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GRAMMATICAL ILLUSIONS AND SELECTIVE FALLIBILITY IN REAL-TIME LANGUAGE COMPREHENSION

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ABSTRACT

Grammatical constraints impose diverse requirements on the relations between words and phrases in a sentence. Research on the online implementation of grammatical constraints reveals a strikingly uneven profile. The parser shows impressive accuracy in the application of some rather complex constraints, but makes many errors in the implementation of some relatively simple constraints. Just as the study of optical illusions has played an important role in the study of visual perception, the parser’s highly selective vulnerability to interference and “grammatical illusions” provides a valuable tool for understanding how speakers encode and navigate complex linguistic representations in real time.
1. INTRODUCTION

Grammatical constraints impose many structural and featural requirements on the relations between words and phrases in a sentence, which include constraints on anaphora, agreement, case, and unbounded dependencies, to name but a few. In investigating how these various requirements are implemented during online language processing, we have a powerful tool for understanding how linguistic representations are encoded and navigated in real time.

Research on the online implementation of grammatical constraints goes back at least 25 years, but a number of recent developments have made this line of inquiry particularly interesting. First, in linguistics there is growing interest in the question of how grammatical computations might be understood as real-time mental processes, with proposals emerging from all corners of the linguistic landscape (e.g., Cann, Kempson, & Marten, 2005; O’Grady, 2005; Phillips, 1996, 2003; Phillips & Lewis, in press; Steedman, 2000).

Second, psycholinguistics has seen a resurgence of interest in the question of how structured information is encoded and accessed in memory. In contrast to earlier work that tended to treat working memory as a passive buffer whose most interesting property was its capacity, recent work has paid closer attention to how structural relations are encoded, and to how relevant and irrelevant information is distinguished in memory. This maturing of research on memory for linguistic structure is closely tied to developments in the literature on the cognitive (neuro-)science of memory (for reviews, see Cowan, 2000; Jonides et al., 2008; McElree, 2006; Ricker, AuBuchon, & Cowan, 2010).

Third, findings on the online status of different constraints are yielding a rich profile of grammatical (in)sensitivity. Past research on the psycholinguistics of filler-gap dependencies, anaphora, agreement, thematic binding, and other phenomena has proceeded largely independently in a series of subliteratures. When the findings on different linguistic phenomena are brought together, a number of striking contrasts emerge. Human parsers are quite good at implementing some rather complex grammatical constraints, such as island constraints on filler-gap dependencies, and strikingly bad at respecting some very simple constraints, such as subject-verb agreement. In some cases comprehenders are susceptible to grammatical illusions, but in other cases they appear to be immune to illusions.

Here we present a preliminary profile of selective fallibility to grammatical illusions in language comprehension. Just as the study of optical illusions has proven to be a valuable tool in understanding visual information processing, we expect that the study of (in)sensitivity to linguistic illusions will be fruitful in research on language.

We begin in Section 2 by summarizing different mechanisms that comprehenders might use to access linguistic material in memory. These mechanisms present a trade-off between speed and structure-sensitivity of processing. In Sections 3, we survey grammatical phenomena where comprehenders appear to