SPECIFICATIONAL PSEUDOCLEFTS: A SELF-PACED READING STUDY

SPECIFICATIONAL PSEUDOCLEFTS: A SELF-PACED READING STUDY INVESTIGATING ELLIPSIS PROCESSING

Ethan J. Stollar, B.A. (Hons)

A thesis submitted to the Department of Linguistics & Languages and the School of Graduate Studies of McMaster University in partial fulfilment of the requirements for the degree of Master of Science.

Descriptive Note

McMaster University MASTER OF SCIENCE (2024) Hamilton, Ontario (Linguistics & Languages)

TITLE: ALL CAPS 1

AUTHOR: Ethan J. Stollar, B.A. (Hons), (McMaster University)

SUPERVISOR: Dr. Ivona Kučerová

PAGES: viii, 50

Lay Abstract

Pseudocleft sentences have two parts: a clause that introduces a subject and a clause that describes the subject. There are different types of pseudocleft sentences that describe the subject in different ways. This thesis argues that some pseudocleft sentences are best understood as sentences that have missing words. Sentences with missing words are known as ellipsis sentences. This thesis presents three arguments for why pseudocleft sentences are best understood as ellipsis. How people understand and process ellipsis sentences is an important question in linguistics. However, how our brains process pseudocleft sentences is not well understood. This work presents an experiment that tests if people read the pseudocleft sentences differently if they are the type that have missing words. Participants read pseudocleft sentences on a computer screen and their reading times were recorded. The results of the experiment did not find a significant difference in reading times for the different types.

Abstract

Theoretical linguistic accounts concerning the nature of pseudocleft constructions have led to differing perspectives on their underlying mechanisms. Specifically, the coreferential properties of pseudoclefts have led to a theoretical divide between syntactic-based accounts and semantic-based accounts. The theoretical contention surrounding pseudoclefts has led to a lack of empirical research concerning their processing. This thesis argues that there is strong evidence from the literature to suggest that pseudoclefts, more specifically a sub-type of pseudoclefts known as specificational pseudoclefts, are best viewed through the lens of a syntactic-based ellipsis account. I present three arguments for an ellipsis-based account of specification pseudoclefts: (1) ellipsis-based accounts provide a more parsimonious explanation for their coreferential properties, (2) Ross (1972) and Schlenker (2003)'s conceptual argument for specificational pseudoclefts as question-answer pairs (QAP) places the burden of proof on any theory that does not posit a QAP analysis, (3) Hirsch (2017) arguements for the existence of VP-ellipsis in pseudoclefts. I then present an experiment that uses a self-paced reading task to investigate the processing of pseudoclefts through the lens of an ellipsis analysis. I hypothesized increased reaction times at the ellipsis sites in specificational pseudoclefts, but not in their counterpart predicational pseudocleft constructions that do not possess ellipsis. There was no significant difference in the reaction times across the conditions. It is unclear if the lack of effect was due to the experimental methodology, the lack of control for the participant's environment, or the potential lack of ellipsis in the pseudocleft constructions. However, this work provides a foundation for future research to investigate the processing of pseudoclefts and the potential for using pseudocleft paradigms to understand language processing.

Acknowledgements

I am indebted to my supervisor Dr. Ivona Kučerová for her unwavering support and encouragement to pursue my intellectual interests and for her guidance throughout the completion of my thesis and my time at McMaster University. I can confidently say that Dr. Ivona Kučerová's mentorship has been incomprehensibly pivotal in my intellectual, academic, and personal development. For this, I am eternally grateful. I would like to thank my committee member Dr. Phoebe Gaston, who has provided me with invaluable feedback and guidance throughout the completion of my thesis.

I would like to thank all of the members of the Advanced Research in Experimental and Applied Linguistics (ARiEAL) community, who have all played a large role in shaping my academic interests, and provided me with an encouraging and engaging environment to pursue those interests. I would like to thank the members of the Syntax Lab at McMaster University, who have provided a vibrant community of friends and colleagues to grow and learn with. I would like to specifically thank Audrey Ho, who has been a constant positive influence in my life and has provided me with selfless unwavering support and encouragement. Our long discussions about linguistics, life, and everything in between are something I will always cherish.

Finally, I would like to thank my family, without who, none of this would have been possible. To my mother, Brenda Marchand, you are a pillar of strength and support, and your tenacity and resolve in life are the most inspiring qualities I have ever witnessed. To my brother Ajay Stollar and sister Brennan Skidmore, I could not ask for more supportive and loving siblings. Thank you for always being there for me.

List of Figures and Tables

List of Abbreviations

AC	Antecedent Constituent
BV	Bound variable
CP	Complementizer Phrase
DP	Determiner Phrase
EEG	Electroencephalography
ERP	Event-Related Potential
INFL	Inflectional Phrase
LF	Logical Form
NPI	Negative Polarity Item
PD	Parallelism domain
PF	Phonological Form
PP	Prepositional Phrase
PPC	Predicational Pseudocleft
QAP	Question-Answer Pair
SPC	Specificational Pseudocleft
TP	Tense Phrase
VP	Verb Phrase

Contents

1 Introduction

Pseudocleft constructions, like in (1), have been a locus of contention regarding the status of foundational aspects of syntactic and linguistic theory, namely, concerning the notions of c-command, binding theory and scope (Akmajian, 1970, Ross, 1972, Higgins, 1973, Jacobson, 1994, Bachenko, 1976, Bošković, 1997, Heycock and Kroch, 1999, Sharvit, 1999, Cecchetto, 2000, Den Dikken et al., 2000, Schlenker, 2003, Bachrach, 2004, Den Dikken, 2006, Hirsch, 2017, Van Luven, 2018, and others). Pseudocleft constructions of the type in (1) have been observed to exhibit the same co-referentiality properties of the antecedent and the reflexive in constructions like (2) (Akmajian, 1970, Ross, 1972, Higgins, 1973, Bachenko, 1976, Bošković, 1997, Heycock and Kroch, 1999, Den Dikken et al., 2000, Den Dikken, 2006).

(1) What Verena$_i$ likes is herself$_i$

(2) Verena$_i$ likes herself$_i$

The presence of the coreferential properties in (1), despite the lack of an apparent structural configuration required to establish the anaphora, is known as the '*connectivity problem*' (Schlenker, 2003). The pursuit of reconciliation for the connectivity problem of pseudoclefts has led to vastly differing theoretical perspectives regarding the grammatical architecture of language in the literature. Three main approaches have emerged from attempts to reconcile the connectivity problem: syntactic reconstruction based accounts, ellipsis based accounts, and semantic based accounts. This thesis will argue that the ellipsis based account is the most compelling, and propose that through the use of online experimental methodologies, pseudoclefts provide a unique opportunity to inform our understanding of the processing of ellipsis in language. Ellipsis processing is a widely studied linguistic process in the psycholinguistic literature, yet pseudoclefts due to their contentious theoretical status, remain

untapped as a methodological tool. In section 2, I will provide an overview of the theoretical landscape of pseudoclefts, and the three main approaches that have been proposed to account for the connectivity problem. I will then provide justification for the ellipsis account as the most compelling proposal. At the end of section 2, I will then provide an overview of the processing literature concerning ellipsis. In section 3, I will explicate the experimental design and methodology that will be used to investigate if a processing profile of ellipsis can be observed in pseudoclefts. In section 4, I will present the results of the experiment and discuss the implications of the findings. In section 5, I will conclude by discussing the implications of the findings of the experiment, and the potential for using experimental methodologies to inform our understanding of linguistic theory.

2 Literature Review

Pseudoclefts are bipartite constructions consisting of a wh-clause that introduces a subject (sometimes a light-headed relative clause (Den Dikken, 2006)), a copular clause, and a 'counterweight' (underlined in (3a)) clause (Den Dikken et al., 2000; Heycock & Kroch, 1999; Higgins, 1973). The counterweight is defined as a constituent in a 'focus position' resulting in the counterweight receiving focal emphasis (Akmajian, 1970; Higgins, 1973). The following sentences in (3) are examples of pseudoclefts.

(3) a. What he brought was a donkey (Higgins, 1973)

b. What they are is silly

c. What John is is important to himself

As argued by Akmajian (1970), pseudoclefts minimally consist of two types: predicational and specificational pseudoclefts. In predicational pseudoclefts (PPC) the counterweight denotes a property related to the referent of the subject, whereas in specificational pseudoclefts (SPC) the counterweight denotes a property of the subject directly. The example in (4a), from Den Dikken (2006), is ambiguous between a predicational and specificational reading.

(4) a. What John does not eat is food for the dog. (Den Dikken, 2006)

b. predicational: 'the things that John does not eat serve as food for the dog'

c. specificational: 'John does not eat (the following:) food for the dog'

The predicational interpretation is given in (4b), where the counterweight 'food for the dog' denotes a property of the referent of what the subject is not eating. For example, there is some food (e.g. leftovers from dinner) that John does not eat, that

can serve as food for the dog. The counterweight of the specificational interpretation ('food for the dog'), given in (4c), denotes a property of the subject 'What John does not eat' directly. For example, John does not eat food for the dog (e.g. food that was manufactured for dogs).

The contrast between PPCs and SPCs is not only limited to interpretational differences. Employing c-command tests show an observable structural distinction between the two types of pseudoclefts (Bachenko, 1976; Bošković, 1997; Den Dikken, 2006; Den Dikken et al., 2000; Heycock and Kroch, 1999; Higgins, 1973; Sharvit, 1999, and others). As we will see in the following sections, this structural difference is what leads to the unique properties of SPCs that have made them a focal point in theoretical linguistics. The following section will first provide an overview of the basic generalizations that differentiate the two pseudoclefts constructions. Then, it will highlight the properties of SPCs that have made them a contentious topic for linguists for the past half of a century, namely their connectivity properties.

2.1 The Connectivity Problem

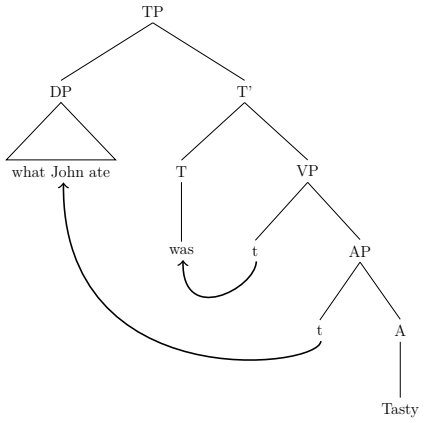
2.1.1 PPCs

This paper will mainly focus on SPCs and their unique properties. However, PPCs have been argued to have a comparatively straightforward syntax (Bošković, 1997). I follow Bošković (1997), in assuming PPCs consist of a wh-clause that is a free relative, and a predicate after the matrix verb. (5) is an example structure of a PPC from Van Luven (2018)[1].

(5) a. What John ate was tasty (Van Luven, 2018)

[1]However, any assumptions implied by this structure should have no implications for this paper. That is, other than the fact that I take the syntactic differentiation between PPCs and SPCs to be a given.

b.



2.1.2 SPCs

One major way that SPCs differ from PPCs, is that because of their structural differences, they display 'connectivity effects' between the wh-subject and the counterweight constituent (Bachenko, 1976; Bošković, 1997; Den Dikken, 2006; Den Dikken et al., 2000; Heycock and Kroch, 1999; Higgins, 1973, and others). Ross (1967) used the term 'connectivity effects' to describe the syntactic and semantic behaviour of moved phrasal elements that are seemingly connected to their base-generated positions. Ross (1972)[2] applied this term to SPCs where he proposed that the wh-phrase is connected to a gap in the counterweight clause. The term 'connectivity effect' has been used in the literature more broadly to describe the phenomena of a licensed element in a syntactic structure, which does not appear to be in the necessary c-command configuration that would license it (Bošković, 1997; Cecchetto, 2000; Den Dikken, 2006; Den Dikken et al., 2000; Heycock and Kroch, 1999; Jacobson, 1994; Ross, 1967, 1972; Schlenker, 2003; Sharvit, 1999, and many others). The connectivity effects of SPCs can be observed through these three main diagnostics: binding theory, bound variables, and negative polarity items (NPI). All of these diagnostics

[2]However, Higgins (1973) is mostly attributed to the idea of connectedness in pseudoclefts

are widely considered standard tests of c-command (6), where an element requiring licensing must be c-commanded by its licensing antecedent.

(6) (Reinhart, 1976)

C-command: Node A c(onsituent)-commands node B iff the branching node most immediately dominating A also dominates B.

The (simplified) binding principles proposed by Chomsky (1981) are given in (7). The examples in (8) showcase binding theory connectivity. The binding principles capture the distribution of licensing nominals via a structural relationship with their antecedent.

(7) (Chomsky, 1981)

a. *Principle A*: An anaphor must be bound in its binding domain.

b. *Principle B*: A pronoun must be free in its binding domain.

c. *Principle C*: An R-expression must be free.

In (8a), the SPC displays an anaphoric relationship between the reflexive and the pronoun, where the reflexive must be co-indexed with the pronoun. This is surprising considering principle A of binding theory, where an anaphor (in this case 'himself') must be bound within its binding domain. As Schlenker (2003) points out, if (8a) has a multi-clausal structure akin to the stipulative tree in (9) we would expect the necessary binding relationship for the anaphor to fail, because the antecedent is too deeply embedded within the wh-subject clause to establish a c-command relationship. When comparing (8a) to (8b), there seems to be the same distribution of referents in the simple single clause counterpart (8b).

(8) a. What he$_i$ is is a nuisance to himself$_{i/*j}$ (*Principle A*) (Sharvit, 1999)

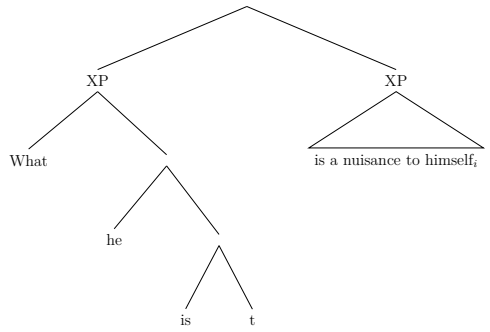
b. He$_i$ is a nuisance to himself$_i$

c. What he$_i$ is is a nuisance to him$_{*i/j}$ (*Principle B*)

d. What he$_i$ is is a nuisance to John$_{*i/j}$ (*Principle C*)

e. What he$_i$ is is happy that Mary likes John$_{*i/j}$ (*Principle C*)

(9)



The example in (8c) shows that having a bound pronoun in the counterweight of SPCs results in a principle B violation. Like (8a), this shows 'connectivity effects' because the antecedent within the wh-subject clause should be outside of the binding domain of the counterweight pronoun. In (8d), we see that an R-expression cannot refer to a nominal element within the wh-subject clause because this seemingly creates a Principle C violation. Similarly, in (8e), even if the verb 'likes' takes a subject ('Mary') a Principle C violation still occurs if the wh-subject co-refers to the R-expression in the counterweight. What the binding tests in (8) show, is that SPCs do not violate any of the binding principles. This shows that there are established anaphoric connections between the antecedents (in the wh-clause) and the anaphors (in the counterweight clause) that need to be accounted for due to a lack of c-command.

These connectivity effects are not only limited to anaphors but also bound variable pronouns as in (10) and negative polarity items (NPI) in (11). In the examples in (10), the pronoun 'his' acts as a bound variable and takes the interpretation of 'no student/no man' as if it were c-commanded by the quantified nominal. The

NPI in (11) is receiving licensing from an element that does not c-command it. In these examples, the NPI 'any', which requires a c-commanding negation element in this context (evidenced by the ungrammatical (11b)), gets licensed by the negation element ('didn't').

(10) a. what no student$_i$ enjoys is his$_i$ finals (Sharvit, 1999)

b. The woman no man$_i$ listens to are his$_i$ wife and his$_i$ mother-in-law

(11) a. What John didn't buy was any books (Sharvit, 1999)

b. * What John bought was any books

In summary, standard syntactic tests of c-command showcase that SPCs display connectivity effects. Through tests of Binding Theory (8), bound variables (10), and NPIs (11), we see co-referentiality between syntactic elements that lack an observable structural configuration required to establish co-reference. The results of the above tests have proven to be divisive, and have been interpreted in two main ways in the literature. On one side of the division, using Schlenker (2003)'s terminology, is the 'revisionists' (Cecchetto, 2000; Jacobson, 1994; Sharvit, 1999). For them, SPCs provide evidence to the idea that syntactic tests of c-command break down and thus connectivity should be analyzed via entirely different (semantic) grammatical principles (Sharvit, 1999). In contrast, 'conservatives' (again, Schlenker (2003)'s terminology) believe that our tests of c-command remain reliable (Bošković, 1997; Den Dikken, 2006; Den Dikken et al., 2000; Heycock & Kroch, 1999; Ross, 1972; Schlenker, 2003), therefore a syntactic account for the properties of SPCs must be established. SPC connectivity from a conservative perspective, is a case of mismatch between what gets interpreted at Logical Form(LF) and what is spelled out at the phonological interface (PF). In the following section, this paper will evaluate the proposals under the two

theoretical approaches, and finally argue that an ellipsis based account of SPCs is the most tenable position.

2.2 Revisionists

Sharvit's (1999) revisionist approach (which is built upon Jacobson (1994)) takes the labor of binding away from notions of c-command and redistributes it to quantificational semantic processes. Here, I provide an abridged version of Schlenker (2003) and Van Luven (2018)'s summaries of Sharvit (1999)'s proposal.

First, Sharvit (1999) makes an appeal to quantification over function to establish binding without c-command. Quantification over function is the use of quantifiers in minimally second-order logical systems to make statements about functions (Väänänen, 2001). For bound variables like the example in (12a), Sharvit (1999) equates a function f that is from an entity (a student) to a thing they like, to their finals (simplified representation from Schlenker (2003) in (12b))

(12) a. What no student$_i$ enjoys is his$_i$ finals

b. [ιf is a natural function & [no x: x a student]x enjoys f(x)]= [λx the finals of x]

Second, Sharvit (1999) references the idea that Principle C effects are the result of the preference for bound readings over accidental co-reference from Reinhart's binding theory (Reinhart, 1983). From this, Sharvit (1999) concludes that if (12b) can account for the binding in (12a), then Reinhart (1983)'s proposal of a competition mechanism can directly account for Principle C effects.

Third, Sharvit (1999) argues that reflexives are always identity functions, and that principle A effects are a morphological reaction due to semantic reflexivization. Principle B effects are derived in the same manner, as Sharvit (1999) argues that this

reflexivization process applies whenever possible. Lastly, Sharvit (1999) argues that NPIs only require downward-entailing contexts. Sharvit (1999) shows that the NPIs in SPCs are in fact in downward-entailment.

Sharvit (1999)'s account of SPCs exemplifies a particular shared assumption of revisionist approaches. Revisionists, like Sharvit (1999), claim that the structures of SPCs are as they appear. The relevant elements that display connectivity effects are receiving binding/licensing from semantic function. Thus to the revisionist, c-command is not involved in binding or licensing elements. Under this approach, any observations from any binding tests are epiphenomenal, and therefore do not provide evidence for structural configuration. Thus, challenging our core assumptions of syntactic theory, which would result in widespread effects for linguistic theory as a whole. The next section will cover conservative approaches, and posit the ellipsis account as a valid explanation. A result, that if correct, maintains the status of c-command in syntactic theory.

2.3 Conservatives

Within the conservative perspective, there are two main groups as to how to analyze the connectivity effects of SPCs, both sharing the theoretical underpinning that connectivity effects within SPCs are a structural phenomenon. The first is the reconstruction group (Bošković, 1997; Heycock & Kroch, 1999) and the second is the ellipsis group (Den Dikken et al., 2000; Schlenker, 2003). The prior believes that connectivity in SPCs is established via a covert reconstruction at LF, whereas the latter believes that there is a licensing element within the counterweight that is hidden due to ellipsis. This section will evaluate reconstruction arguments[3] against

[3]I will only cover Bošković (1997), however Heycock and Kroch (1999) have a similar proposal which uses iota reduction as opposed to covert movement.

ellipsis arguments. Afterwards, more broadly, I evaluate conservative approaches versus revisionist approaches.

2.4 Reconstruction

Bošković (1997) argues that in order to achieve connectivity in SPCs there must be a covert LF movement of the counterweight into the wh-clause. Bošković (1997) follows Chomsky (1986) and Lebeaux (1983) in that he assumes anaphors undergo head movement at LF. Consider the example in (13a), here the anaphor undergoes covert head movement into INFL at LF (13b).

(13) a. SS: John likes himself (Bošković, 1997)

b. LF: John himself$_i$ + INFL likes t_i

Following this idea, Bošković (1997) proposes that 'what' is a surface anaphor. Being a surface anaphor means it must have an antecedent and it must be replaced by its antecedent at some level of the representation (here, LF). The idea here, is that Bošković (1997) claims the counterweight is the antecedent of the surface anaphor, which would then allow the counterweight to covertly move into the chain headed by 'what'. The covert movement of the counterweight is what establishes the relevant binding relationships for connectivity (Bošković, 1997). Consider the examples in (14).

(14) a. What John$_i$ is is important to himself$_i$ (Bošković, 1997)

b. What John$_i$ saw in the mirror was himself$_i$

c. What everyone$_i$ proved was his$_i$ own theory

d. What John <u>didn't</u> buy was <u>any</u> pictures of fred

Under this proposal, the anaphors in (14a) and (14b) get c-commanded by their antecedent after the covert movement. The bound variable in (14c) gets c-commanded

by the quantifier at LF. Finally, the NPI in (14d) gets c-commanded by the negation at LF. Although reconstruction approaches manage to derive all of the necessary c-command relationships, as Schlenker (2003) and others point out, there is a major issue with reconstruction in SPCs. The issue is that the covert movement required for SPC connectivity requires movement to a non-c-commanding position in the structure. In proposing a structural account for SPCs, reconstruction hypotheses violate a foundational syntactic constraint of movement. This major violation therefore makes reconstruction based accounts undesirable, or potentially untenable, unless we revise a major part of our syntactic assumptions. However, as briefly mentioned earlier, the conservative perspective is not limited to construction-based accounts in the literature. Another prevalent, and arguably more tenable position is the ellipsis or deletion-based approaches to SPC connectivity (Den Dikken, 2006; Den Dikken et al., 2000; Schlenker, 2003, and others). Here I will evaluate the basic arguments of Den Dikken et al. (2000)'s ellipsis-based approach to SPCs, and show that it is a more tenable position than the previously outlined proposal. Note, however, that there are many other ellipsis-based accounts for SPC connectivity in the literature[4].

2.5 Ellipsis

Den Dikken et al. (2000) follows Drubig (1997) and Hankamer (1974) in that they analyze canonical SPCs (for example the SPCs in (14))[5] as topic-comment constructions. The wh-clause is the 'topic', and the counterweight is the 'comment'. They analyze the comment as a fully-fledged IP in the complement of a Topic-head. In

[4]See for example, (Den Dikken, 2006; Emonds, 1970; Schlenker, 2003), and others

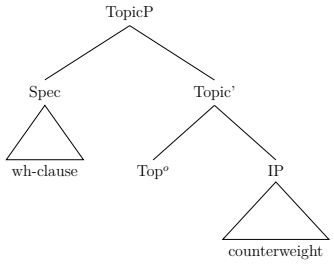
[5]Den Dikken et al. (2000) make a distinction between canonical SPCs and so-called reversed SPCs (RSPCs). They argue that RSPCs are syntactically unrelated structures. To Den Dikken et al. (2000) RSPCs (Type B SPCs, using their terminology) are argued to only show a subset of the connectivity effects of SPCs. The distinction is beyond the scope of this paper. However, see Schlenker (2003) for relevant criticisms of this approach.

their proposal, the wh-clause is an interrogative clause generated in the specifier of Topic, and the copula is realized in the head of Topic (15).

(15) (Den Dikken et al., 2000)

a. $[_{TopP}\ [_{CP}$ what John is $t][_{Top'}$ is $[_{Top^o}[_{IP}$ angry with himself]]]

b.



In order to establish the connectivity effects of SPC, they propose that the element requiring licensing in the counterweight gets bound by an elided element in the fully-fledged IP. Therefore the LF representation for (15a) is represented in (16a).

(16) (Den Dikken et al., 2000)

a. $[_{TopP}\ [_{CP}$ what John is $t][_{Top'}$ is $[_{Top^o}[_{IP}$ ~~John is~~ angry with himself]]]

b. $[_{TopP}\ [_{CP}$ what John didn't buy $t][_{Top'}\ [_{Top^o}$ was$][_{IP}$ ~~John didn't buy~~ any wine]]]

c. $[_{TopP}\ [_{CP}$ what no student enjoys $t][_{Top'}\ [_{Top^o}$ is $][_{IP}$ ~~no student enjoys~~ his finals]]]

In (16a), the reflexive anaphor 'himself' gets bound by the R-expression 'John' in the specifier of IP in the counterweight clause. Thus, it obviates the principle A violations without stipulating any covert movement at LF. The 'missing' material can be optionally elided under the condition that it parallels a constituent in the wh-clause. (16b) and (16c) show that this also applies for NPI licensing (16b) and bound

variable (16c) constructions. Den Dikken et al. (2000) motivate this proposal based on an observation first made by Higgins (1973). Higgins (1973) observes that SPCs are essentially question-answer-pairs(QAP). The topic-comment structure of SPCs aligns with QAPs in the sense that the restrictions on elided material match between SPCs and QAPs. Only material parallel to the material in the wh-clause can be elided under standard assumptions of parallelism. (17a) shows an ellipsis violation on grounds of parallelism. The same pattern holds with possible answers for questions, as in (17b).

(17) a. * What John is is ~~John is angry with~~ himself

b. * Question: What is John? Answer: ~~John is angry with~~ himself

Ellipsis approaches establish the relevant binding of elements in SPCs without revising any of our underlying assumptions about c-command and binding. Unlike ellipsis approaches, reconstruction approaches would require revisions to foundational syntactic constraints of movement. Revisionist approaches would require the widest re-conception of our theories of language, redistributing the labor of binding to a purely semantic process. However, it is not clear that any theory presented here constitutes an argument of parsimony over another. Although, Schlenker (2003) who credits Sportiche (in p.c), points to examples from Ross (1972) (18), as a strong conceptual argument against any theory which does not posit that SPCs are QAPs.

(18) a. What I did then was call the grocer (Ross, 1972)

b. What I did then was I called the grocer

Schlenker (2003) points out the fact that for a given SPC (18a), there is a counterpart construction (18b) that incorporates what would be the elided material. This must be explained by any given theory. Any theory that does not posit QAP would

first have to explain the existence of (18a), then the existence of (18b) independently. Whatever the mechanism is, that results in the (b) construction, would have to account for the fact that the counterweight is a fully projected clause in these examples. Since the independent proposal for (a) must be different from (b), if you do not postulate QAP, a theory without QAP is necessarily more redundant. This is because a QAP proposal with ellipsis accounts for (b) and (a) simultaneously. Therefore, the ellipsis account has not only empirical coverage but also conceptual reasoning as to why it may be the most compelling account of SPC data. This argument is strengthened when considered alongside evidence of ellipsis in SPCs from Hirsch (2017).

2.6 Criticial Evidence For Ellipsis: Hirsch (2017)

In Hirsch (2017)'s work on cross-categorical operators, Hirsch provides compelling new evidence for ellipsis in SPCs. The first part of the argumentation starts with the goal of distinguishing the counterweight in SPCs as fully fledged TPs as opposed to smaller DP structures. Hirsch (2017) shows that certain adverbs (i.e. with difficulty adverbials) can adjoin to the clausal spine but not to DPs. The important observation here is that if these same adverbials can be hosted in the counterweight of SPCs. This strongly suggests that the post-copular constituent is a larger structure, containing a 'hidden clausal structure' (Hirsch, 2017).

(19) -with difficulty adverbials (Hirsch, 2017)

a. with difficulty, John Flew off to Paris

b. John, with difficulty, flew off to Paris

c. *John flew off to, with difficulty, Paris

d. John flew off to Paris, with difficulty

(20) structures for (19a,19b,19d) (Hirsch, 2017)

a. [TP [PP with difficulty][TP John flew off to Paris]]= structure for (a)

b. [John$_i$ [vP [PP with difficulty][vP t$_i$ flew off to Paris]]]= structure for b

c. [TP [TP John flew off to Paris][PP with difficulty]=structure for d

(19c) is ungrammatical because if the PP adjoined to the clausal spine, the [DP Paris] would need to move above the PP. However, such a movement would strand the preposition 'to', causing the derivation to crash (21).

(21) * [TP [TP [TP John flew off [PP to t$_i$]][PP with difficulty]][DP Paris]$_1$]]

Hirsch (2017) points out that it is a possibility for the PP 'with difficulty' to adjoin directly to the DP 'Paris'. That DP + PP structure could then remain in situ, thus allowing for the counterweight to be a DP structure. Importantly, however, since (19c) is an ungrammatical utterance, this possibility gets independently ruled out. Thus, the structure in (22) is not possible. Hirsch (2017) concludes that since (22) is illicit, 'with difficulty' cannot integrate as an adjunct into DP structures. The impossibility of 'with difficulty' to adjoin to the DP structure leads to the following generalization in (23).

(22) * [TP John flew off [PP to [DP [PP with difficulty][DP Paris]]]]

(23) Hirsch (2017)'s Generalization:

a. the PP 'with difficulty' can adjoin on the clausal spine, but not to DPs.

Therefore, if this PP can occur at a given site in a SPC, it must be the case that there is a clausal structure at that site to host the PP (Hirsch, 2017). The example in (24) shows that in 'with difficulty' can occur within SPCs. Hirsch (2017) notes that 'and' must scope within the counterweight constituent based on the semantic entailment resulting in the interpretation in (25b) and not (25a).

(24) What Obama approved was this bill and, with difficulty, that bill (Hirsch, 2017)

(25) entailments of (24):

a. → Obama approved this bill with difficulty

b. → Obama approved that bill with difficulty

Following the proposal so far, the PP 'with difficulty' that cannot adjoin to DPs can be attached within the counterweight of SPCs, thus providing evidence that the counterweight is a full clausal structure.

Hirsch (2017) appeals to VP-ellipsis next to add further evidence that counterweights are TPs and not DPs. Hirsch (2017) argues that showing that a VP is present in the counterweight clause which licenses the ellipsis of another VP, is evidence that the counterweight is a fully realized TP. Consider Hirsch (2017)'s proposed structure in (26).

(26) TP Analysis: (Hirsch, 2017)

a. [TP [DP What Obama approved][VP was [TP Obama$_1$ [&P [vP t$_1$ approved this bill][and [t$_1$ [VP approved that bill]]]]]]]

If the second VP conjunct can license the ellipsis of the third VP, while the first VP cannot, then there is evidence of ellipsis in the lower clause which is only possible under the assumption that it is a fully expanded clause. Note, that if the possibility of a construction like (26) is correct, it makes the empirical coverage of Schlenker (2003)'s conceptual argument, from (18), even more compelling - it shows that the clausal structure of SPCs can possess ellipsis. Hirsch (2017) provides the examples in (27)[6] (adverbial clause structure in (27b)) to show that this is the case.

[6] Δ represents elided material

(27) (Hirsch, 2017)

a. What Obama approved was this bill and, though he would rather not have Δ, that bill

b. [CP though [TP he would rather not have ~~[VP approved that bill]~~ Δ]]

Hirsch (2017) postulates that the pre-copular VP could act as an antecedent and license the lower ellipsis. He argues that the structure of the pre-copular free relative is as in (28). The VP begins the derivation as 'approved what' and after wh-movement it becomes 'approved *t*'. Hirsch (2017) appeals to the parallelism constraint in (29) to show that 'approved *t*' is not parallel to the elided material. Thus, it can not serve as an antecedent.

(28) [DP …[CP what$_1$ [TP Obama [VP approved t$_1$]]] (Hirsch, 2017)

(29) **Parallelism Condition** Hirsch (2017)

a. VP$_e$ can elide if VP$_e$ is reflexively dominated by a constituent PD (= Parallelism domain) and the linguistic context provides an antecedent AC (antecedent constituent for PD which is semantically identical to PD, modulo focused marked constituents)

b. PD is semantically identical to AC modulo focus if there is a focus alternative to PD, PD$_{Alt}$, such that for every world w and assignment function g, $[\![PD_{Alt}]\!]^{w,g} = [\![AC]\!]^{w,g}$

Following the constraint in (29), and assuming that the pre-copular VP is the antecedent, where Δ (the elided material) is equal to the Parallelism domain (PD), Hirsch (2017) argues that the antecedent constituent (AC) is an assignment-dependent variable. Therefore, equivalency only holds under a variable assignment of g such that g(1) = 'that bill'. Since other variable assignments are possible for g, parallelism does

not hold. It then follows that the pre-copular VP cannot be the antecedent which licenses the ellipsis[7]

In sum, Hirsch (2017)'s provides two compounding arguments to suggest that SPCs should be analyzed as ellipsis structures. First, through showing that the PP 'with difficulty' can only attach to a clausal spine and that SPCs can take this PP in their counterweight. Using the observation that the PP must attach to the clausal spine and that SPCs can take PPs in their counterweight, Hirsch (2017) shows that the counterweight is made up of an additional clausal structure (a TP in this case). This alone does not present a problem for proposals that stipulate that the structure of SPCs should be analyzed as is, corresponding to their overt PF realizations. However, in conjunction with the ellipsis data, the 'with difficulty' adverbial data presents problems for the revisionist approaches. If we take parallelism constraints seriously, such a theory must now account for the following: i) a fully realized TP structure in the counterweight position that potentially includes the relevant clausal elements for parallelism, and ii) the existence of elided VP material post conjunction ('and'), which cannot establish parallelism with any potential antecedent in the pre-copular clause. Quantification over function accounts must now reconcile the fact that VP-ellipsis is possible in SPC constructions, where parallelism, the prerequisite to establish ellipsis at PF, is only possible with elements that exist in a 'hidden' clausal structure.

Naturally, there are three main reason to pursue an ellipsis account for SPC constructions. First, an ellipsis account provides adequate theoretical coverage for the range of data without requiring foundational revisions to our understanding of the grammar of language. Second, Ross (1972)'s examples (see (18)) and Schlenker (2003)'s conceptual argument place the burden of proof on any theory that does not

[7]Hirsch (2017) appeals to a 'conjunction reduction' syntax in order to rid the overt presence of the post-copular VP at PF. However, such distinctions go beyond this paper.

analyze SPCs as QAPs. Third, Hirsch (2017)'s analysis of the structure and the existence of VP-ellipsis in SPCs, provides a compelling motivation to pursue ellipsis based approaches over revisionist approaches. If the ellipsis proposal is on track and ellipsis has a predictable processing profile, we should observe the same profile for processing of SPCs in an experimental setting. Thus, pseudoclefts present an ideal candidate for the investigation of ellipsis processing. I argue that observing processing correlates for ellipsis in SPCs is possible, and evidence of such would provide future research with a new paradigm for investigating ellipsis processing.

2.7 Processing of Ellipsis

Ellipsis processing has been a topic of interest in the language processing literature for a long time (see Frazier and Clifton (2005) for relevant discussions). In order to leverage the pseudocleft paradigm to establish an ellipsis processing profile, there needs to be a sufficient contrasting environment that allows for an informative comparison. If SPCs consist of ellipsis structures, we hypothesize that there should be some associated cost with ellipsis relative to a non-ellipsis syntactic structure. The following section will summarize Phillips and Parker (2014)'s overview of the existing literature on ellipsis processing in order to showcase how the pseudocleft paradigm can serve to aid in the exploration of understanding ellipsis processing.

2.7.1 Phillips and Parker (2014)

Phillips and Parker (2014) provide an in-depth review of the psycholinguistic literature that has utilized experimental methodologies to investigate ellipsis processing. Phillips and Parker (2014) highlights that research in the domain of ellipsis has led to three main theoretical alternatives to address what they refer to as "ellipsis resolution". The term ellipsis resolution comes from the observation that ellipsis is

anaphoric. The resolution must occur as a 'recovery of memory' (Phillips & Parker, 2014), that is dependent on the antecedent. This recovery is constrained via parallelism, as we have seen defined in Hirsch (2017)'s proposal in (29). The parallelism constraint is often stated as the identity constraint. Phillips and Parker (2014) point out that the formulation of the identity constraint is a highly debated topic in the literature. There are two main theoretical camps, the first is the 'syntactic identity' camp and the second is the 'semantic identity' camp. The syntactic identity camp argues that the identity constraint is a syntactic constraint that gets formalized over syntactic structures. Whereas, the semantic identity camp argues that the identity constraint is a semantic constraint that gets formalized over semantic representations. Phillips and Parker (2014) argue that the main contention between these theoretical camps is that a syntactic position under-generates the identity constraint, whereas a semantic position over-generates.

To showcase these positions, Phillips and Parker (2014) cite the classic argument for the syntactic identity camp from Sag (1976) and Williams (1977), and provide the datapoints in (30) from Kehler (2000). The argument is that a voice mismatch causes the ellipsis site to be ungrammatical, as in the examples in (30).

(30) (Kehler, 2000)

a. John looked into this problem and Bill did ~~look into this problem~~ too

b. *This problem was looked into by John, and Bill did ~~look into this problem~~ too

The data in (30) argues for the syntactic identity camp because generally in semantic theory passive and active forms are considered to be semantically equivalent (Phillips & Parker, 2014). However, the data in (30) shows that the passive form of the verb does not license the ellipsis site. Therefore, if ellipsis is sensitive to a

syntactic distinction, it must be realized over syntactic structures. However, Phillips and Parker (2014) reference the semantic identity camps counter examples in (31), from Kehler (2000). The data in (31) shows that the ellipsis site is licensed even when there is a mismatch in voice.

(31) (Kehler, 2000)

a. This problem was to have been looked into, but obviously no one did ~~look into this problem~~

The strict syntactic identity approach under-generates and cannot account for the data in (31), and the strict semantic identity approach over-generates and cannot account for the data in (30). The contention between these two positions has resulted in a third hybrid analysis that attempts to reconcile the two positions. The hybrid analysis argues that the identity constraint is a combination of both syntactic and semantic constraints (Kehler, 2000). The hybrid analysis uses discourse relations to relate the two clauses in a way that allows for the identity constraint to be satisfied. While this thesis does not take a position on the identity constraint, instead, this thesis is concerned with motivating pseudoclefts as a viable paradigm of investigation for ellipsis processing. However, it is important to note that the identity constraint is a crucial component of the theoretical debate and one of many motivational forces that drive ellipsis processing research.

Phillips and Parker (2014) summarize another contention in the literature that psycholinguistic experiments target. This contention exists within the syntactic identity account and concerns whether there is syntactic structure at the ellipsis site (null copy account) or if there is a pointer element that results in the anaphoric relation (pointer account). Again, this thesis does not rest upon either assumption. However, as Phillips and Parker (2014) point out, processing research often tries to disambiguate

the proposals by pursuing the idea that if the null copy account is correct, then ellipsis processing time should be sensitive to the syntactic complexity of the antecedent. In contrast, if the pointer account is correct, then ellipsis processing time should remain insensitive to the syntactic complexity of the antecedent. This brief summary of the theoretical landscape brings us to Phillips and Parker (2014)'s classification of the types of experimental ellipsis processing studies in the literature. Phillips and Parker (2014) categorize these studies into three main types: mismatching antecedent studies, accessing antecedent information studies, and syntactic complexity studies.

Mismatching antecedent studies have investigated the processing of ellipsis constructions where there is a mismatch between the antecedent and the ellipsis site. Phillips and Parker (2014) review studies by Arregui et al. (2006) and Kim et al. (2011) which utilize acceptability rating measure methods. Phillips and Parker (2014) conclude that these studies show that there is a "cline of acceptability", where acceptability degrades as the mismatch between the antecedent and the ellipsis site increases. This acceptability cline has been used to further argue against semantic identity proposals, as there is an effect of the syntactic antecedent on the ellipsis processing.

Accessing antecedent information studies have investigated what antecedent information is accessed during ellipsis processing. Phillips and Parker (2014) reviewed cross modal lexical decision studies by Shapiro and Hestvik (1995) and Shapiro et al. (2003), a self-paced reading experiment by Yoshida et al. (2012), event-related brain potential (ERP) studies by Kaan et al. (2004) and Martin et al. (2012), speed-accuracy trade off experiments by Martin and McElree (2008, 2009, 2011), and a visual fixation experiment by Snider and Runner (2011). Phillips and Parker (2014) argue that these studies provide evidence that antecedent information is accessed rapidly during processing. However, these studies fall short in answering any questions about the

nature of the null copy account versus the pointer account of ellipsis.

The syntactic complexity manipulation studies investigate if the size of the ellipsis antecedent impacts the processing time at the ellipsis site. Phillips and Parker (2014) reviewed studies by Frazier and Clifton (2000, 2001), Martin and McElree (2008, 2009, 2011), and Murphy (1985). Phillips and Parker (2014) argue that these studies show that the antecedent size does not impact the processing time at the ellipsis site. This result is consistent with the pointer account of ellipsis. However, Phillips and Parker (2014) argue that the results are not conclusive and that further research is needed.

Phillips and Parker (2014)'s overview of the psycholinguistic literature provides insight into some of the major motivations surrounding ellipsis processing research. It is in light of this body of research that I propose that the pseudocleft paradigm can serve as a useful tool to investigate the processing of ellipsis. The pseudocleft paradigm provides a contrasting environment that allows for an informative comparison between ellipsis and non-ellipsis structures. In the next section I will showcase, using Kaan et al. (2004)'s study on ellipsis ERPs as an example, how the pseudocleft paradigm naturally fits into the experimental designs of ellipsis processing research. Following this, I will motivate an experimental design using self-pace reading to contrast the processing profiles of PPC and SPC sentences in search of ellipsis processing correlates. Finally, I will present the results of the experiment and discuss their implications.

2.7.2 Kaan et al. (2004)

In a study investigating the resolution of elided verbs in VP-ellipsis strucutres, Kaan et al. (2004) recorded the ERPs of participants reading verb gapped constructions. They manipulated the plausibility of the critical word following the elided verb.

In (32), 'took the hammer' is more plausible than 'sanded the hammer'.

(32) Ron took/#sanded the planks, and Bill Δ the hammer (Kaan et al., 2004)

For the implausible conditions they report first an N400 response at the critical word ('hammer'). Following Brown and Hagoort (1993), they argue that this N400 response reflects integration difficulty, and thus is evidence that the elided material is processed at or before the noun. The second finding for the implausible condition was that the N400 response was followed by a P600 response at the noun. Kaan et al. (2004) analyze this P600 response in tandem with the N400 response. Their analysis is that it reflects that the participant attempts to integrate the critical noun with the elided verb material. The semantic implausibility leads to the integration difficulty.

What is of more interest to the current hypothesis, is their comparison between a control ERP without an elided verb and the plausible ellipsis condition. For the plausible condition they did not find the same N400 + P600 profile of the implausible condition. Instead, the plausible condition resulted in a negativity response between 100ms and 300ms at the determiner position following the ellipsis site. The non-ellipsis ERP was recorded by averaging 200 post verbal-determiners in non-ellipsis sentences (Kaan et al., 2004). Their results show that determiners following non-gapped sites do not produce a negativity response. This suggests that ellipsis has a predictable ERP component associated with determiner positions. The reason for this predictability is, as Kaan et al. (2004) points out, because the determiner site is the first possible position where the parser can recognize there is elided material. Therefore, making determiner sites, or other recognizable positions that are the first identifiers of ellipsis, a strong potential for observing ERPs related to ellipsis. This idea is further corroborated by their followup study Kaan et al. (2013), where they showed ERP effects at determiner sites in Dutch. Since ERPs are observable for

ellipsis, if SPC construction possess ellipsis they should be a viable candidate for investigation because any instance of ellipsis should be reflected by ellipsis related ERPs. In the next section I will further elaborate on how such SPC constructions, with various types of binding relationships, lend themselves to experimental investigation.

2.7.3 SPCs With Determiners

SPCs have the structural configuration that would allow us to investigate them for ERP correlates of ellipsis. As we have seen there exist a variety of SPC that showcase connectivity effects. Namely, we have seen connectivity effects for Binding Theory, bound variables, and NPI SPC examples. Here I will show that each of these conditions lend themselves to a configuration where potentially elided material precedes a determiner. The proposal builds on the assumption that elided material proceeding a determiner position does in fact produce reliable ERP components in EEG recordings. Therefore, we should be able to identify a similar ERP response profile in SPCs if the ellipsis account is on track. Consider the principle A SPC examples in (33-35) and their LF representations in (b).

(33) a. What he is is a nuisance to himself

b. *LF:* What he is is ~~he is~~ a nuisance to himself

(34) a. What Verena is is the kindest person to herself

b. *LF:* What Verena is is ~~Verena is~~ the kindest person to herself

(35) a. What Mona is is an appreciator of herself

b. *LF:* What Mona is is ~~Mona is~~ an appreciator of herself

The examples in (31-33), under an ellipsis proposal, all possess elided material preceding a determiner position. In these examples the proposed elided material is

given in the (b) LF representations, where the subject and verb is elided proceeding a noun. Principle A SPC examples, therefore, lend themselves nicely to a paradigm of ellipsis proceeding a determiner. However, bound variable examples like we seen in (10) (repeated below in (36)), do not naturally fit into the mold we are after. Although, we can reconcile this issue by embedding the bound variable pronoun into a DP in the counterweight, as in (37 - 39).

(36) what no student$_i$ enjoys is his$_i$ finals (Sharvit, 1999)

(37) a. What no boy enjoys is the work of his father

b. *LF:* What no boy enjoys is ~~no boy enjoys~~ the work of his father

(38) a. what any man loves is the sound of his own voice

b. *LF:* what any man loves is ~~any man loves~~ the sound of his voice

(39) a. what any cat admires is the sound of her own meow

b. *LF:* what any cat admires is ~~any cat admires~~ the sound of her own meow

In (37 - 39), by embedding the bound variable within in the DP, it allows for the ellipsis to precede a determiner. We now have a configuration for both the only positive condition for the binding theory examples, and the bound variable examples. Some NPIs are quantifiers that exists in complementary distribution with determiners. Arguably, these NPI should indicate the the ellipsis site in the same fashion as determiners, as a result of occupying the same clausal position. NPI's examples like (40) also naturally lend themselves to the configuration we are after.

(40) a. What he doesn't have is any money

b. *LF:* What he doesn't have is ~~he doesn't have~~ any money

The SPC examples in (33 - 40) showcase that SPCs have the necessary structural configuration required to compare them to reported ellipsis ERP profiles (Kaan et al.,

2004). If the ellipsis account of SPC connectivity effects is on track, SPCs should be a viable candidate for observing a similar ERP profile for SPCs in EEG recordings. This section has showed that the SPC paradigm can be applied to experimental processing tasks, in this case EEG tasks, which highlights the versatility of the paradigm in the investigation of ellipsis. In the next section I will explicate an experimental design for a self-paced reading experiment that will contrast the processing profiles of SPCs and PPCs. Following this, I will present the results of the experiment and discuss their implications.

3 Experiment Design

Contrasting the processing profiles of PPC and SPC pseudocleft sentences in order to investigate for ellipsis processing correlates in SPCs requires a carefully designed experimental setup that enables meaningful and accurate comparisons. The main challenge, however, is that pseudoclefts are often ambiguous between the predicational and specificational interpretations. To effectively contrast the processing profiles of these pseudocleft types, we need a distinct property that enables a clear and meaningful comparison between them. Pseudoclefts, both PPC and SPC, have a number of reported distinguishing properties in the literature. Table 1 from Van Luven (2018), shown below, summarizes some of the main distinguishing properties. The following section will explore which distinguishing properties from Van Luven (2018)'s summary[8], as well as some additional properties not included in their summary, can be utilized to make appropriate comparisons for the processing profiles of pseudocleft types.

Table 1

Van Luven (2018)

	Predicational PC	Specificational PC
Reversible	×	✓
Connectivity	×	✓
Relationship to QAPs	×	✓
Pause/List Intonation	×	✓
Referential Counterweight	×	✓
Copular Restrictions	×	✓
Subject-Aux Inversion	✓	×
Raising	✓	×

[8]QAP, list intonation, and Subject-Aux inversion will not be covered here as they have no obvious connection to the type of stimuli design required.

3.1 Reversibility

SPCs are distinguishable from PPCs through their ability to be reversed (Bošković, 1997; Collins, 2002; Declerck, 1988; Den Dikken, 2006; Den Dikken et al., 2000; Heycock & Kroch, 1999; Moro, 1997; Van Luven, 2018). In the SPC in (41), both the canonical order and the inverse are licit. For the PPC in (42), the inverse of the pseudocleft produces an ungrammatical sentence.

(41) a. What John$_i$ is is important to himself$_i$ (Den Dikken et al., 2000)

b. Important to himself$_i$ is what John$_i$ is

(42) a. What John is is important to him

b. *Important to him is what John is

The property of reversibility is inadequate for designing a testing environment to contrast SPC and PPC processing. The problem lies in the fact that while PPC sentences are not reversible, SPC sentences in their canonical form still exhibit ambiguity, allowing for both SPC and PPC interpretations. Furthermore, comparing inverse SPC sentences to PPC sentences would introduce too many confounding variables due to differences in their word order.

3.2 Connectivity

As discussed in section 2.1.2, connectivity disambiguates SPCs from PPCs (Bachenko, 1976; Bošković, 1997; Den Dikken, 2006; Den Dikken et al., 2000; Heycock and Kroch, 1999; Higgins, 1973; Van Luven, 2018, and others). Recall that in (41a), the presence of a reflexive anaphor rules out the possibility of a PPC interpretation due to a Principle A violation. Similarly, in (42a), the presence of the pronoun rules out an SPC interpretation due to a Principle B violation. Connectivity could potentially serve as a distinguishing property for designing the experimental stimuli. However,

using connectivity as the distinguishing feature is not without challenges. The main issue is accounting for the processing differences between anaphors and pronouns. Specifically, the parser does not disambiguate between a PPC and SPC interpretation until it encounters either the anaphor or the pronoun. Any inherent difference in word lengths, coupled with any potential processing differences between anaphors and pronouns, would be realized at the critical region of analysis. Therefore, these significant differences could potentially render any inferences about online processing as unreliable.

3.3 Referential counterweight

Van Luven (2018), following Declerck (1988), points out that the referentiality of counterweights in SPCs, and the lack thereof in PPC counterweights, has implications for distinguishing pseudoclefts. If a definite counterweight cannot be construed as a function from individuals to truth values, and must instead be treated as a semantic entity, we can derive strict SPC interpretations by leveraging definiteness, as illustrated in (43).

(43) a. What Fiona forgot was the cake (SPC / *PPC) (Declerck, 1988)

b. What Fiona forgot was a cake (SPC / PPC)

There is two issues with referentiality that rule it out as a candidate for the experimental design. The first is that a definite can be construed as a function from individuals to truth values (Declerck, 1988; Van Luven, 2018), as in (44). Secondly, the indefinite pseudocleft remains ambiguous between a SPC and PPC interpretation. Therefore, referentiality alone does not possess the capacity to ensure SPC versus PPC processing.

(44) What John bought is the bomb (Van Luven, 2018)

a. PPC: John bought an audi and the audi is the bomb

b. SPC: John literally bought the bomb

3.4 Copular Restrictions

Another distinguishing property of pseudoclefts is that SPCs have more restrictions related to their copula than PPCs (Bošković, 1997; Den Dikken, 2006; Den Dikken et al., 2000; Van Luven, 2018, and others). One restriction is that SPCs cannot convey negation of the predicate, only a contrastive interpretation (Bošković, 1997; Declerck, 1988; Den Dikken et al., 2000; Higgins, 1973; Van Luven, 2018). However, these examples for the purposes of stimuli design have a complex meaning that would not lend itself to the experimental design required. Furthermore, there is no clear way to restrict the interpretation into a strict SPC reading using this distinction. For example, in (45) the sentence cannot mean that "John isn't proud of himself", rather it means the reference of "what john is" cannot be proud but rather must be something else like disgusted with himself. However, the property that is restricting this sentence from being a PPC is the reflexive anaphor which would produce a Principle A violation in a PPC context, not the negation of the predicate property.

(45) #What John is <u>isn't</u> proud of himself (SPC / *PPC) (Den Dikken, 2006)

One copular restriction that on the surface looks promising as a potential distinguishing property is that SPC copulas must show tense harmony with the WH-clause (Akmajian, 1970; Bošković, 1997; Den Dikken, 2006; Den Dikken et al., 2000; Higgins, 1973; Van Luven, 2018). In (46a), when the copula is not in tense harmony with the WH-clause the SPC interpretation is illicit. However, in (46b) when there is tense harmony both SPC and PPC interpretations are possible.

(46) a. What John used to be is very rude (*SPC / PPC) (Higgins, 1973)

b. What John used to be was very rude (SPC / PPC)

The first problem here is that, again, there is no way to purely restrict the ambiguity in both directions. Tense harmony allows us to derive strictly PPC interpretations, but not strictly SPC interpretations. The second issue, one that Higgins (1973)'s points out, is that the tense harmony distinction may not be as reliable as it seems. The problem is that the past tense forms of modal verbs can serve as present tense with respect to the tense harmony restriction. For example, in (47) Higgins (1973)'s shows that specificational interpretations are viable in both configurations.

(47) a. What John couldn't afford is a Mercedes (SPC / PPC) (Higgins, 1973)

b. What John couldn't afford was a Mercedes (SPC / PPC)

Thus far, we have examined several distinguishing properties, with connectivity emerging as the most compelling, that show promise for designing an experiment to compare the processing profiles of SPC and PPC sentences. It is conceivable that these properties could be combined to create a stimulus set that effectively contrasts SPC and PPC processing. However, I will introduce two additional distinguishing properties from the literature that, I argue, can achieve the same goal in a more straightforward manner. Following this, I will provide a rationale for the final stimulus design.

3.5 How and Whether

Hankamer (1974) demonstrates that SPCs, which he refers to as WH-clefting constructions, can utilize how and whether in their counterweight while PPCs cannot. Hankamer (1974) argues that PPCs, which he calls headless relatives (HR), "cannot take certain types of predicates, because they do not occur in ordinary predicational sentences" (Hankamer, 1974), and that these can occur is SPCs. Hankamer

(1974)'s claim is that sentences containing how and whether as their focus constituent must then be unambiguously SPC. He uses the examples in (48) to argue that how and whether pseudoclefts are unambiguously SPCs, since (48b) shows that how- and whether- are not possible ordinary predicates.

(48) a. What I don't understand is how clefts work (SPC / *PPC) (Hankamer, 1974)

b. *This procedure is how clefts work

If predicational sentences cannot accommodate "how" and "whether" constructions, it may be feasible to derive strict SPC readings within a pseudocleft processing stimuli setup. These constructions could be contrasted with the various distinguishing properties that yield strict PPC readings. However, similar to the connectivity issue, the absence of a minimal pair could introduce processing confounds, complicating accurate inferences. The final distinguishing property I will discuss will enable the differentiation between SPC and PPC with the use of a minimal pair.

3.6 Predicative Adjectives and Way/Manner Adverbs

Pseudoclefts with way or manner adverbs in the counterweight clause are unambiguously interpreted with a specificational reading (Bolinger, 1972; Den Dikken, 2006). In (49a), the presence of the adverb in the counterweight clause disallows a predicational interpretation. Similarly, in (49b), the presence of the adjective in the counterweight clause disallows a specificational interpretation.

(49) a. The way he spoke to me was flatteringly (SPC / *PPC) (Bolinger, 1972)

b. The way he spoke to me was flattering (*SPC / PPC)

The interpretation for (49a) is that the speaker was flatteringly spoken to, while the interpretation for (49b) is that the manner of speaking that the speaker happened

to be utilizing, such as an encouraging tone for example, was flattering. The former interpretation for (49a) is relative to the subject directly, the way he spoke. While the latter interpretation for (49b), is relative to a referent of the subject, not the subject directly. When the adverb is present in the counterweight clause, only a specificational interpretation that references the subject directly is possible. Contrastively, when the adjective is present in the counterweight clause, only a predicational interpretation that references the referent of the subject is possible. This property is a strong candidate for the experimental design as it provides a clear minimal pair that can be used to contrast the processing profiles of SPC and PPC sentences. The processing differences between adjectives and adverbs are a similar issue to the processing differences between anaphors and pronouns in the connectivity examples. However, the difference in word length between adjectives and adverbs is less pronounced than the difference between anaphors and pronouns. Therefore, the potential processing differences between adjectives and adverbs are less likely to introduce confounds in the critical region of analysis.

In summary, the property of predicative adjectives and way/manner adverbs is the most promising distinguishing property for designing an experiment to contrast the processing profiles of SPC and PPC sentences. This property provides a clear minimal pair that can be used to derive strict SPC and PPC interpretations. However, there are additional considerations that must be taken into account when designing the final stimulus set. The following section will provide a rationale for the final stimulus design.

3.7 Stimuli Design

The final stimulus design will consist of a set of SPC and PPC pseudocleft sentences that differ in whether they contain a predicative adjective or an adverb. When

the parser encounters a predicative adjective in the counterweight clause, it should derive a PPC interpretation. Likewise, when the parser encounters an adverb it should derive the SPC interpretation. If the theoretical analysis of SPCs as instances of ellipsis is correct, then differences in processing should correspond to ellipsis correlates. However, there remains two issues with the current design. The first, is that the parser cannot disambiguate between an SPC and PPC interpretation until they reach the sentence final position. Therefore, there will need to be a spillover region at the end of each stimuli sentence in order capture the processing difference. The second issue is that there is no way to ensure that the processing difference is a reflection of the difference in processing SPC versus PPC, and not a reflection of surprisal. If the parser prefers either PPC or SPC as the more canonical pseudocleft, then the processing difference could be due to surprisal. In order to account for these issues the stimuli will be designed such that it contains a 'but' conjunction that conjoins two pseudoclefts, and a prepositional phrase will be added to the end of the conjunction to function as a spillover region (50).

(50) a. The way he delivered the message was quick but the way he delivered the package was slow to his frustration

b. The way he delivered the message was quickly but the way he delivered the package was slowly to his frustration

The rationale behind this decision is that if there is a surprisal response for encountering either a SPC or PPC, then the first adverb or adjective should prime the parser in a way that reduces the surprisal effect in the second conjunct, since each second conjunct will always match the type (SPC or PPC) of the first. The 'but' conjunction serves as the spillover region for the first conjunct, and the added prepositional phrase serves as a sentence final spill over region for the second conjunct.

The use of the adverb and adjective pseudocleft distinction allows for a clear, minimal pair that disambiguates the parser between SPC and PPC interpretations, respectively. The difference in word length between the adjective and adverb is minimal, and less likely to impact the analysis relative to the connectivity examples. The use of the conjunction and prepositional phrase spillover region will allow us to account for effects of surprisal in the analysis, and circumvents the sentence final position issue for recording the processing effects.

4 Experiment

4.1 Participants

Fifty-one participants were recruited through Prolific, an online platform designed for targeted recruitment of participants based on demographic criteria (www.prolific.com). Participants were not restricted by country. Participants were compensated £6 for approximately forty minutes of their time [9]. All participants were screened through Prolific and self-declared as fluent in English, with English being their primary and first learned language. The participants included twenty-seven females, twenty-three males, and one participant who chose to not disclose their gender. Participants' ages ranged from nineteen to fifty-four (M = 32.71). All participants provided informed consent. The experiment, and all procedures were reviewed and approved by the McMaster Research and Ethics Board (project ID #7157).

4.2 Procedure and Materials

Participants were presented with a series of sentences in a self-paced reading task. The experiment was conducted online using the participants computer on the Pavlovia platform (www.pavlovia.org). The experiment was programmed using PsychoPy (Peirce et al., 2019). At the beginning of each trial participants were instructed to focus on a fixation cross in the center of their screen. Participants were instructed to press the 'space' key on their keyboard to proceed to the sentence. Each sentence was presented word-by-word in the center of the screen. Participants were instructed to read each word normally and hit 'space' to proceed to the next word. After reading the sentence, participants were presented with a comprehension question. Participants were instructed to answer the question by pressing the 'Y' key for 'yes'

[9] Prolific is based in the United Kingdom, thus participants were paid in British pounds (£).

and the 'N' key for 'no'. Comprehension questions referenced the objects of the verb to ensure participants accurately interpreted the sentence. Once the comprehension question was answered, participants would be presented with the next fixation cross. The experiment consisted of 150 trials, with one-hundred filler sentences, and fifty experimental sentences. The experimental sentences were pseudo-randomized with the filler sentences, such that there were four stimuli lists. Each list contained all experimental sentences. The experimental sentences in each list were presented in a pseudo-randomized order, such that no list had the same order of experimental sentence presentation as another list. The filler sentences were also pseudo-randomized, such that no list had the same order of filler sentence presentation as another list. The pseudo-randomized stimuli were manually inspected and adjusted to ensure that no two experimental sentences were presented in immediate succession. Thirteen participants were assigned to list one, two, and three, while twelve participants were assigned to list four.

4.3 Analysis

Following Kim et al., (2019), A linear mixed-effects regression model was fitted to the reaction time data using the *lme4* package in R version 4.4.1 (Baayen, 2008; Baayen et al., 2008; Bates et al., 2014; Jaeger, 2008, Kim et al., 2019). The fixed effects included the interaction between sentence type and critical region. Regions corresponded to individual words. The critical regions were defined as the regions where the adverbs or adjectives occurred and two regions immediately following for spillover effects. Critical region 1 consisted of the adverb/adjective and the the two following words in the first clause. Critical region 2 consisted of the adverb/adjective and the two following words in the second clause. The model included main effects for word length and comprehension question accuracy. The model also included random

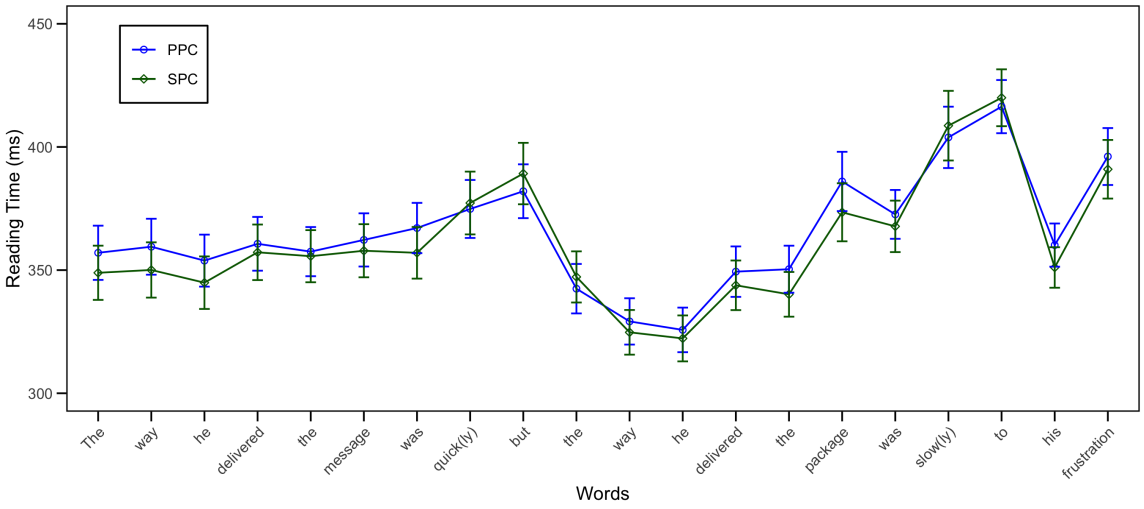
intercepts for participants, sentences, and trial number, as well as random slopes for sentence type by participants. Seven submissions were discarded due to inattention, defined as any comprehension score below eighty-five percent (overall comprehension score was M = 91.04). Five experimental sentences were excluded from the analysis due to an error in the stimuli creation. Reaction times less than 150 ms and greater than 1500 ms were filtered out to ensure that the data reflected processing.

4.4 Results

Figure 1 presents the region-by-region mean reaction times for the experimental sentences. Figure 2 presents the interaction plot of the mean reaction times by critical region and type. Table 2 presents the results of the linear mixed-effects regression model for critical region 1 and critical region 2.

Figure 1

Region-by-region reaction time means for the experimental sentences.



The regions of interest are the adverbs and adjectives, as well as the two regions following. Error bars represent 95% confidence intervals

At critical region 1 and critical region 2, a main effect of word length was observed, such that longer words were associated with longer reaction times ($\hat{\beta}$ = 0.002, SE =

Table 2

Summary of the results of the linear mixed-effects regression model for critical region 1 and critical region 2

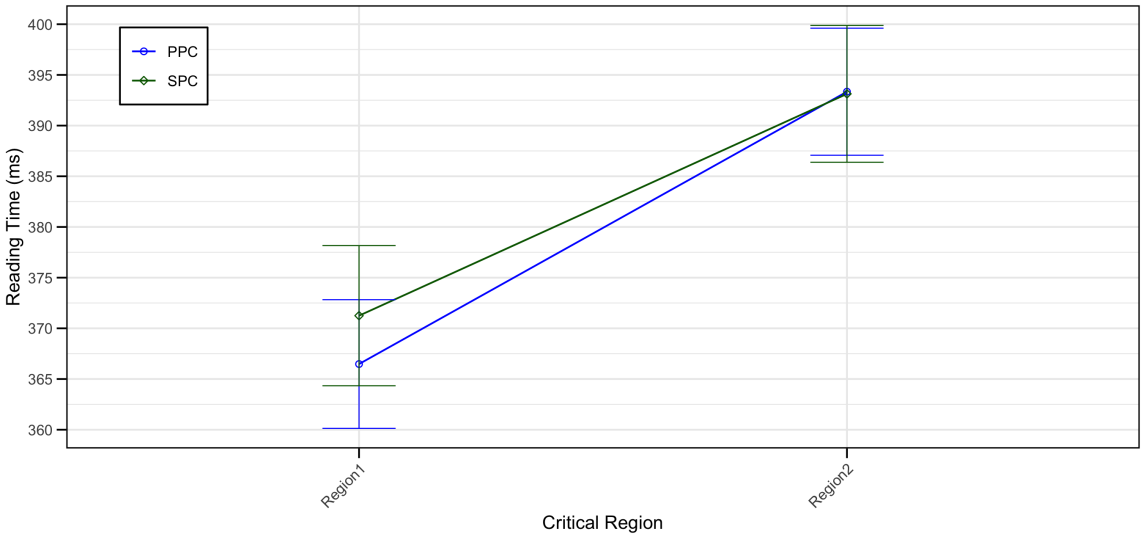
Fixed effects	Estimate	Std. Error	t value	p
(Intercept)	0.491	0.018	27.789	< 0.0001
Type	-0.000	0.004	-0.093	0.926
CriticalRegions	-0.013	0.001	-10.976	< 0.0001
WordLen	0.002	0.000	6.084	< 0.0001
Accuracy	-0.001	0.002	-0.486	0.627
Trials	-0.002	0.000	-60.579	< 0.0001
Type:CriticalRegions	-0.001	0.001	-1.183	0.237

0.000, t = 6.084, p $<$ 0.0001). A main effect of comprehension question accuracy was found, such that higher accuracy was associated with shorter reaction times ($\hat{\beta}$ = -0.001, SE = 0.002, t = -0.486, p = 0.627). A fixed effect of trial number was observed, such that as the trial number increased, reaction times decreased ($\hat{\beta}$ = -0.002, SE = 0.000, t = -60.579, p $<$ 0.0001). There was no observable effect of sentence type, indicating that there was not a significant difference in the reaction times of SPC versus PPC sentences in critical region 1 and critical region 2 ($\hat{\beta}$ = -0.000, SE = 0.004, t = -0.093, p = 0.926). A significant main effect of critical region was observed ($\hat{\beta}$ = -0.013, SE = 0.001, t = -10.976, p $<$ 0.0001). A post hoc analysis performing pairwise comparisons between critical region 1 and critical region 2 revealed that reaction times in critical region 1 were significantly faster than critical region 2 ($\hat{\beta}$ = -0.0253, SE = = 0.002, p = $<$ .0001). There was no significant interaction between sentence type and critical region ($\hat{\beta}$ = -0.001, SE = 0.001, t = -1.183, p = 0.237). However, a post hoc analysis revealed that the interaction between sentence type and critical region was significant across regions. PPC region 1 was processed significantly faster than PPC region 2 ($\hat{\beta}$ = -0.028, SE = 0.003 p = $<$ 0.0001). PPC region 1 was processed significantly faster than SPC region 2 ($\hat{\beta}$ = -0.03, SE = 0.008, p = 0.004). SPC region 1 was processed significantly faster than SPC region 2 ($\hat{\beta}$ = -0.023, SE

= 0.003, p = < 0.0001). SPC region 1 was processed significantly faster than PPC region 2 ($\hat{\beta}$ = -0.03, SE = 0.008, p = 0.007). The pairwise comparisons confirmed that the interaction between sentence type and critical region was not significant within regions.

Figure 2

Interaction plot of mean reaction times by critical region and type.



The regions of interest are the adverbs and adjectives, as well as the two regions following. Error bars represent 95% confidence intervals

4.5 Discussion

The experiment aimed to investigate if an online processing study using a self-paced reading design could identify differences in processing between SPC and PPC sentences. Due to compelling theoretical evidence that SPC sentences contain instances of ellipsis, it was hypothesized that by contrasting the processing profile of PPC and SPC pseudocleft sentences there is potential for extracting evidence of an ellipsis processing profile.

The results of the experiment did not support the hypothesis. There was no

significant difference in the reaction times of SPC and PPC sentences within the critical regions. The lack of effect could be due the nature of the self-paced reading task, which may not be sensitive enough to detect the processing differences between the SPC and PPC sentences. A visual inspection of graph 1 shows that the SPC sentences in both regions trend towards reversing from faster than to slower than the PPC condition, although this is not statistically justified and no claim that this trend manifests can be made. Future research using a more sensitive methodology, such as EEG, may be able to detect the processing of ellipsis within the SPC sentences and provide evidence of the ellipsis processing profile in pseudoclefts. There was also a highly significant fixed effect of trial number observed. As the trial number increased, reaction times decreased. This effect could be explained as a practice effect, where the participants became more familiar with the task and stimuli throughout the experiment trials. Alternatively, the effect of trial number could be due to fatigue, where participants became less attentive as the experiment progressed. The lack of effect could be due to a combination of factors including the effect of trial and the online data collection methodology. The collected data had a relatively high coefficient of variance (CV = 0.33). This high variability may have masked the effect of sentence type in the critical regions. Future research could benefit from a larger sample size to reduce the variance. Future research could consider in-person data collection within a controlled environment. The in-person data collection would allow for more control over the participants' environment, and may reduce the variability while helping to reduce any effects introduced by lack of attentiveness.

A significant main effect of region was found, such that for both SPC and PPC conditions region 2 was processed slower than region 1. This effect could be explained by the increasing complexity of the sentences as they progress, and by the nature of the "but" conjunction contrasting the two clauses. At the point of processing the

second adverbial/adjective the parser is contrasting the two clauses, which may result in increased processing time at the second critical region.

It is possible that the lack of effect of sentence type in the critical regions suggests that SPC sentences are not processed with ellipsis. However, the results of the experiment do not directly provide evidence to support this claim. Furthermore, given the compelling theoretical evidence that SPC sentences contain instances of ellipsis (Hirsch, 2017; Ross, 1972; Schlenker, 2003), it is unlikely that the lack of effect is due to the absence of ellipsis in SPC sentences.

5 Conclusion

This thesis has evaluated the current approaches to the 'connectivity problem' in specificational pseudocleft constructions. Three arguments were provided to motivate the ellipsis proposal as the most promising account of the connectivity problem. First, the ellipsis account provides adequate explanation for the data with the least amount of foundational revisions to our theory. Second, the conceptual argument made by Schlenker (2003) using Ross (1972)'s counterpart examples, places the burden of proof on any theory that does not analyze SPCs as QAPs. Finally, Hirsch (2017)'s arguments for a fully expanded TP clause, and for the existence of VP-ellipsis, provide compelling evidence that the ellipsis account is on track. Following these arguments this thesis highlighted that ellipsis is detectable using EEG methodologies (Kaan et al., 2004), and that SPCs lend themselves to the same configurational setup required to investigate ellipsis. This thesis than presented an online self-paced reading experiment to investigate ellipsis processing correlates in SPCs. Although the results of the experiment did not support the hypothesis, the results do not provide evidence to reject the ellipsis account. Furthermore, I argue that this work has highlighted the potential for using pseudoclefts to inform our understanding of ellipsis processing

in language despite the null results. This work has shown that a carefully designed pseudocleft experiment can provide a unique opportunity to investigate ellipsis processing in language. Future research should continue to explore pseudocleft contrasts to elucidate ellipsis processing correlates in language. Future research should consider using in-person controlled environments to reduce statistical noise. Additionally, future research should consider the use of more sensitive experimental methodologies that have been shown to identify ellipsis processing, such as EEG. The experimental design of this work provides a foundation for future research to build upon, and to further investigate if ellipsis processing correlates can be observed in pseudoclefts. Understanding ellipsis processing is paramount to understanding the grammatical architecture of language, and the exploration of untapped methodological tools to aid in this endeavor is a worthwhile, and necessary pursuit.

References

Akmajian, A. (1970). On deriving cleft sentences from pseudo-cleft sentences. *Linguistic inquiry*, *1*(2), 149–168.

Arregui, A., Clifton, C., Frazier, L., & Moulton, K. (2006). Processing elided verb phrases with flawed antecedents: The recycling hypothesis. *Journal of Memory and Language*, *55*, 232–246.

Baayen, R. H. (2008). *Analyzing linguistic data: A practical introduction to statistics using r*. Cambridge University Press.

Baayen, R. H., Davidson, D. J., & Bates, D. M. (2008). Mixed-effects modeling with crossed random effects for subjects and items. *Journal of Memory and Language*, *59*(4), 390–412. https://doi.org/10.1016/j.jml.2007.12.005

Bachenko, J. C. (1976). *Some semantic rules in the formal description of english pseudo-cleft sentences.* New York University.

Bachrach, A. (2004). Pseudoclefts. *PROCEEDINGS-NELS*, *34*(1), 117–132.

Bates, D., Maechler, M., Bolker, B., & Walker, S. (2014). Lme4: Linear mixed-effects models using eigen and s4 [R package version]. https://cran.r-project.org/web/packages/lme4/index.html

Bolinger, D. L. M. (1972). *That's that* (Vol. 155). Mouton.

Bošković, Ž. (1997). Pseudoclefts. *Studia linguistica*, *51*(3), 235–277.

Brown, C., & Hagoort, P. (1993). The processing nature of the n400: Evidence from masked priming. *Journal of Cognitive Neuroscience*, *5*, 34–44.

Cecchetto, C. (2000). Connectivity and anti-connectivity in pseudoclefts. *North East Linguistics Society*, *30*(1), 11.

Chomsky, N. (1981). Government and binding. *Dordrecht: Foris*.

Chomsky, N. (1986). *Knowledge of language: Its nature, origin, and use*. Greenwood Publishing Group.

Collins, P. (2002). *Cleft and pseudo-cleft constructions in english*. Routledge.

Declerck, R. (1988). *Studies on copular sentences, clefts, and pseudo-clefts*. Leuven University Press/Foris Publications.

Den Dikken, M. (2006). Specificational copular sentences and pseudoclefts. *The Blackwell companion to syntax*, 292–409.

Den Dikken, M., Meinunger, A., & Wilder, C. (2000). Pseudoclefts and ellipsis. *Studia linguistica*, *54*(1), 41–89.

Drubig, B. (1997). *Fokuskonstruktionen* (tech. rep. Bericht Nr. 115). Arbeitspapiere des Sonderforschungsbereichs 340. Tübingen.

Emonds, J. (1970). *Root and structure-preserving transformations* (Doctoral dissertation). MIT. Cambridge.

Frazier, L., & Clifton, C. (2000). On bound-variable interpretations: The lf-only hypothesis. *Journal of Psycholinguistic Research*, *29*, 125–139.

Frazier, L., & Clifton, C. (2001). Parsing coordinates and ellipsis: Copy alpha. *Syntax*, *4*, 1–22.

Frazier, L., & Clifton, C. (2005). The syntax-discourse divide: Processing ellipsis. *Syntax*, *8*(2), 121–174. https://doi.org/10.1111/j.1467-9612.2005.00077.x

Hankamer, J. (1974). On the noncyclic nature of wh-clefting. *Chicago Linguistic Society*, *10*, 221–286.

Heycock, C., & Kroch, A. (1999). Pseudocleft connectedness: Implications for the lf interface level. *Linguistic inquiry*, *30*(3), 365–397.

Higgins, F. R. (1973). *The pseudocleft construction in english* (Doctoral dissertation). MIT.

Hirsch, A. (2017). *An inflexible semantics for cross-categorial operators* (Doctoral dissertation). Massachusetts Institute of Technology.

Jacobson, P. (1994). Binding connectivity in copular sentences. *Semantics and linguistic theory*, *4*, 161–178.

Jaeger, T. F. (2008). Categorical data analysis: Away from anovas (transformation or not) and towards logit mixed models. *Journal of Memory and Language*, *59*(4), 434–446. https://doi.org/10.1016/j.jml.2007.11.007

Kaan, E., Overfelt, C., Tromp, D., & Wijnen, F. (2013). Processing gapped verbs. *Journal of psycholinguistic research*, *42*, 307–338.

Kaan, E., Wijnen, F., & Swaab, T. Y. (2004). Gapping: Electrophysiological evidence for immediate processing of "missing" verbs in sentence comprehension. *Brain and Language*, *89*(3), 584–592.

Kehler, A. (2000). Coherence and the resolution of ellipsis. *Linguistics and Philosophy*, *23*, 533–575.

Kim, C. S., Kobele, G. M., Runner, J. T., & Hale, J. T. (2011). The acceptability cline in vp ellipsis. *Syntax*, *14*(4), 318–354.

Kim, N.-R., Brehm, L., & Yoshida, M. (2019). The online processing of noun phrase ellipsis and mechanisms of antecedent retrieval. *Language, Cognition and Neuroscience*, *34*(2), 190–213. https://doi.org/10.1080/23273798.2018.1518531

Lebeaux, D. (1983). A distributional difference between reciprocals and reflexives. *Linguistic Inquiry*, 723–730.

Martin, A. E., & McElree, B. (2008). A content-addressable pointer mechanism underlies comprehension of verb-phrase ellipsis. *Journal of Memory and Language*, *58*(3), 879–906.

Martin, A. E., & McElree, B. (2009). Memory operations that support language comprehension: Evidence from verb-phrase ellipsis. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *35*, 1231–1239.

Martin, A. E., & McElree, B. (2011). Direct-access retrieval during sentence comprehension: Evidence from sluicing. *Journal of Memory and Language*, *64*, 327–343.

Martin, A. E., Nieuwland, M. S., & Carreiras, M. (2012). Event-related brain potentials index cue-based retrieval interference during sentence comprehension. *NeuroImage*, *59*, 1859–1869.

Moro, A. (1997). *The raising of predicates: Predicative noun phrases and the theory of clause structure*. Cambridge University Press.

Murphy, G. (1985). Psychological explanations of deep and surface anaphora. *Journal of Pragmatics*, *9*, 171–198.

Peirce, J. W., Gray, J. R., Simpson, S., MacAskill, M. R., Höchenberger, R., Sogo, H., Kastman, E., & Lindeløv, J. (2019). Psychopy2: Experiments in behavior made easy. *Behavior Research Methods*. https://doi.org/10.3758/s13428-018-01193-y

Phillips, C., & Parker, D. (2014). The psycholinguistics of ellipsis. *Lingua*, *151*, 78–95.

Reinhart, T. (1976). *The syntactic domain of anaphora* (Doctoral dissertation). MIT, Cambridge, Massachusetts.

Reinhart, T. (1983). Coreference and bound anaphora: A restatement of the anaphora questions. *Linguistics and Philosophy*, 47–88.

Ross, J. R. (1967). Constraints on variables in syntax.

Ross, J. R. (1972). Act. In *Semantics of natural language* (pp. 70–126). Springer.

Sag, I. A. (1976). *Deletion and logical form* (PhD Dissertation). Massachusetts Institute of Technology.

Schlenker, P. (2003). Clausal equations (a note on the connectivity problem). *Natural Language & Linguistic Theory*, *21*(1), 157–214.

Shapiro, L. P., & Hestvik, A. (1995). On-line comprehension of vp-ellipsis: Syntactic reconstruction and semantic influence. *Journal of Psycholinguistic Research*, *24*, 517–532.

Shapiro, L. P., Hestvik, A., Lesan, L., & Garcia, A. R. (2003). Charting the time-course of vp-ellipsis sentence comprehension: Evidence for an initial and independent structural analysis. *Journal of Memory and Language*, *49*, 1–19.

Sharvit, Y. (1999). Connectivity in specificational sentences. *Natural Language Semantics*, *7*(3), 299–339.

Snider, N., & Runner, J. T. (2011). Structural parallelism aids ellipsis and anaphor resolution: Evidence from eye movements to semantic and phonological neighbors. *Talk presented at the Linguistic Society of America Annual Meeting*.

Väänänen, J. (2001). Second-order logic and foundations of mathematics. *Bulletin of Symbolic Logic*, *7*(4), 504–520.

Van Luven, K. M. (2018). *Pseudoclefts* (Doctoral dissertation). Carleton University.

Williams, E. (1977). Discourse and logical form. *Linguistic Inquiry*, *8*, 101–139.

Yoshida, M., Dickey, M., & Sturt, P. (2012). Predictive processing of syntactic structure: Sluicing and ellipsis in real-time sentence processing. *Language and Cognitive Processes*. https://doi.org/10.1080/01690965.2011.622905

Appendix

A1: Experimental Stimuli

Full list of the experimental stimuli:

The way he approached the jury was convincingly but the way he approached the judge was ineffectively to his regret

The way he approached the jury was convincing but the way he approached the judge was ineffective to his regret

The way she explained the problem was meticulously but the way she explained the method was incorrectly to her dismay

The way she explained the problem was meticulous but the way she explained the method was incorrect to her dismay

The way he tricked the customer was smoothly but the way he tricked the boss was recklessly to his embarrassment

The way he tricked the customer was smooth but the way he tricked the boss was reckless to his embarrassment

The way she painted the picture was energetically but the way she painted the room was lethargically to her annoyance

The way she painted the picture was energetic but the way she painted the

room was lethargic to her annoyance

The way he played the scrimmage was enthusiastically but the way he played the championship was indifferently to his disappointment

The way he played the scrimmage was enthusiastic but the way he played the championship was indifferent to his disappointment

The way she described the scene was accurately but the way she described the aftermath was inaccurately to her remorse

The way she described the scene was accurate but the way she described the aftermath was inaccurate to her remorse

The way he delivered the message was quickly but the way he delivered the package was slowly to his frustration

The way he delivered the message was quick but the way he delivered the package was slow to his frustration

The way she developed the solution was precisely but the way she developed the framework was imprecisely to her dissatisfaction

The way she developed the solution was precise but the way she developed the framework was imprecise to her dissatisfaction

The way he rode the motorcycle was dangerously but the way he rode the bicycle was carefully to his advantage

The way he rode the motorcycle was dangerous but the way he rode the bicycle was careful to his advantage

The way she gathered the data was efficiently but the way she gathered the participants was inefficiently to her irritation

The way she gathered the data was efficient but the way she gathered the participants was inefficient to her irritation

The way he delivered the speech was boldly but the way he delivered the conclusion was clumsily to his discontent

The way he delivered the speech was bold but the way he delivered the conclusion was clumsy to his discontent

The way she chose the candidate was decisively but the way she chose the proposal was impulsively to her reluctance

The way she chose the candidate was decisive but the way she chose the proposal was impulsive to her reluctance

The way he recounted the story was loudly but the way he recounted the news was quietly to his confusion

The way he recounted the story was loud but the way he recounted the news was quiet to his confusion

The way she completed the course gradually but the way she completed the race was hastily to her safety

The way she completed the course was gradual but the way she completed the race was hasty to her safety

The way he cooked the dinner was deliberately but the way he cooked the dessert was carelessly to his discomfort

The way he cooked the dinner was deliberate but the way he cooked the dessert was careless to his discomfort

The way she managed the team was patiently but the way she managed the interns was aggressively to her satisfaction

The way she managed the team was patient but the way she managed the interns was aggressive to her satisfaction

The way he sang the song was beautifully but the way he sang the chorus was shakily to his distress

The way he sang the song was beautiful but the way he sang the chorus was shaky to his distress

The way she led the group was ineffectively but the way she led the class was powerfully to her astonishment

The way she led the group was ineffective but the way she led the class was powerful to her astonishment

The way he asserted the claim was firmly but the way he asserted the rumor was tentatively to his disbelief

The way he asserted the claim was firm but the way he asserted the rumor was tentative to his disbelief

The way she woke the patient was gently but the way she woke the doctor was harshly to her unease

The way she woke the patient was gentle but the way she woke the doctor was harsh to her unease

The way he handled the situation was delicately but the way he handled the consequences was immaturely to his agitation

The way he handled the situation was delicate but the way he handled the consequences was immature to his agitation

The way she stole the book was silently but the way she stole the bag was

frantically to her discomposure

The way she stole the book was silent but the way she stole the bag was frantic to her discomposure

The way he solved the equation was impressively but the way he solved the puzzle was inadequately to his disapproval

The way he solved the equation was impressive but the way he solved the puzzle was inadequate to his disapproval

The way she explained the event was honestly but the way she explained the party was deceitfully to her disfavor

The way she explained the event was honest but the way she explained the party was deceitful to her disfavor

The way he presented the claim was methodically but the way he presented the resolution was emotionally to his disorientation

The way he presented the claim was methodical but the way he presented the resolution was emotional to his disorientation