an observation discovered by Janet Dean Fodor and Dianne Bradley, and originally reported in @qp2. That observation is that a garden path sentence like (4) repeated here as (6) is, for whatever reason, not as difficult to process when presented as an interrogative, as in (7), rather than a declarative.~~These attachment ambiguities which are difficult to parse in the declarative, appear to be less difficult to parse when presented in polar interrogative context. Consider again the somewhat difficult to process sentence in (@cramiGPy), repeated below as (@dec) for convenience.~~

(6) He had planned to cram the paperwork [$_{PP_1}$ in the drawer] [$_{PP_2}$ in~~to~~ his briefcase].

(7) Had he planned to cram the paperwork [$_{PP_1}$ in the drawer] [$_{PP_2}$ in~~to~~ his briefcase]?

Peckenpaugh (2016) attempted to find a behavioral correlate of this intuition by looking at variation in reading time of sentence like (6) and (7), but the results were