Narrowing the Focus:
Experimental studies on exhaustivity and contrast

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Chapter 1
Introduction

1.1 The question addressed in this dissertation

Focus structure has a profound effect on language production and processing. In production, it affects word order: for instance, focused words can be moved to the front of a sentence, as in an English cleft (ex. 1) or the end of a sentence where they align with the main stress, as in Spanish prosodic movement (ex. 2). Most languages have one or the other or both of these movements available. For example, focused words move to the front of the sentence in Hungarian, and in Italian, focused words move to the end of the sentence. In English, both strategies are available.

1) It was a **HORSE** that ruined the field.
2) Compró el **diario** MARÍA.
   Bought a **newspaper** Maria
   ‘Maria bought a newspaper.’
   (Zubizarreta 1998)

Focus also affects morphology: for instance, a number of languages mark focus by attaching a morpheme, usually derived from the copula, to the focused word. Wolof is one of these languages, attaching the copula morpheme *la* to focused words (ex. 3).

3) Fas **lawoon**.
   Horse **COP.3SG.PAST**
   ‘It was a horse.’
   (Kihm 1999: pg. 247, ex. 2)

Finally, focus affects prosody: for instance, some languages, such as Mandarin, change the prosodic phrasing of a sentence with a focused word. Other languages, such as German and English, put a special pitch accent on the final word of a focused phrase. This accent takes the form of an L+H* intonational contour in English (ex. 4).
4) A **HORSE** ruined the field.

In processing, focus has been shown to have a profound effect not only on the interpretation of the sentence containing the focused word, but also on the mental representation of the context containing that sentence. Gernsbacher and Jescheniak (1995) found that focused topics are privileged in a speaker’s representation of a conversation. Frazier and Clifton (1998) found that focus resolves ambiguity in otherwise ambiguous sluices. For instance, in (ex. 5), *who* is ambiguous between the person doing the claiming and the person being fired unless one of them is focused. In that case, *who* was interpreted as referring to the focused noun.

5) Somebody claimed that the president fired someone, but no one knows who.

(Frazier and Clifton 1998: pg. 510, ex. 11)

Kaiser (2011) likewise found that focus is used to resolve ambiguity, specifically ambiguity in resolving which potential antecedent a pronoun refers to. For instance, in (ex. 6), the ambiguous *he* in the phrase *he was holding a yellow tennis racket* was more likely to be interpreted as *John* when *John* was focused.

6) Speaker A: I heard that Greg congratulated Mike enthusiastically yesterday.
Speaker B: No, that’s not quite right. It was John who congratulated him. The prizes for the best-ranked tennis players were about to be announced, and *he* was holding a yellow tennis racket. Everyone was in a good mood that day.

(Kaiser 2011: pg. 24, ex. 8)

Yet, despite that focus has so much influence on an utterance, it still remains unclear what the meaning of focus is. Some theories consider focus to be entirely pragmatic, having no influence on the truth conditions or presuppositions of a focused sentence. Relevance Theory, for instance,
attributes to focus only the property of emphasis: it marks something as important. Schwarzschild (1999) attributes to focus only the property of marking something as not GIVEN.

Other theories consider focus to have a semantic contribution, contributing either to the truth conditions or the presuppositions of a focused sentence, but even within these, there is disagreement. For instance, von Stechow (1981, 1982) developed a theory in which the meaning of focus is to divide an utterance into an assertion and a background. The assertion is the focused word and the background is the rest of the utterance.

7) A **HORSE** ruined the field.
   
   \[<\text{horse}, \lambda x.\text{ruined}(x, \text{the field})>\]

On the other hand, Rooth (1985) developed a theory in which the meaning of focus is to introduce alternatives to the focused sentence into the derivation. Under this theory, there are two representations for a focused sentence: the first is the ordinary meaning of the sentence but the second is a focus value containing the alternatives to the actual sentence.

8) A **HORSE** ruined the field.

   Ordinary value: a horse ruined the field
   
   Focus value: \{a horse ruined the field, a pig ruined the field, a truck ruined the field, …\}

Much of the debate between these theories of meaning has so far centered around how adequately the theory can compositionally account for the congruence between questions and focus in their answers, truth conditional focus association effects with operators like *only*, and, occasionally, word order. The difficulty for research into focus is that several very different types of theories have been demonstrated to be equivalently capable of accounting for these patterns. For instance, all of theories mentioned so far (pragmatic, semantic, based on newness/giveness, based on alternatives), as well as several hybrid theories (ex: Reich 2004, Büring 2007), have been demonstrated to handle question-answer congruence and focus association effects adequately (Rooth 1992, Krifka 2001, Schwarzschild 1999, Wedgwood 2005). This dissertation, then, will attempt to address the question of what focus means from a
slightly different angle. Its goal will be to narrow the realm of possible meanings for focus by experimentally testing for one possible property of focus: contrast.

Specifically, this dissertation tests whether comprehenders need to compare a focused proposition to other propositions in order to interpret it. It investigates three things: 1) It investigates whether focus accesses a set of alternatives to an utterance. It will be looking for evidence that hearers are using alternatives to interpret a sentence with a focused word. 2) It investigates whether the members of this set are contrasted with the actual utterance. If hearers are using a set of alternatives to interpret focus, it could be the case that they access the set without forming any opinions about its members or the case that they consider all members except the actual proposition to be less ideal or even false. 3) It investigates whether this set of alternatives is accessed as part of the semantic derivation (ex: assertion or presupposition) or as a separate pragmatic process. Furthermore, it investigates whether the presence of a set of alternatives is a part of the truth conditions of a focused sentence (ex: an assertion of the sentence) or a part of the definedness conditions of a focused sentence (ex: a presupposition of the sentence).

I have chosen to look at contrastiveness because it is one of the most controversial issues in focus research. Alternative sets are central to many of the most popular theories (ex: Rooth 1985, Büring 2007) while other popular theories don’t use it at all (ex: Krifka 2001). This dissertation argues that focus does access a set of alternatives as part of the semantic derivation of a focused utterance, but the members of this set are not semantically prohibited from being true.

1.2 Organization of the dissertation

The dissertation is organized as follows:

Chapter 2 presents two lexical decision experiments and a mouse tracking experiment which support the view that focus accesses a set of alternative and, furthermore, that the members of this set are semantically related to the focused word itself. Lexical Decision Experiment 1 introduced sets of words that are not normally related to one another (ex: sergeant - scientist) to a group of participants and found that the participants used these newly learned associates as alternatives to the actual sentence. Lexical Decision Experiment 2 and the mouse tracking experiment used long term semantic associates (ex: sergeant – lieutenant) and found that participants also used these as alternatives to the actual sentence. The set of alternatives appears,
therefore, to be cognitively real, and its membership is, at least, determined using the same semantic networks as are used in semantic priming.

Lexical Decision Experiment 2 and the mouse tracking study additionally found that members of the set of alternatives are made less salient. In Lexical Decision Experiment 2, participants were slow to access members of the set, and in the mouse tracking study, participants were reluctant to move the mouse towards members of the set. Both of these things indicate that the members of the set are being inhibited so that they do not receive activation/saliency. This suggests that the members of the set are contrasted with the actual sentence.

Chapter 3 investigates what the nature of this contrast between the actual sentence and the alternatives is by exploring the possibility that the members of the set are made less salient because they are presupposed to be false. The chapter begins by showing that the intuition that the alternatives are false (called the exhaustivity intuition) does not have the properties of a presupposition, but rather of a conversational implicature. Specifically, the exhaustivity intuition fails to arise in downward entailing environments and is able to canceled.

This chapter then continues with two rating experiments in which participants were asked to judge the naturalness of in situ focus (Judgment Experiment 1) and clefted focus (Judgment Experiment 2) in contexts where the alternatives were true and in contexts where the alternatives were false. Neither experiment found a difference in the participants’ ratings for these two different environments. This is further evidence that the exhaustivity intuition is not part of the semantics of focus, but rather a conversational implicature.

Chapter 4 investigates whether access to a set of alternatives is semantic or pragmatic. It first determines that the presence of a set of alternatives does not have the properties of a conversational implicature: this meaning cannot be detached, never fails to arise, and cannot be canceled. It then investigates whether access to a set of alternatives is truth conditional. It finds that logical operators cannot access this component of meaning (ex: negating a sentence with a focused word does not negate the presence of alternatives: the actual proposition must still contrast with other potential propositions). Based on these finds, Chapter 4 concludes that access to a set of alternatives is part of the semantic meaning of focus, but does not affect the truth conditions of a sentence. For instance, access to a set of alternatives could be a presupposition of focus.
Chapter 5 presents the conclusions: access to a set of alternatives is part of the semantic, but non-truth conditional, meaning of focus. The members of this set are made less salient during the processing of focus, but the source of this is not a presupposition that the alternatives are false. The source could be a conversational implicature that the alternatives are false or, perhaps, a product of the mental effort involved in accessing such a set. This dissertation has to leave open several questions, such as whether focus has meaning other than accessing a set of alternatives or whether there are different types of focus that each have different meanings, but this dissertation can establish that focus has at least the meaning of accessing a set of alternatives.
Chapter 2
Focus Inhibits Alternatives

2.1 Introduction

The biggest distinction between theories about the meaning of focus is whether they posit the existence of a set of alternatives or not. Of the main theories, Rooth’s Alternative Semantics, Roberts’ Integrated Pragmatics, and some versions of Structured Meanings, such as Reich’s (2004), explicitly require a contextually restricted set of alternatives as a felicity condition for an utterance with a focused constituent. Other theories, though, such as von Stechow and Krifka’s Structured Meanings and Schwarzschild’s Theory of Givenness, do not have this requirement. The main concern of this chapter will be determining whether focus invokes a set of alternatives. If it is found that a set of alternatives is part of the meaning of focus, then theories that explicitly require the set will be considered more viable than theories that do not.

This chapter includes three experiments that ask three questions:

1) Is focus interpreted using a set of alternatives?¹

2) If focus is interpreted using a set of alternatives, what propositions can be members of this set? Specifically, if the alternative propositions differ from the actual proposition only in that they substitute a different word in for the focused word (ex: an alternative to John was late might be Susan was late), are these substitutions associates of the focused word itself or are they predictable fits to the context that aren’t necessarily associates of the focused word?

3) If focus is interpreted using a set of alternatives, do these members contrast with the actual utterance? Specifically, do words receive more or less activation when they are included in a set of alternatives to a focused utterance versus when they are not members of such a set?

This chapter is organized as follows: Section 2.2 reviews the major theories of the meaning of focus, showing that, while they are all compatible with a set of alternatives, only some theories

¹ The findings in this chapter have consequences for whether the set of alternatives is most likely generated at the time that the focus marking is processed or already in existence prior to the focus marking (ex: presupposed), but they do not definitely support one view over the other.
explicitly invoke a set of alternatives. Section 2.3 presents the previous experimental evidence for the set of alternatives. Lexical Decision Experiment 1 and Lexical Decision Experiment 2 are presented in Section 2.4. These experiments found that focus does invoke a set of alternatives, but they found conflicting results about whether the members of the focus set receive more or less activation by virtue of being included in the set. Mouse Tracking Experiment 3 seeks to resolve this conflict in Section 2.5. It found that members of the set of alternatives receive less activation by virtue of being included in the set, suggesting that the alternatives and the actual utterance are contrasted with one another. Conclusions are in Section 2.6.

2.2 Theories of the meaning of focus predict a set of alternatives

All of the main theories of focus are compatible with invoking a set of alternatives, but only some have an explicit mechanism for invoking a set of alternatives. This section will give an overview of several of the most popular theories for the meaning of focus with the goal of introducing the different ways that focus could be interpreted. It concentrates on how the presented theory treats alternatives to the focused sentence. This provides the theoretical background for the experiments that follow later in this chapter.

2.2.1 Alternative Semantics

Rooth’s Alternative Semantics (1985, 1992) has an explicit mechanism for invoking a set of alternatives. It proposes that utterances with a focused constituent presuppose a pronoun, the antecedent of which is a set of alternatives. In order to assign the pronoun to the correct antecedent, hearers must either access a set of alternatives that has been explicitly listed in the previous discourse or else accommodate the existence of a set of alternatives, determining which objects are in the set using various pragmatic and cognitive processes.

Specifically, Rooth proposes that constituents with a focused element have two meanings: the ordinary meaning and the focus value. The ordinary meaning is just the meaning that the constituent would have under conventional semantic computations. The focus value is the set of semantic objects of the same type as the focused constituent. It must include the ordinary value of the constituent and at least one other object that is not the ordinary value of the focused constituent, but beyond that, which objects become part of the focus value is determined only by
their type, not by any other factors such as relevance or salience. For a sentence such as (1) below, if Mary is focused, then the focus value is a set of semantic objects of type e. But if loves is focused, as in (b), then the focus value is a set of semantic objects of type \( \langle e, t \rangle \).

1) a) \([\text{Mary}]_F\) loves John.

Ordinary value: \([[[\text{Mary}]]]_{F_6} \text{loves John}]^0 = \text{loves(Mary, John)}

Focus value: \([[\text{Mary}]_{F_6} \text{loves John}] f = \{\lambda x. x e D_e \land [\text{Mary loves } x]\} = \{\text{Mary loves John, Tom loves John, the horse}^2 \text{ loves John, the television loves John, …}\}

b) Mary [loves]_F John.

Ordinary value: \([\text{Mary} [\text{loves}]_{F_2} \text{John}]^0 = \text{loves(Mary, John)}

Focus Value: \(\text{[Mary [loves]_{F_2} \text{John}] f = \{\lambda P. P \in D_{e(t)} \land P(\text{Mary, John})\} = \{\text{loves(Mary, John), hates(Mary, John), cleans (Mary, John), …}\}

Speakers, though, do not use the focus value of a constituent when calculating the meaning of an utterance with a focused constituent. Rooth (1992) proposes that the operator ~ introduces a presupposition that there is a variable, \( \Gamma_k \), whose antecedent is a subset of the focus value containing the ordinary value and at least one other object. He suggests that the other objects in this set are determined by context, relevance, frequency, recency, and other cognitive and pragmatic factors. Other authors (e.g. Beaver and Clark 2008) make similar assumptions.

2) Focus Interpretation Principle: Adjoin an operator ~\( V \) to a phrase \( \alpha \) in LF, where \( V \) is a variable with either the same type as \( \alpha \) (individual case) or the type of a set of objects with the same type as \( \alpha \) (set case).

---

\(^2\) We are treating nonproper nouns, for the time being, as type e. We are doing this 1) for the sake of demonstrating that the focus value does not discriminate in what it includes and 2) because Schwarzschild treated all nouns as being of type e in his theory, for the sake of existential type shifting. Common nouns, though, are most frequently considered to be of type \( \langle e, t \rangle \).
3) Presuppositions introduced by ~ (Rooth 1992: 93)

**Set Case:** Where $\phi$ is a syntactic phrase and $C$ is a syntactically covert semantic variable, $\phi \sim C$ introduces the presupposition that $C$ is a subset of $[[\phi]]^f$ containing $[[\phi]]^0$ and at least one other element.

**Individual Case:** $\phi \sim \psi$ introduces the presupposition that $\psi$ is an element of $[[\phi]]^f$ distinct from $[[\phi]]^0$.

The value of the variable (the variable is most frequently written as $C$) is determined pragmatically so the exact placement in LF of $\sim \Gamma_k$ is free. However, when used with a focus sensitive word, such as *only*, it determines, by anaphora, the domain of quantification for the focus sensitive word. For example, in (4) below, the domain of quantification for *only* is the set [introduced [Bill]$_F$ to Sue].

4) Rooth 1992: 89

```
S
  NP
    Mary
  VP
    only(C$_1$)
    VP
      VP
        ~C$_1$
        NP$_F$
          introduced
          Bill
        PP
          to Sue
```

The placement of $\sim \Gamma_k$ might also be constrained by the phonology as the operator has phonological consequences. The variable is covert.

This theory therefore requires, as a felicity condition for an utterance with a focused constituent, that there is a set of alternatives that differs from the ordinary value of the utterance only in the value of the focused constituent. Additionally, the speaker/hearer should only be considering those alternatives that are members of $C$’s antecedent, which is defined according to pragmatic and cognitive considerations. This theory therefore predicts that upon hearing a focused constituent, a hearer should invoke a set of alternatives to the focused constituent. It also suggests that the members of the set of alternatives are related, at least in part, to the context of the utterance because the
antecedent to C should be already under discussion. However, this isn’t fully necessary. Just as cataphora allows a pronoun to be used before its antecedent is introduced, it is possible that a hearer would delay assigning a value to C until after the focused utterance so that the focused utterance itself, not just the context preceding it, could be used to determine the proper antecedent.

2.2.2 Integrated Pragmatics

Robert’s theory of Integrated Pragmatics (1996, building on work by Stalnaker 1978) is a very similar theory of the meaning of focus that also explicitly requires a contextually restricted set of alternatives to an utterance with a focused constituent. Unlike Rooth, Roberts proposes that the set of alternatives is introduced into the derivation pragmatically, not as the result of an operator or other semantic entity. Instead, the meaning of focus is the result of the greater structure of the dialogue. Integrated Pragmatics, following Stalnaker (1978), takes the goal of a conversation to be reducing the context set to a singleton set, the actual world. In other words, the goal of any conversation is to determine the Big Question: “What is the way things are?” (Stalnaker 1978). Conversational partners are restricted, in accomplishing this goal, by both conventional rules, such as the rules of syntax or semantics, and conversational rules, such as the Gricean Maxims. They have two moves available to them: set-ups (aka: questions) and pay-offs (aka: assertions). The partners pose questions to one another and, by answering these questions, seek to eventually answer the Big Question. Whenever the conversational partners accept a proposed question, they commit everyone, by the conversational maxim of Relevance (5), to the common goal of finding as quickly as possible a complete, true answer to this question. A complete answer is necessary by the maxim of quantity (5), and a true answer is necessary by the maxim of quality (5). This question becomes the Question Under Discussion (QUD).

5) a) Relevance: “Be relevant”
   b) Quantity: “Make your contribution as informative as is required for the current purposes of the exchange”
   c) Quality: “Try to make your contribution one that is true”

   (Grice 1972: 152)
The strategy for the conversational partners is to propose, accept, and answer QUDs that satisfy sub-goals of the main goal (answering the Big Question) and sub-goals of the sub-goals. The role of focus in this theory is that focus presupposes the QUD. QUDs can be both explicit and implicit. Explicit QUDs are straightforward to accommodate into the common ground, but in order for implicit QUDs to be accommodated, the conversational partners have to have a way of deriving what the question was. According to the Integrated Pragmatics approach, the partners can derive this using focus. Since the denotation of a question is the set of possible responses (Hamblin 1973; Karttunen 1977; or the set of possible worlds: Groenendijk and Stokhof 1985), and the utterance with the focused constituent must be one of the possible responses to the implicit QUD, the partners can derive the other potential responses by substituting appropriate alternatives into the position of the focused constituent, and thereby determine the set that denotes the implicit QUD. In this theory, the set of alternatives is the set of possible responses to the QUD.

There is no unique requirement in Integrated Pragmatics that the set of possible responses be determined/restricted by the context of the utterance or any other consideration, but the theory, nevertheless, does predict that participants will consider sets of alternatives that are identical to Rooth’s C. All quantifiers (ex: *who*) are contextually restricted, so the possible responses to the QUD will have to be as well. Additionally, since the goal of the conversation is to determine which world is the actual world, the conversational partners have a motivation to consider only those worlds that are likely candidates for being the actual world. Similarly, the partners will want to consider all of the contextually appropriate responses to the QUD so that they don’t miss the one that belongs to the actual world. In this way, the conversational partners are developing a set of alternatives that includes only all of the plausible responses to the QUD, where plausibility is going to have to be determined by cognitive and pragmatic processes that take into account the context of the utterance. In this way, Integrated Pragmatics also predicts a set of alternatives determined by context that should be the same as the set generated by C in Alternative Semantics.

---

3 Karttunen took the meaning of a question to be the set of all true answers. This would make a meaningful difference in what composes the set of alternatives, but not in the existence of a set of alternatives.
2.2.3 Structured Meanings

Other theories of focus, though they would be compatible with a set of alternatives, do not explicitly require one. One such theory is Structured Meanings in its original design (von Stechow 1981, 1982; Cresswell and von Stechow 1982; Krifka 1991, 2001, Reich 2003). Structured Meanings separates an expression with a focused constituent into two parts: the focus and the background. It accomplishes this by moving the focused constituent so that it is adjoined to the background constituent. This is a lambda abstraction procedure, and the unstructured, ordinary expression can be retrieved by functional application between the focus and the background. For instance, for the sentence, *Mary introduced [Bill]_F to John* the structured meaning would be as in (6).

6) $\llbracket\text{Mary introduced [Bill]}_F\text{ to John}\rrbracket = \langle\text{Bill}, \lambda x.\text{introduced(Mary, } x, \text{ John)}\rangle$

The first part of the structured meaning denotes the individual *Bill* and the second part denotes the property of being introduced to John by Mary. One of the advantages of this system is that questions are also properties, with wh-words being replaced with variables, so question-answer congruence is a matter of identity between the question and the background of the answer.

7) $\llbracket\text{Who did Mary introduce to John?}\rrbracket = \lambda x.\text{introduced(Mary, } x, \text{ John)}$

This original theory could easily incorporate sets of alternatives by stipulating that part of the definition of focus is a function for creating a set of salient alternatives that is interpreted locally. Reich (2010), in fact, uses such a function in his definition of *only*. The function $\text{alt}_c$ creates alternatives that are salient within a given context $c$.

8) a) $\llbracket\text{only}\rrbracket = ((a, P)) = 1 \text{ iff } \forall x \in \text{alt}_c(a) (P(x) = 1 \rightarrow x = a)$
   b) $\llbracket\text{Mary only introduced [Bill]}_F\text{ to John}\rrbracket = \text{only} ((\llbracket\text{Bill}\rrbracket_F, \lambda y.\text{introduced(Mary, } y, \text{ John)})) = \langle\text{Bill}, \lambda y.\text{introduced(Mary, } y, \text{ John)}\rangle = 1 \text{ iff } \forall x \in \text{alt}_c(\text{Bill}) ((\lambda y.\text{introduced(Mary, } y, \text{ John)})(x) = 1 \rightarrow x = \text{Bill})$
Reich, in earlier work (2004), makes the even stronger claim that Structured Meanings needs to generate alternatives. Structured Meanings is, at its core, a theory of focus movement so unlike Alternative Semantics which could be compositionally derived in a number of different ways, Structured Meanings is particularly susceptible to criticism involving barriers to movement. In particular, it has been noted by many authors (e.g. Reich 2010, Rooth 1996, Krifka 1991) that it is possible to focus a noun phrase in a complex NP with a focus sensitive particle outside of the NP. Under Structured Meanings, the focused NP should have to move out of the complex NP to the focus sensitive particle, but this would be a violation of the complex NP constraint.

9) a) Dr. Svenson only rejected the proposal that [John]\textsubscript{f} submitted.

(from: Rooth 1996, 281)

b) \langle \text{only [John]}_{f}, \lambda x. \text{Dr. Svenson rejected [NP the proposal that x submitted]} \rangle

Krifka (1996) proposes one solution to this problem where there are two focus objects in a sentence: the focus and the focus phrase which contains the focus. The focus phrase would raise to \textit{only}, but the focus would be interpreted in situ so that it does not have to raise out of the complex NP. Reich argues that this is an unjustified complexity on the system, and it would be better if all focus could be interpreted uniformly. He proposes, instead, that a focus index introduces into a derivation a local function that generates contextually salient alternatives to the focused constituent, as in the definition of \textit{only}, and a choice function that picks from the set of alternatives exactly the ordinary meaning of the expression. In (10) below, \((\text{alt}_{c}(\text{Bill}))\) creates alternatives to \textit{Bill}; \(f_{\text{Bill}}\) is the choice function that picks out \textit{Bill} (the ordinary meaning), and \(f_{1}\) is a choice function variable. The choice function variable could be bound by a focus sensitive particle like \textit{only}, and if we apply functional application to this structured meaning, we apply \(f_{\text{Bill}}\) to every instance of \(f_{1}\), arriving at the unstructured meaning because \(f_{a}(\text{alt}_{c}(a)) = a\).

10) a) \langle [\text{Mary introduced [Bill]}_{f} to John]\rangle = \langle f_{\text{Bill}}, \lambda f_{1}. \text{Mary introduced } f_{1}(\text{alt}_{c}(\text{Bill})) \text{ to John} \rangle
In this way, the Reich’s Structured Meaning proposal explicitly includes a set of alternatives. It should be noted, though, that this set of alternatives is slightly different from Rooth’s. Although both alt_c and C pick out the same contextually restricted set, the set of alternatives is generated by alt_c in Reich’s Structured Meanings while, in Alternative Semantics, it is a presupposition of the utterance that C is already present in the context.

2.2.4 *Givenness Theory*

Finally, Schwarzschild’s (1999) theory of focus does not explicitly require that a set of alternatives be part of the structure of a focused utterance, but if we look at the processing necessary to produce a focused utterance under this theory, it does predict a set of alternatives. I will refer to this theory as the Givenness Theory for convenience. The Givenness Theory is an Optimality Theory explanation for the placement of pitch accents in a sentence. Schwarzschild’s immediate concern was that constituents that appear to be focused, for instance the answer to the question in (11) below, is not always marked with a pitch accent.

11) \{John drove Mary’s red convertible. What did he drive before that?\}
   A: He drove her [BLUE]F convertible.
   (Schwarzschild 1999, pg. 146, ex: 12)

Schwarzschild proposes a series of constraints to explain this data, and one of the two highest ranking constraints is \textit{GIVENness}:

12) \textit{GIVENness}: If a constituent is not F-marked, it must be given.
    (Schwarzschild 1999, pg. 155, ex. 32)

\textit{GIVENness} requires that only new material can be pitch accented, and it is the mechanism for determining whether a constituent is given that causes speakers/hearers to generate a set of alternatives. The informal definition of GIVEN is in (13) below, and the formal definition is in (14) below.

\footnote{The other highest ranking constraint is \textit{FOC}: A Foc-marked phrase contains an accent. \textit{FOC} and \textit{GIVENness} are unranked with respect to each other.}
13) Definition of GIVEN (final informal version): (ex. 25, pg. 151)
An utterance U counts as GIVEN iff it has a salient antecedent A and
a) if U is type e, then A and U corefer;
b) otherwise: modulo \( \exists \)-type shifting, A entails the Existential F-Closure of U.

14) Definition of GIVEN (formal version): (ex. 28, pg. 152)
An utterance B counts as GIVEN iff it has an antecedent A and
a) if the semantic type of B is e, \( \forall \langle w, g \rangle \in c \exists h[\llbracket A \rrbracket^g = [B]^g] \)
b) if the semantic type of B is conjoinable:
\( \forall \langle w, g \rangle \in c \exists h[\text{ExClo}(\llbracket A \rrbracket^g)(w) \Rightarrow \text{ExClo}(\llbracket B \rrbracket^g,h)(w)] \)

There is a slight problem though. The definition of GIVEN relies on entailment and entailment can only exist between propositions. Many of the constituents that can be focused are not themselves propositions. To get around this, Givenness Theory proposes that GIVEN compares expressions after they have undergone a process of existential type shifting\(^5\).

15) Existential Type Shift: ExClo (ex. 26, pg. 152)
   a) If \( \omega \in D_\emptyset \) then \( \text{ExClo}(\omega) = \omega \)
   b) For any conjoinable type \( \langle a, b \rangle \):
      If \( \omega \in D_{\langle a, b \rangle} \) then \( \text{ExClo}(\omega) = \lambda w \exists u \in D_a[\text{ExClo}(\omega(u))(\omega)] \)
   c) t is a conjoinable type.
      If b is a conjoinable type, then so is \( \langle a, b \rangle \), for any type a.

Existential type shifting becomes equivalent to replacing all missing arguments with an existentially closed variable. For instance, if we wanted to evaluate if the object NP of a sentence such as *John painted the house* was given, we would search for an antecedent to (16).

\(^5\) Constituents of type e are excluded from this and get a special rule for determining if they are GIVEN.
16) \[ \exists P \exists u [P \in D_{\langle e, c, t \rangle} \land u \in D_e \land [(P(u)(\text{the house}))]] \] (Someone did something to the house.)

Under the definition of GIVEN in (14), a speaker would need to apply (16) to all of the other propositions in a context, c, to see if anything else entailed (16). For instance, a sentence such as *Jane washed the house* could serve as an antecedent for (16) since it entails the existential closure in (16).

17) Jane washed the house. \[ \rightarrow \exists P \exists u [P \in D_{\langle e, c, t \rangle} \land u \in D_e \land [(P(u)(\text{the house}))]] \]

Therefore, under Schwarzschild’s theory, if the sentence *Jane washed the house* was part of a conversational partner’s context, then the house would have to be considered given.

Schwarzschild’s theory then does not explicitly require a set of alternatives to the focused constituent, but the process of existential closure creates propositions that are identical to a frame in Alternative Semantics/Integrated Pragmatics or the background in Structured Meanings. Moreover, when a speaker or hearer is determining whether an existentially closed proposition has an antecedent, s/he will have to compare it to all other salient propositions in the context that have the same frame or background. This results in a contextually restricted set of propositions that differ only with respect to the focused constituent. This is the same set generated by C or alt. There are two significant differences though.

Firstly, the set of alternatives in Givenness Theory is a cognitive process used to verify a violable constraint on accented material. Even if we treat this high ranked constraint as a presupposition—saying that a pitch accented constituent with an antecedent is undefined— the set of alternatives itself is still not a presupposition of the focused material. It is still just a cognitive process necessary to evaluate the GIVEN constraint.

Secondly, the set of alternatives is triggered by given material, not focused material. A speaker must generate a set of alternatives in order to verify that unaccented material has an antecedent. There is no reason for a speaker to generate a set of alternatives for pitch accented material.
2.2.5 Summary of semantic theories and aims of this chapter

In sum then, the main theories for the meaning of focus disagree about the status of alternatives to a focused constituent. In Alternative Semantics, a presupposition of focus requires that a contextually restricted set of alternatives already be present. In Reich’s Structured Meanings, a set of alternatives must be generated at the time that an utterance with a focused constituent is encountered. In Integrated Pragmatics, the set of alternatives is the denotation of a pragmatically supplied QUD. In Givenness Theory, the set of alternatives isn’t part of the structure of a focused utterance at all, but is rather part of a cognitive process that the speaker undergoes to optimally distribute pitch accents and the comprehender undergoes to verify the appropriateness of the pitch accents. Finally, in Krifka and von Stechow’s Structured Meanings, the set of alternatives isn’t required at all.

This leaves open several questions. First of all, are comprehenders using a set of alternatives to understand an utterance with a focused constituent? The original Structured Meanings would predict that they are not. Secondly, if comprehenders are using a set of alternatives, what are the members of the set? Alternative Semantics and Reich’s Structured Meanings only say that the members must be salient with no further specification for what that means. Integrated Pragmatics and Givenness Theory are the most explicit. Integrated Pragmatics would require that every possible answer to the QUD be in the set of alternatives, and Givenness Theory would require that the members have the same form as the existentially closed proposition and be part of the prior context. Finally, if comprehenders are using a set of alternatives, what properties does the presence of this set contribute to the meaning of a focused utterance? In Alternative Semantics, Integrated Pragmatics, and Givenness Theory, the entire contribution of the set of alternatives is that the set is present. In such a case, we would expect that members of the set are made additionally salient by focus. In Reich’s Structured Meanings, however, it could be argued that because altc selects a member out of the set of alternatives, the members of the set contrast with the focused constituent. They are, in effect, rejected in favor of the focused constituent. In such a case, we would expect that members of the set are made less salient by focus.

This chapter will attempt to answer these questions. Specifically, it will ask:

1) Do comprehenders interpret focus using a set of alternatives?
2) Are members of the set of alternatives associates of the focused word itself (ex: members of the same category) or are they predictable fits to the context that aren’t necessarily associates of the focused word?

3) Do words receive more or less activation when they are included in a set of alternatives to a focused utterance versus when they are not members of such a set?

First it will review previous experimental work that has addressed these concerns, and then it will present three new experiments.

2.3 Previous experimental evidence for the existence of a set of alternatives

There hasn’t been much experimental work done that specifically addresses the set of alternatives. This section reviews three studies that have provided evidence for the set of alternatives. Braun and Tagliapietra (2010) used a cross modal priming study to show that comprehenders do generate a set of alternatives. Kim (2012) used two eyetracking studies to show that the same result, but also that the members of the set of alternatives are members of the same category as the focused constituent, whether the category is defined semantically (ex: apple ➔ fruits) or contextually (magazine ➔ newsstand).

2.3.1 C. Kim 2012

C. Kim (2012) conducted a series of eye tracking studies that provided evidence for the cognitive reality of the focus set of alternatives. In both experiments, participants heard a set of sentences, and the last sentence contained the focus particle only. In the first experiment, there were two characters: Mark who had some items in the first sentence and Jane who had some items in the second sentence. Jane has an item that is of the same semantic kind as an item that Mark has. For instance, in (18), apples and oranges are the same semantic kind: fruit. This was to investigate whether semantic kinds were members of the set of alternatives.

18) Mark has candy and apples. Jane (only) has some oranges.

While listening to the sentences, participants saw a display with four regions (ex. Figure 1) and were asked to click on the item that Jane has.
The display would include (i) the actual item that Jane has (target item: oranges), (ii) a cohort competitor for the target item (i.e., an item starting with the same sound as the target item, for example oars), and (iii) two unrelated distractor items (ex: pencils and mittens). The logic was that when participants heard the word only, they would access a set of alternatives, and this would help them predict the object NP. Eye movements to objects in a display are closely time locked to the referents that are being considered (Cooper 1974; Tanenhaus, Spivey-Knowlton, Eberhard, and Sedivy 1995; for a review see Tanenhaus & Trueswell 2006). If participants are using additional information from the focus set of alternatives to anticipate what word will be said, they should look at the target faster when hearing a sentence with the focus particle only than when hearing a sentence without a focus particle. However, if participants are not accessing a set of alternatives or if semantic kinds are not members of the set, participants will only be guided by the sounds that they hear. This would mean that, for sentences with only as well as for sentences without a focus-sensitive word, participants should be equally likely to look at any of the items until the beginning of the word oranges, at which point, participants should be as likely to look at “oars” as “oranges” (as the initial vowel is the same).

C. Kim found that participants were faster to disambiguate the target word when it was preceded by a focus sensitive word than when it was not. This is evidence that participants were
accessing a set of alternatives upon hearing the word only, and furthermore that objects of the same semantic kind as the focused constituent are members of the set.

C. Kim then ran a second study with the same procedure in order to investigate whether context guides membership into the set of alternatives. In the second study, the characters are Jill and Peter. In the first sentence, Jill and Peter are introduced as being in a certain location. In the second sentence, Jill wants to buy some items, and then, in the third sentence, Peter wants to buy some items. The target was the final word of the third sentence. An example item is in (19).

19) Novel-Wide: Jill and Peter are at the drugstore. Jill wants to buy some paperclips and some notebooks. Novel-Narrow: Jill and Peter are at the newsstand. Jill wants to buy some comic books and some cigarettes.6 Peter (only) wants to buy some magazines.

Like in the first experiment, participants would see a display while hearing these sentences. The display depicted the target word (ex: magazines), a cohort competitor (ex: magnets), and two unrelated distractors (ex: scissors and lamps). An example display is in Figure 2.

6 The experiment also contained two other conditions in which Peter wants to buy the same item as Jill. These were designed to investigate whether participants preferred discourse new or old material. C. Kim found a general preference for discourse new material, except in the presence of only which seemed to prefer discourse old material.

Mention-Wide: Jill and Peter are at the drugstore. Jill wants to buy some magazines and some notebooks.

Mention-Narrow: Jill and Peter are at the newsstand. Jill wants to buy some magazines and some notebooks.
The main goal of this version of the experiment was to investigate whether the context of an utterance influenced which objects were included in the set of alternatives. In the Wide condition, Jill and Peter are in a very general environment (ex: a drugstore), and the objects that Jill wants to buy are not related to those that Peter wants to buy. In the Narrow condition, Jill and Peter are in an environment that would be much more likely to only offer a limited range of products (ex: a newsstand), and the items that Jill wants to buy are closely related to those that Peter buys.

The experiment found that participants fixated on the target word faster in the presence of only than without only when Jill and Peter were in a limiting environment (ex: newsstand), but not when Jill and Peter were in a general environment (ex: drugstore). This experiment provides further evidence that participants are accessing a set of alternatives, and, furthermore, that the members of the set can be constrained by the context of the utterance. For example, when Jill and Peter were at a newsstand, the participants, upon hearing only, were accessing a set of alternatives that consisted of types of printed media. Because of this, magazines, as a type of printed media, was under consideration, but its cohort competitor, magnets, was not. This allowed the participants to fixate on “magazines” quickly when they began to hear the word. On the other hand, when Jill and Peter were in a drugstore, the participants, upon hearing only, were accessing a set of alternatives that consisted of a wider range of items. In this case, magazines and magnets were equally likely to be members of the set, and the participants could not decide between them until the auditory stimuli disambiguated them.

Together, these two experiments from C. Kim’s dissertation show that the set of alternatives is cognitively real. Additionally, these studies show that the members of the set of alternatives
can be of the same semantic kind as the focused constituent and that membership can be contextually constrained. What is left open by these studies, though, is whether the presence of alternatives is driven by focusing or by the lexical entry of a focus associating word like only. For instance, it isn’t necessary that focus accesses a set of alternatives as part of its semantic meaning, but rather, only could have a lexical entry that instructs it how to use focus in order to access the alternatives, and indeed, all of the main theories of focus posit that only includes reference to contextually restricted alternatives in its semantic definition. Without only, focus may not access a set of alternatives.

It is also unclear whether or not the alternatives become more or less salient as a result of being included in the focus set of alternatives. While the results look as if members of the set are facilitated, these experiments were testing the state of the set before the participants knew what the focused constituent was. The experiments presented in Section 2.4 hope to clarify these issues.

2.3.2 Braun and Tagliapietra 2010

Braun and Tagliapietra (2010) investigated whether the focus set of alternatives is cognitively real using a cross-modal lexical decision task that relied on semantic priming. Semantic priming is the phenomenon that occurs when a word (known as the prime or cue, ex: doctor) commonly causes another word to become more salient (known as the target, ex: nurse). It is commonly proposed that, when hearing or seeing a word, a comprehender is only able to recognize that a certain string of sounds/letters matches an entry in his/her mental lexicon once the entry receives enough activation to reach its threshold. Activation can come from a number of sources, but one possible source is from semantically related words. When one word (ex: doctor) receives activation, this activation spreads to other semantically related concepts (ex: nurse). Because these related concepts now have some amount of activation, they are more salient than concepts that have not yet received any activation, and more salient concepts are more likely to be produced or present in the mind. This is the phenomenon of semantic priming. Semantic priming happens automatically when a word is presented in isolation or when a word is presented as part of an utterance or dialogue. (Neely 1976, 1977)

Braun and Tagliapietra were building on an earlier study by Norris et al (2006). Norris et al conducted a cross-modal priming study, which showed that priming was stronger when the prime
word was preceded by a focus-sensitive word (ex: *only*) and/or contrastively accented. Braun and Tagliapietra were concerned that in the Norris et al study, it was difficult to tell what was causing the contrastive focus effect since the results treated contrastive accenting and focus sensitive words the same, so in the Braun and Tagliapietra experiment, focus was only marked by a contrastive accent.

Braun and Tagliapietra used a lexical decision task where the participant first heard a sentence containing a prime word, and then had to decide if the next word that appeared was a real word of Dutch or a non-word. Only real words were used in experimental conditions. The logic of a lexical decision task is that participants must access a word’s lexical representation in order to decide that it is a real word and not a non-word. The faster a participant is able to affirm that a word is real, then the more activated that word had to be in their mind already. In other words, if a word is already activated for a participant, then they will be faster to affirm that that word is real when it is presented to them.

In the Braun and Tagliapietra study, the participants first heard a sentence with either a neutral intonation or two contrastively accented words. The last word of the sentence was the prime word. An example item is in (20).

20) In *Florida*$_F$, he photographed a *flamingo*$_F$.

Participants were then shown (in writing) (i) a word that contrasted with the prime word and was semantically related to it (i.e., was an alternative to the prime word, ex: *pelican*), (ii) a related, non-contrastive word (ex: *pink*), or (iii) an unrelated, unassociated word (e.g. *celebrity*).

The more that the prime word activated the target word before it appeared, the faster the participant should have responded to the target word. The related words (ex: *pelican, pink*) should be recognized faster than the unrelated word (ex: *celebrity*), in light of the well-known phenomenon of semantic priming. However, if an alternative set really does exist for focused constituents, then only the related contrastive word (ex: *pelican*), but not the others, should be included in this set. This is because only targets that could be grammatically substituted for the prime word (ex: *flamingo*) are plausible alternatives for the prime word in the sentence. Consequently, when the prime is heard with a contrastive accent, the related contrastive word should be more activated. Thus, *pelican* should be recognized faster than either *pink* or *celebrity*.
Braun and Tagliapietra’s results support this prediction. When the prime word (ex: *flamingo*) was heard with a neutral intonation, both of the related words (ex: *pelican, pink*) were recognized faster than the unrelated word (ex: *celebrity*), but there was no significant difference in the response times to the two related words. However, when the prime word was contrastively focused, participants still recognized the related non-contrastive word (ex: *pink*) faster than the unrelated word (ex: *celebrity*), but they recognized the related contrastive word (ex: *pelican*) even faster. This cannot be attributed to semantic priming being strengthened by the saliency of the word in focus because participants only responded faster to the related contrastive word, not the equally related, equally primed non-contrastive word. This is additional evidence for the existence of a set of alternatives when a word is focused.

This study also provided evidence for which objects can be members of the set of alternatives. Braun and Tagliapietra selected their targets by a free association task that presented 31 Dutch speaking participants with the prime words from the study and then asked them to respond with the first word they thought of (ex: *pelican* would be a response to *flamingo*). Braun and Tagliapietra then chose as targets responses that were given by at least 25% of the participants. It appears that semantic associates of the focused constituent can be members of the set of alternatives.

Finally, it should be noted that members of the set of alternative were made more salient by focus in this study. This is to be expected if the set of alternatives is present in the mind of the comprehender and not rejected. This is consistent with the set of alternatives in Alternative Semantics and Integrated Pragmatics.

This study, though, did not investigate the effect of context on the set of alternatives. C. Kim (2012) provided evidence that the set of alternatives is contextually restricted. It remains possible that the members of the set are related to the context of the utterance, in addition to being related to the focused constituent itself as was found in this study. The experiments in the following section will seek to clarify the role that context plays in determining the members of the set of alternatives, as well as support the findings that 1) there is a set of alternatives and 2) the members of the set are facilitated.
2.4 Lexical Decision Experiments 1 and 2

The existence of a focus set of alternatives, as has been shown, is contentious within semantic theories of focus. Integrated Pragmatics, Alternative Semantics, Givenness Theory, and Reich’s Structured Meanings require a set of alternatives, but the original Structured Meanings does not, and even within the theories that do, the set of alternatives is built differently. Integrated Pragmatics and Alternative Semantics presuppose that the set is already present in the context of an utterance by the time that a focused constituent is encountered, but allow that a speaker might need to accommodate the existence of this set, thus only determining what the members of this set must have been upon encountering the focused constituent. Reich’s Structured Meanings generates a set of alternatives when the focused phrase is encountered, and Givenness Theory generates a set of alternatives when given material is encountered. It is therefore extremely important to determine whether the set of alternatives exists and how it is composed. As discussed in Sections 2.3.1, 2.3.2, and 2.3.2, three previous studies have provided evidence that the focus set of alternatives exists in the minds of language users and that the members of this set are facilitated. The first goal of Lexical Decision Experiments 1 and 2 is to replicate these results.

The second goal of Lexical Decision Experiments 1 and 2 is to test whether the set of alternatives can be built dynamically from the linguistic context of the utterance, instead of relying on long term semantic associations. The previous studies all relied on prime-target pairs related by semantic kinds or free association, not the linguistic or extra-linguistic context of the utterance (although there was some evidence from the second experiment in C. Kim (2012) that extra-linguistic context also influences the membership of the set of alternatives). This question has both methodological and theoretical consequences. Methodologically, experiments on the focus set of alternatives should be sure to test alternatives that are actually members of the set. Theoretically, knowing what the members of the set are can tell us how the set is built, and also, to an extent, when the set is built. If the members of the set of alternatives must be semantically related to the focused constituent, then the set cannot be built before encountering the focused constituent. The comprehender would have to know what the focused constituent is before knowing what the members of the set are. This raises the possibility that perhaps the set is not presupposed, and therefore already present in the context. If, however, the members of the set are predictable from the context of the utterance, then the set of alternatives can be built before encountering the focused constituent. The comprehender could use the information preceding
the focused constituent to know what the members of the set are before encountering the focused constituent.

2.4.1 Lexical Decision Experiment 1

In this experiment, I investigated whether comprehenders access a set of alternatives in order to understand a focused sentence and whether newly learned associates can be members of this set. This was done using a priming paradigm where participants read a short narrative, the last sentence of which ended in a focused word. Participants were then asked to perform a lexical decision task on a target word. I measured the speed with which they could affirm that the target word was a real word. This was done in order to probe whether the participants were using a set of alternatives to interpret the focused last sentence. I varied the relationship between the target word and the focused last word of the short narrative in order to probe what types of relationships are included in the set of alternatives. The results suggest that comprehenders do use a set of alternatives when interpreting focus and that newly learned association can be members of this set.

2.4.1.1 Lexical Decision Experiment 1 participants

Forty-nine native speakers of English from the University of Southern California community participated in the experiment. They were naïve to the purpose of the study.

2.4.1.2 Lexical Decision Experiment 1 materials and design

Thirty sets of four sentences and a target word were composed as the experimental materials. All stimuli were presented to the participants in written form, not spoken. Together, the four sentences told a short narrative, as illustrated in ex. (21)).

21) a) Little Jackie wanted to work as a famous singer, painter, and dancer.  
b) These were the careers that she saw the most on television.  
c) When she was older, she learned that it was difficult to be famous.  
d) In college, she worked as only a dancer.  
   In college, she worked as a dancer.  [Focused, Associated]  
   In college, she worked as only a painter.  [Focused, Newly Learned]
In college, she worked as a painter. [Unfocused, Newly Learned]
In college, she worked as only an architect. [Focused, Unrelated]
In college, she worked as an architect. [Unfocused, Unrelated]

After participants had read the story, they saw the target word on the screen and performed a lexical decision task on it:

Target Word: *singer*

We measured participants’ reaction times affirming that the target word was a real word of English. The target word was kept constant for all conditions of an item so that any differences in reaction time cannot be attributed to properties of the target word.

Sentence (a) introduced a set of three objects. The first item was the target word that the participants performed the lexical decision task on (ex: *singer*). The second item (ex: *painter*) was not semantically associated with the target (though the context built a relationship between it and the target word), and the third item was commonly associated with the target (ex: *dancer*). Association was defined using the South Florida Free Association Norms (Nelson, McEvoy, and Schreiber 1998). *Associated* words had a forward cue-to-target strength of .08-.25\(^7\). *Cue-to-target strength* is a ratio derived by dividing the number of people who responded with a particular word when given a cue word by the total number of people. For example, *dancer-singer* has a forward cue-to-target strength of .15, meaning that when given the word *dancer*, 15% of the people in a group responded *singer*. The words used in the *unassociated* condition were words that never cued the target – i.e., when given the unassociated word, no one responded with the target word.

Sentence (b) assigned a common property to the set introduced in the first sentence in order to reinforce their relationship to one another. Sentence (c) moved the narrative along. Sentence (d) contained the prime word as the last word of the sentence (ex: In college she worked as only a *dancer*). The prime word was bare or focused with *only*.

\(^7\) This is not an especially high cue to target strength (for comparison, *doctor-nurse* has a cue-to-target strength of .38 and *nurse-doctor* has a strength of .55), but unfortunately, other constraints of the experiment, such as the need to control word frequency, did not make a higher cue to target strength plausible.
We manipulated the nature of the association relation between the prime word and the target word: (i) **Associated**: The prime was a semantic associate of the target word (ex. dancer if the target is singer). (ii) **Unassociated**: The prime was not semantically associated with the target word but was mentioned in the set from the first sentence (ex. painter if the target is singer). (iii) **Unmentioned**: The prime is not semantically associated with the target word and not in the set from the first sentence (ex. architect if the target is singer). Thus, by manipulating **Focus** (presence vs. absence of only) and **Relatedness** (associated, unassociated, unmentioned), we created six conditions, shown below:

22) In college, she worked as…
(i) Focused, associated: *only a dancer*
(ii) Unfocused, associated: *a dancer*
(iii) Focused, unassociated: *only a painter*
(iv) Unfocused, unassociated: *a painter*
(v) Focused, unmentioned: *only an architect*
(vi) Unfocused unmentioned: *an architect*

All three primes for an item (the associated, the unassociated, and the unmentioned) were matched for frequency to be within 10 words/million of each other (Kucera and Frances 1967). All target words were between 10 and 29 words/million. The same target word was always used for an item so that differences between target words, such as cohort size, orthographic shallowness, etc, would not affect reaction times unevenly across conditions.

In addition to the 30 targets, the study also included 48 fillers. Fillers used real words and non-words. The full experiment had a 1:1.5 real words to non-words ratio.

### 2.4.1.3 Lexical Decision Experiment 1 procedure

We used a lexical decision task. All stimuli were presented in writing on a computer screen using Perception Research System’s Paradigm. The first three sentences of an item (Sentences (a,b,c)) were presented one at a time. Participants hit the space bar to move to the next sentence. The fourth sentence (Sentence (d)) was presented one to three words at a time (small function words were grouped together to make it easier to read), and participants used the space bar to
move through the sentence. This word-by-word presentation was done to control the timing between when the participant saw the prime word and the target word. The primes were presented in a chunk either with the article, if in the unfocused condition, (ex: *a painter*) or with the article and *only*, if in the focused condition (ex: *only a painter*).

The participant pressed the spacebar when s/he finished reading the prime, and the target word appeared in the center of the screen after a 250ms delay. As the target word appeared, the background color of the screen also changed from blue to pink. Participants were trained that the color change meant they should decide if the string of letters was a word or not. They pressed the ‘f’ key if the string of letters was a real word of English and the ‘j’ key if it was not. Participants were instructed to take their time reading the sentences, but to carry out the lexical decision task as quickly as possible. Reaction time was measured from when the target word appeared on the screen to when the participant pressed ‘f.’

There were also four comprehension questions evenly spaced throughout the experiment. All Seven participants were excluded for not answering at least three of the four questions correctly. Data from forty-two participants was included in the final analysis.

2.4.1.4 Lexical Decision Experiment 1 results

Any trial where the participant answered incorrectly that the target was not a word was excluded from analysis. This resulted in 1.3% of the data being excluded. No participant responded incorrectly to more than 3 trials (90% accuracy). Reaction times (RTs) were adjusted so that any RT that was more than three standard deviations from a participant’s mean in that condition was adjusted to the participant’s mean for that condition. This affected .2% of the data (3 trials).

The RTs for all six conditions are shown in Error! Not a valid bookmark self-reference. To analyze the data statistically, we used ANOVA with two factors: Focus (presence vs. absence of *only*) and Relatedness (associated, unassociated, unmentioned). There was a significant main effect of focus ($F_1(1, 41)= 6.62, p_1 < .05; F_2(1, 29)= 4.26, p_2 < .05$). Participants responded faster to the target word when the prime was focused by *only* than when the prime was unfocused, as can be seen in Figure 4. This is additional evidence that speakers are in fact using a set of alternatives when evaluating a focused constituent.
We also found a marginal main effect of relatedness ($F_1(2, 40)= 2.55, p_{1} = .091; F_2(2, 28)= 3.06, p_{2} = .063$) (see Figure 5). Thus, participants’ RTs were influenced by the nature of the relationship between the prime and the target. There was no significant interaction between focusing and the relationship between the prime and the target ($F_1(2, 40)=.933, p_{1}=.402; F_2 (2,28)=606, p_{1}=.553$).

![Figure 3: Reaction time for all experimental conditions of Lexical Decision Experiment 1](image)

![Figure 4: Reaction times on trials with and without the focus-marker only in Lexical Decision Experiment 1, collapsing across how prime and target were related](image)
To investigate which differences in the relatedness factor were driving the main effect, planned t-tests were run comparing the associated and the unassociated condition to the unmentioned condition, both when focused and when not focused (ex: a painter vs. an architect; only a painter vs. only an architect, see Error! Not a valid bookmark self-reference.). Planned t-tests comparing the focused version of each prime to its unfocused version were also run (ex: the reaction times for singer when the prime was a painter vs. only a painter). The overall RTs, collapsing the focused and unfocused conditions, are shown in Figure 5. (This is the same data as shown in Error! Not a valid bookmark self-reference. and Figure 4, just collapsing across conditions.) Three significant or marginal effects were found:

Lexical decision for the target word in the focused, unassociated condition (ex. when only a painter preceded the target singer) was significantly faster than in the focused, unmentioned condition (ex. when only an architect precedes the target singer) \( t_1(41) = -3.2, p_1 < .05; t_2(29) = -2.2, p_2 < .05 \). This indicates a priming effect for items associated to the target only by a learned association in the context (painter had been mentioned in the context set but is not semantically associated). This is evidence that associations that are newly learned from the context, not just long term semantic associations, are used when determining the members of the set of alternatives.

Lexical decision times for the target word (ex: singer) in the unfocused, associated condition (prime: a dancer) was significantly faster than in the unfocused, unmentioned condition (prime: an architect) by subjects but not by item \( s(t_1(41) = -2.1, p_1 < .05; t_2(29) = -1.35, p_2 = .187 \). This is the classic lexical-decision result showing that the target was indeed being primed by a related
word. The lack of significance by item may be caused by variation across items, perhaps due to different prime frequencies.

Finally, lexical decision times for the target word (ex: singer) in the focused, unassociated condition (prime: only a painter) was significantly faster than the unfocused, unassociated condition (prime: a painter) by items($t_2(29)$ = -2.29, $p_2 < .05$) and marginally faster by subjects ($t_1(41)$ = -1.8, $p_1 = .076$). This finding is important because it further supports the idea that the unassociated items were included in the participants’ set of focus alternatives, presumably due to their membership in the ‘ad-hoc’ set that was created in the narrative. The other result supporting this, that unassociated items were recognized faster than unmentioned items in the focused condition of this study, is harder to interpret, because the unmentioned prime words were the only condition that wasn’t mentioned in the prior linguistic context. Thus, the effect previously discussed could be attributed to givenness. However, this additional finding that unassociated words were recognized marginally faster in the focused condition than in the unfocused condition shows that the unassociated words were sensitive to the focus manipulation. This argues strongly that the unassociated words were part of the focus alternative set, and therefore primed.

Lexical decision times for the target word (ex: singer) did not differ from each other in the unfocused unassociated condition (prime: a painter) vs. the unfocused unmentioned condition (prime: an architect) ($t_1(41)$ = -1.41, $p_1 = .17$; $t_2(41)$ = -1.09, $p_2 = .28$). This, though, is to be expected if the unassociated item is primed only by virtue of being included in the focus set of alternatives. More problematic is that lexical decision times in the focused associated condition (prime: only a dancer) and the focused unmentioned condition (prime: only an architect) did not differ from each other ($t_1(41)$ = -.543, $p_1 = .59$; $t_2(41)$ = -.17, $p_2 = .87$). Furthermore, lexical decision times in the unfocused associated condition (prime: a dancer) did not differ from those in the focused associated condition (prime: only a dancer) ($t_1(41)$ = -.139, $p_1 = .89$; $t_2(41)$ = .04, $p_2 = .97$). If semantic associates are members of the set of alternatives, as was found in Braun and Tagliapietra (2010), then we would expect that lexical decision times for target words in the focused associated condition (prime: only a dancer) should be faster than lexical decision times in both the focused unmentioned condition (prime: only an architect) and the unfocused associated condition (prime: a dancer). The fact that we observed no differences here opens the possibility that membership into the set of alternatives is determined only by the newly learned
associations in the context. This would be consistent with the set of alternatives being present before the focused constituent is encountered, as is proposed by Integrated Pragmatics and Alternative Semantics.

Finally, lexical decision times for target words in the unfocused unmentioned condition (prime: *an architect*) and in the focused unmentioned condition (prime: *only an architect*) differed marginally by subjects but not by items ($t_1(41) = -1.78$, $p_1 = .082$; $t_2(41) = -1.19$, $p_2 = .24$). This result could be problematic, as it might indicate some general speed effect of focusing, but it is also possible that, if membership into the set of alternatives is determined by context, the unmentioned item is plausible enough to have been included in the set of alternatives in enough cases to drive this small result. At any rate, this result doesn’t reach the significance threshold so little can be said.

2.4.1.5 *Lexical Decision Experiment 1 discussion*

Our lexical decision experiment confirmed prior findings that the presence of focus speeds up word recognition (C. Kim 2012, Braun and Tagliapietra 2010). Importantly, we also found that unassociated primes (ex: *only a painter*) primed the target at least as well as related primes (ex: *only an architect*) in the focused condition. In other words, focused primes related to the targets only by newly learned associations in the context (rather than long-term semantic associations) also cause the target to be recognized faster than when an unmentioned prime is used. This suggests that unassociated primes, related to the target only by newly learned associations in the context, are members of the set of alternatives.

Oddly though, no such result was found for semantic associates. C. Kim (2012) found that semantic kinds were members of the set of alternatives, and Braun and Tagliapietra (2010) found that free associates, just like the ones Lexical Decision Experiment 1 used, were members of the set of alternatives. There are a few possibilities for why Lexical Decision Experiment 1 did not find a result for semantic associates. The less interesting possibilities are 1) that it is a floor effect, meaning that the participants in the unfocused condition were already responding to the target as fast as they ever could, and 2) that the strength of the association was weaker for Experiment 1 than for Braun and Tagliapietra. Braun and Tagliapietra used free associates with at least a .25 forward cue-to-target strength; Experiment 1, because it was also controlling for frequency, used free associates with at least a .08 forward cue-to-target strength. The more
interesting possibility is that semantic associates may not be used to build the set of alternatives. This would mean that membership into the set is determined by the context of the focused utterance and that the set could then be determined before encountering the focused constituent. This would be consistent with the set of alternatives being presupposed as it is in Integrated Pragmatics and Alternative Semantics. The results in previous studies could be driven by a relationship between the alternative being tested and the context of the utterance. This is particularly apparent in C. Kim (2012): all of the focused items she tested were predictable from the context of the utterance. Braun and Tagliapietra’s results are harder to explain in this manner, but not impossible, because their alternatives were related to the context as well.

In order to investigate this further, we conducted a second lexical decision experiment. Lexical Decision Experiment 2 had only semantic associates in it, not newly learned associates, in order to investigate whether semantic associates are included as members of the set of alternatives. It also included a condition in which focusing was marked by an L+H* accent, and not by the presence of only, to determine whether the results from Lexical Decision Experiment 1 were being driven by the presence of focus or the presence of only. All theories predict that only accesses a set of alternatives, but only Integrated Pragmatics, Alternative Semantics and Reich’s Structured Meanings predict that constituents focused with a pitch accent access a set of alternatives.

2.4.2 Lexical Decision Experiment 2

In this experiment, I investigated whether comprehenders access a set of alternatives in order to understand a focused sentence and whether semantic associates can be members of this set. This was done using a priming paradigm where participants read a short narrative, the last sentence of which was presented auditorily. The last sentence ended in a focused word. Participants were then asked to perform a lexical decision task on a target word. I measured the

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8 This experiment had five conditions in total, but only three conditions will be reported in this section. The two conditions that have been excluded are: new-information focus that introduces a new lexical item into the discourse and new-information focus that introduces a new referential object into the discourse. The additional purpose of Lexical Decision Experiment 2 was to determine whether new-information focus accessed a set of alternatives. This question, and therefore these additional two conditions, are irrelevant to the current discussion, and so they have not been included here. More details on the new-information focus conditions can be found in 2.4.2.7.
speed with which they could affirm that the target word was a real word. This was done in order to probe whether the participants were using a set of alternatives to interpret the focused last sentence. The results suggest that comprehenders do use a set of alternatives when interpreting focus and that newly learned association can be members of this set.

2.4.2.1 Lexical Decision Experiment 2 participants
Data from forty native speakers of English from the University of Southern California community was included in the final analysis. They were naïve to the purpose of the study. Data from three participants was excluded because they had six or more data points that were more than three standard deviations from the overall mean reaction time, and these data points were unevenly distributed to favor a particular condition so that the data for one condition was completely missing. The excluded participants were replaced with new participants so that there was no data lose.

2.4.2.2 Lexical Decision Experiment 2 materials
Thirty sets of three sentences and target words were composed as the experimental materials. The last word of the third sentence was the prime word. All prime-target pairs were the same as those from Lexical Decision Experiment 1, but, unlike Experiment 1, the last sentence containing the prime word was presented auditorily. The other context sentences were presented in writing. Written, there did not need to be concerns about systematic confounds in the prosody/speed/etc of the previous sentences affecting participants’ reaction times.

Two types of contrastive focus were compared to a given condition that was neither contrastively focused nor new-information focused.

23) Lexical Decision Experiment 2 Conditions
a) contrastive focus with a pitch accent:
   Jackie worked as a dancer. Jackie went to New York. So she worked as a dancer.
b) contrastive focus with only:
   Jackie worked as a dancer. Jackie went to New York. So she worked as only a dancer.
c) given:

Jackie worked as a dancer. Jackie went to New York. So she worked as a dancer.

TARGET: singer

In the contrastive focus conditions, the prime word (ex: *dancer*) was either focused with a contrastive pitch accent or by association with *only* as in Lexical Decision Experiment 1. Example (23) is an example of a contrastive pitch accent condition, and example (23) is an example of an association with *only* condition. The words in both of these items were almost identical\(^9\) to the given condition (ex.23). The only difference was whether the prime word was contrastively focused. This was done so that any difference between these contrastive conditions and the given condition could be said to be due to either the contrastive accent or the presence of *only*. The sentence containing the prime word in these three conditions was a direct repetition of the first sentence. This was done so that the prime was unquestionably given, under any definition. For instance, Schwarzschild (1999) defines givenness according to existential closure. Chafe (1976) defines a constituent as given if it is inferentially related to the previous context by categorization. Prince (1981) expands this to include any constituent that is evoked or inferentially related to either the discourse or an extralinguistic/situational context, while other authors, such as Kuno (1972), define givenness as predictability or the speaker’s assumptions about the hearer’s knowledge (Clark and Haviland 1977). In the givenness condition, the prime, both as a lexical item and as a discourse object, has already been introduced in the discourse. Additionally, the VP containing the prime word has been introduced into the discourse so that there is no chance of focus projection requiring a pitch accent on the prime word. This should make the prime word and the VP anaphoric (Schwarzschild 1999), inferentially related to the previous discourse (Chafe 1979, Prince 1981), and predictable (Kuno 1972, Clark and Haviland 1977). Repeating a VP can sound awkward in a conversation; therefore, the connective *so* was used in an attempt to make the repetition informative, and thus felicitous.

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\(^9\) In six items, it was necessary, in order to make the contrastiveness plausible, to negate the second sentence of the item. An example of this would be item #1 in Appendix B. The given condition was: *Jane ate an apple. Jane was hungry. So she ate an apple*. However, the contrastive *only* condition was: *Jane ate an apple. Jane wasn’t hungry. So she ate only an apple*. With the exception of the negation, the contrastive conditions and the given conditions had the same words.
2.4.2.2.1 Acoustic properties of the experimental stimuli

This experiment relied upon an L+H* pitch accent to mark focus and a falling intonation to mark givenness. In order to ensure that the pitch accent was used accurately, an acoustic analysis was performed on the experimental stimuli.

Many authors going back to Pierrehumbert (1980) and Jackendoff (1972) have claimed that an L+H* pitch contour is associated with contrastive focus\(^{10}\), and there is experimental evidence supporting this. For instance, Carlson et al (2009) was able to use this pitch contour successfully in a study showing that contrastive focusing can influence the choice of referent for sluicing constructions, and, more importantly for this discussion, Braun and Tagliapietra (2010) were able to show that this pitch accenting caused participants to access a set of alternatives. Katz and Selkirk (2009) found that the L+H* pitch contour is associated with new-information focus as well, but that F0 is more compressed for new-information focus than for contrastive focus, making the pitch less prominent. In light of these studies, in our experiment, the items that were contrastively focused with a contrastive accent had a very prominent L+H* pitch contour on the prime word. Items contrastively focused by association with only had a very prominent L+H* pitch contour on the word only. I decided to put the pitch accent on the word only in this condition so that the contrastive accent condition and the only condition could be distinguished from one another.

The given condition was entirely deaccented, with a low pitch through the entire sentence.

Three acoustic measurements were taken to confirm these pitch contours: maximum pitch, pitch rise, and duration\(^{11}\).

**Maximum pitch**: The maximum pitch is the maximum pitch of the stressed syllable of the prime word or, for the only condition, the stressed syllable of only. The purpose of this

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\(^{10}\) Although there have also been claims that other accents are also associated with contrastive focus. See, for example, Watson et al 2008 who found, in a visual world eyetracking study, that that H* also associates with focus, though L+H* in their study appears to be more specialized for contrastive focus. Crucially, L+H* has been used by other studies to invoke effects related to contrastive focus so it should be an effective standard here. In general, there is a great deal of disagreement about how prosody maps to meaning.

\(^{11}\) I also measured the pitch range for the material preceding the focused constituent, but this measurement is only relevant to the new-information conditions that are not being reported here.
measurement was to ensure that the contrastive items and new items accomplished the H*, as compared to the given items.

It was found that the maximum pitch in the contrastive accent condition was significantly higher than in the given condition (t(29)=9.03, p<.001) and, the maximum pitch in the only condition was significantly higher than in the given condition (t(29)=8.27, p<.001). There was no significant difference between the contrastive accent condition and the only condition (t(29)= -0.39, p=.701). This shows that the contrastive conditions did have a higher pitch than the given condition, as would be consistent with them having an H* accent.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Maximum Pitch (Hertz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>con accent</td>
<td>209.472</td>
</tr>
<tr>
<td>given</td>
<td>171.9443333</td>
</tr>
<tr>
<td>only</td>
<td>208.564</td>
</tr>
</tbody>
</table>

Table 1: Maximum pitch for items in Lexical Decision Experiment 2

**Pitch Rise:** The pitch rise was measured for the stressed syllable of the prime or, for the only condition, for the stressed syllable of only. It was calculated by subtracting the pitch at the beginning of the stressed syllable from the maximum pitch for that syllable (maximum pitch – beginning pitch). The beginning pitch was measured at the onset of the stressed syllable, or, if the stressed syllable began with an unvoiced consonant, at the next closest voicing. The items were, unfortunately, not always ideal for acoustic analysis because they were designed for controlling frequency and relatedness and other purposes. However, it is important to remember that any problems this method of measuring might have introduced into the acoustic analysis are spread evenly across all conditions since the stressed syllable was in the same environment for every condition (except the only condition).
It was found that the contrastive accent condition had the greatest pitch rise (vs. given: (29)=8.14, p<.001; vs. only: t(29)= -4.24, p<.001). The only condition had a significantly greater pitch rise the given condition (t(29)=3.67, p<.01).

<table>
<thead>
<tr>
<th>Condition</th>
<th>Pitch Rise (Hertz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>con accent</td>
<td>37.13766667</td>
</tr>
<tr>
<td>given</td>
<td>4.494333333</td>
</tr>
<tr>
<td>only</td>
<td>21.95066667</td>
</tr>
</tbody>
</table>

*Table 2: Pitch rise for items in Lexical Decision Experiment 2*

**Duration:** The duration was measured from the onset of the prime’s stressed syllable to either the beginning of the onset of the following syllable or, if the prime was one syllable long, the beginning of silence at the end of the word. The duration for the only condition was also measured on the prime word. This was done because measuring on the word only would have required measuring on a different word than in the other conditions, and there is no reason to believe that the duration of the stressed syllable of only would be comparable to the stressed syllable of the prime. We expect that the prime word in the only condition should exhibit some features of contrastive focusing, due to association with focus, but not as strongly as the word only itself or the prime in the contrastive accent condition.

The prime in the contrastive accent condition was significantly longer than in the given condition (t(29)=6.44, p<.001) and the only condition (t(29)=4.42, p<.001). The prime in the only condition was also significantly longer than in the given condition (t(29)=2.73, p<.05).
Table 3: Duration for prime word in Lexical Decision Experiment 2

In sum, then, the contrastively focused items did differ acoustically from the given items. The contrastive accent condition had the highest maximum pitch, the greatest pitch rise, and the longest duration. This is consistent with an L+H* accenting. The only condition had a higher maximum pitch, greater pitch rise, and longer duration than the given condition. This is consistent with a flat intonation for the given condition.

2.4.2.3 Lexical Decision Experiment 2 procedure

Lexical Decision Experiment 2 was a cross modal lexical decision task. The first two sentences of an item were presented on a computer screen, as in Experiment 1, using Perception Research Systems’ Paradigm. Participants pressed the space bar to move to the next sentence. When they pressed the spacebar after the second sentence, the third sentence automatically played. Then, after a 250 ms pause, the target word (ex: singer) was presented, and the participant was instructed to press as quickly as possible either ‘f’ to indicate that the target was a real word of English or ‘j’ to indicate that the target was a nonword. Reaction time was measured from when the target word appeared to when the participant pressed either ‘f’ or ‘j.’

Randomly spaced throughout the experiment were nine comprehension questions. All participants answered at least six of them correctly to be included in the experiment.
2.4.2.4 Lexical Decision Experiment 2 predictions

It is expected that the given conditions will not make use of a set of alternatives. Therefore, there should be a significant difference between participants’ reaction times in the given condition and any condition that the participants are interpreting using a focus set of alternatives. Specifically, based on the results of Lexical Decision Experiment 1, C. Kim (2012), and Braun and Tagliapietra (2010), it is expected that participants should be significantly faster to respond to the target word on conditions where they are making use of a focus set of alternatives than on the given condition where they are not using a focus set of alternatives. The logic here is the same as in Experiment 1: the target word should be a member of the set of alternatives so it is already activated when the participants have to access its lexical form in order to declare that is a real word of English.

2.4.2.5 Lexical Decision Experiment 2 results

As in Experiment 1, all reaction times (RTs) that were more than three standard deviations from the participant’s mean in a particular condition were adjusted to the participant’s mean for that condition. This resulted in .7% of the data being adjusted (8 trials). The results are in Figure 6 below.

![Reaction Time for Lexical Decision Experiment 2](image)

*Figure 6: Results for all conditions in Lexical Decision Experiment 2*
The given condition was used as a baseline. Because it did not contain any type of focus, new or contrastive, it should be an accurate measure of how fast participants are likely to respond to the target in the absence of a focus set of alternatives.

It is interesting to note that, in this experiment unlike in Lexical Decision Experiment 1, the contrastive only condition caused participants to respond to the target word significantly slower than they did to the given condition ($t_1(39) = 2.69, p_1 < .05; t_2(29) = 2.31, p_2 < .05$). There was, however, no significant difference between the contrastive accent condition and the given condition ($t_1(39) = 1.08, p_1 = .29; t_2(29) = .87, p_2 = .39$) nor between the contrastive accent condition and the only condition ($t_1(39) = -.78, p_1 = .44; t_2(29) = -.58, p_2 = .56$).

2.4.2.6 Lexical Decision Experiment 2 discussion

There are two curious results in Lexical Decision Experiment 2. Firstly, participants’ reaction times for the contrastive accent condition did not differ from their reaction times in the given condition, even though their reaction times did differ for the only condition as opposed to the given condition. It is possible that the results seen in Lexical Decision Experiment 1 were the result of only accessing a set of alternatives, as part of its definition. In this case, focus wouldn’t access alternatives; only would include in its lexical entry a strategy for using focus to determine the correct set. This would be consistent with the original Structured Meanings, but it would contradict the results of Braun and Tagliapietra (2010). It should also be noted that the contrastive accent condition did not differ significantly from the only condition either. If the only condition was accessing a set of alternatives, but the contrastive accent condition was not, then the participants’ reaction times should have been different for these two conditions. It seems more likely that the lack of difference between the contrastive accent condition and the given condition is a result of the experiment itself; perhaps there was too much variation or not enough participants.

The most interesting result from Lexical Decision Experiment 2 was that the presence of a set of alternatives caused a slowdown (aka: the only conditions, instead of a speedup as in Lexical Decision Experiment 2 and the previous literature: the contrastive only condition was significantly slower than the given condition. There are two possible explanations for this slowdown.
The first possibility is that compiling a set of alternatives involves additional processing. Cowles (2003) ran an ERP study that would support this. She was investigating the difference between contrastive focus and information focus. Participants read either a contrastive focus context, as in (24) or an information focus context, as in (24).

A butcher, a chef, and a specialist were in the kitchen of a posh restaurant. They had started up the business together. It was successful, but they were very busy. All of them wanted everything to be perfect, but only one had time to stop and check the soup. Which one tasted the soup?
b) Information Focus Context for Cowles 2003
The kitchen of a posh restaurant was filled with people trying to get orders filled. Near the door was a butcher and another person. A group of cooks was clustered around a stove, including a chef and a specialist. There was a pot of soup in the corner that was almost ready to be served. Did anyone taste the soup?

Following the context, participants read, for both conditions, a sentence such as After a moment, the butcher tasted the soup. Each word of the sentence was presented separately and rapidly in the center of the screen (RSVP presentation). There are some possible issues with this design: for instance, it uses two different types of questions to evoke the different types of focus and, if we follow conventional theories assigning questions the meaning of being the set of possible answers, questions are inherently contrastive. However, even if this study was evoking contrastive focus in both contexts, it still is likely that only the context in (24) was capable of generating a set of alternatives for just the word butcher. This is because the context in (24) saliently introduces a set of alternatives to butcher, and the alternative set in (24) would be something like {the soup was tasted, the soup wasn’t tasted}, not a set of alternatives to butcher.

Cowles (2003) found in this study that for the condition where butcher likely had a set of alternatives (24), there was a significant Late Anterior Negativity (LAN) as compared to the condition where butcher likely didn’t have a set of alternatives. A LAN is usually associated with filler-gap dependencies and attributed to increased working memory load. This is evidence that using the set of alternatives does have processing costs. It, therefore, is not completely
unexpected that participants would be slower to respond to the target word when they had to use a set of alternatives.

This explanation might also be able to explain why no such slowdown was found in Lexical Decision Experiment 1. Since Lexical Decision Experiment 1 provided the participants with a set as part of the context, it may not have been as laborious for participants to compile a set of alternatives in that experiment. It would still remain to be explained, though, why no slowdown was seen in Braun and Tagliapietra (2010).

The second possibility is that participants are contrast ing the set of alternatives to the focused constituent. The participants may be rejecting the alternatives because they are not the constituent that is true of the utterance. This process could be semantic (the definition of focus invokes exhaustive selection), pragmatic (participants reason that only the focused constituent is true of the utterance), or cognitive (inhibiting likely alternatives to the focused constituent helps with accessing the correct lexical item). It should be noted, though, that for both of these possibilities, C. Kim (2012) would still not expect a slowdown because she was measuring the activation of the focused constituent itself, but it is puzzling that no slowdown was found in Lexical Decision Experiment 1 or Braun and Tagliapietra (2010).

2.4.2.7 Lexical Decision Experiment 2 additional conditions

Lexical Decision Experiment 2 had a second purpose that is not immediately relevant to this dissertation: to determine if new-information focus and contrastive focus are the same phenomenon by investigating whether new-information focus also invokes a set of alternatives. New-information focus is the pitch accent associated with introducing new information into a discourse. Researchers who believe that there are multiple types of focus minimally consider contrastive focus, associated with contrast or identification, and new-information focus to be distinct (e.g. Cowles (2003), É Kiss (1998), Katz and Selkirk (2009), Zubizarreta (1998)). The question of whether or not focus is a uniform phenomenon is not directly related to the questions in this dissertation though, the additional results of Lexical Decision Experiment 2 will be reported here very briefly.

Experiment 2 had five conditions. In addition to the conditions reported in Section 2.4.2.2, it had a lexically new (25) and a referentially new condition (25). The difference between the two
types of new-information focus was that, for the lexically new condition, the prime word itself was new but the object it referred to had been previously introduced, while, for the referentially new condition, the object the prime word referred to was new at the time of the prime word but the lexical item itself had been previously introduced. The same sound file was used for both new-information focus conditions. There was an H* accent on the prime word (ex. dancer).

25) Two Additional Conditions
   
a) lexically new:
   Jackie worked as something. Jackie went to New York. So she worked as a dancer.

b) referentially new:
   Jackie’s father worked as a coach before becoming a dancer. Later, Jackie went to New York. So she worked as a dancer.

TARGET: singer

The only condition was found to be significantly slower than the lexically new condition ($t_1(39) = 2.51, p_1 < .05; t_2(29) = 2.53, p_2 < .05$), and marginally slower, by item, than the referentially new condition ($t_1(39) = 1.55, p_1 = .13; t_2(29) = 1.85, p_2 = .07$).

There was, however, no significant difference between the contrastive accent condition and the lexically new condition ($t_1(39) = 1.09, p_1 = .28; t_2(29) = 1.87, p_2 = .25$) or between the contrastive accent condition and the referentially new condition ($t_1(39) = .47, p_1 = .64; t_2(29) = .35, p_2 = .72$). Additionally, neither of the new-information focus conditions were significantly different from the given condition (lexically new: $t_1(39) = -.08, p_1 = .94; t_2(29) = -.10, p_2 = .92$) (referentially new: $t_1(39) = .72, p_1 = .48; t_2(29) = .69, p_2 = .50$).

These results suggest that new-information focus is in fact distinct from contrastive focus. Specifically, they suggest that new-information focus does not access a set of alternatives while contrastive focus does. When the prime was new-information focused, participants did not react to the target any faster or slower than when the prime was given. This is evidence that new-information focus does not access a set of alternatives. Additional support for this conclusion comes from the fact that participants reacted to the target slower when the prime was associated with only than when it was lexically focused: whatever the participants were doing to interpret
only, they were not doing to interpret lexically new material. At the very minimum, these results support concluding that the focus that associates with only is distinct from the focus on lexically new material.

However, this result is somewhat difficult to interpret. While there is a difference between the focus associated with only and new-information, this could be a result of the lexical entry for only and not be related to a difference between new-information focus and contrastive focus. The contrastive accent condition was included in this experiment in hopes of clearing up any ambiguity of this sort, but, unfortunately, it did not differ significantly from any other condition at all. Because of this, it still remains an open question whether new-information focus and contrastive focus are different types of focus.

2.5 Mouse Tracking Experiment 3

Lexical Decision Experiment 2 found that participants were slower to react to the target word when the prime was associated with only. This contradicts previous finds Braun and Tagliapietra (2010) and Lexical Decision Experiment 1. The main purpose of Mouse Tracking Experiment 3, therefore, was to determine whether members of the set of alternatives are facilitated (and so participants should react to them faster) or inhibited (and so participants should react to them slower). Lexical Decision Experiment 2 found that participants reacted to members of the set of alternatives slower than non-members, but this isn’t consistent with the results from Lexical Decision Experiment 1 or Braun and Tagliapietra (2010).

The second purpose of Mouse Tracking Experiment 3 was to determine whether the members of the set of alternatives are related to the context of a focused constituent or related to the focused constituent itself. Lexical Decision Experiment 1 sought to answer this question, but there was a problem with how the contextually related words were defined in that experiment. Prime words in the unassociated condition of that experiment had no semantic relation to the target word (ex: when hearing painter no one in the norming database responded with singer (Nelson et al 1998)), and so Lexical Decision Experiment 1 assumed that if an unassociated target was successfully primed, it could not be because of any relationship between the prime and the unassociated target. This assumption though, was incorrect. Lexical Decision Experiment 1, in the first and second sentence, taught the participants to group a set of ad-hoc items together into the same set, and there is some experimental evidence that priming between
newly learned associations is as strong as between previously learned semantic associations. McKoon and Ratcliff (1979, 1986) present a series of experiments showing that newly learned associations can be primed as readily as semantic associations. McKoon and Ratcliff conducted seven lexical decision tasks and one episodic memory task. In these experiments, participants were given a list of word pairs, some highly related like grass-green and others unrelated like grass-city, that they were instructed to memorize. They were then shown a prime word followed by a target word. The participants had to indicate whether the target was a real word of English or a non-word. Their reaction times were recorded. After the participant finished a series of prime-target pairs, s/he would be given a new study list followed again by a series of prime-target pairs. For the one episodic memory experiment, the participants had to indicate instead whether the target word had appeared in the study list or not. The seven lexical decision task experiments varied on 1) whether non-words appeared in the study list, 2) the probability of an unrelated pair being tested, and 3) how long the prime word was presented to the participant before the target word appeared. All of these experiments found that unrelated word pairs, so long as the participant had studied them on the list, behaved the same as previously-learned, semantically related word pairs. Furthermore, McKoon and Ratcliff found that this effect held even when the prime word was only presented for 50ms before the target word appeared and when the participants were presented with very few prime-target pairs that were actually from the study list so that there was a low probability of a newly associated word pair being tested. This indicates that priming between newly learned associations is automatic under the definition provided by Posner and Snyder (1975a,b).

The McKoon and Ratcliff studies provide strong evidence that the same mechanisms that relate semantically associated concepts to each other are also at work relating newly associated concepts. For instance, both semantic associates and newly learned associates might be connected through a semantic network. Thus, Lexical Decision Experiment 1 actually tested whether associates of the focused constituent—whether newly learned or long term—can be members of the set of alternatives. It found that activation spreading from the focused constituent to its associates within a semantic network might be responsible, not only for semantic priming, but for choosing the members of the set of alternatives.

Since Lexical Decision Experiment 1 left open the question of whether members of the set of alternatives can be related to the context alone, Mouse Tracking Experiment 3 will define
contextual associates as words that are predictable from the context of the focused constituent. Predictability was determined by a norming study.

2.5.1 *Norming for contextual associates*

Forty sets of two sentences were composed as the experimental materials. Among these were the last two sentences of the twenty-four experimental items in Lexical Decision Experiment 2. The first sentence introduced a character, and the second sentence began with *so*. The last word (the prime word in the previous experiments) was replaced with a blank line. An example item is in (26).

26) Jackie went to New York. So she worked as ______________________________.

The norming study was administered over email. The experimental materials were arranged in a column in a word document and sent as an attachment. Participants were instructed to fill in the blank twice with the first and second word that came to mind when they read the sentence. The participants then sent the completed list back to the experimenter over email. Twenty-six native speakers of English participated. They were naïve to the purpose of the study.

Responses were coded for how many participants chose that particular word and how often that word was the participants’ first choice. To be included in Mouse Tracking Experiment 3, a particular word had to be given by at least 25% of the participants. This was done to mirror Braun and Tagliapietra’s requirement that a free associate be given by 25% of their norming study participants before being considered a semantic associate of the prime word. In the event that more than one word was given by at least 25% of the participants, the word that was more frequently the participants’ first choice was used, except where considerations about frequency prohibited it. More details about frequency are given in the materials section of Mouse Tracking Experiment 3.

2.5.2 *Mouse Tracking Experiment 3 participants*

24 native speakers of English from the USC community participated in the study. They were naïve to the purpose of the study.
2.5.3 *Mouse Tracking Experiment 3 materials*

Twenty-four sets of two sentences, two target words, and a nonsense word were composed as the experimental materials. The sentences were those from the norming study for which at least 25% of the participants gave the same response. The last word of the second sentence was the prime word. An example item is in (27) below.

27) Jackie went to New York. So she worked as a teller.

    Semantic Associate Target: banker  
    Contextual Associate Target: waitress  
    Nonsense Word: phrub

Each set of sentences was paired with three target words: a semantic associate, a contextually predictable target, and a non-word. The semantic associate was a free associate of the prime word according to the South Florida Free Association Norms (Nelson et al 1998). The forward cue-to-target strength of the prime-semantic associate pairs was .08-.73, with a mean of .21 and a median of .15. It should be noted that this is higher than in Lexical Decision Experiment 1.

The contextually predictable target was chosen by the norming fill-in-the-blank task. The contextually predictable target was the response given 26-73% of the participants, with a mean of 42% and a median of 37%. The contextually predictable target was not related by free association to the prime word or the semantic associate target. It was only related to the context preceding the prime word.

The non-words were chosen from the ARC non-word database (Rastle et al 2002). They were all orthographically legal and pronounceable in English.

For any one item, the prime and the two real word targets differed in frequency by a maximum of 10 words/million (Kucera and Francis 1967). Frequency, though, was not controlled across the experiment as a whole to allow for a higher degree of semantic and contextual relatedness.

There were two factors and six conditions. The first factor was focus: the prime word was either **focused (foc)** or **unfocused (unfoc)**. The second factor was which target words were presented. The participants saw one of the following sets of words:
a) **semantic condition (sem):**

semantic associate target and nonsense word

(banker – phrub)

b) **contextually predictable condition (con):**

contextual associate target and nonsense word

(waitress – phrub)

c) **competition condition (com):**

semantic associate target and contextual associate target

(banker – waitress)

There were two recordings made for each item: one where the prime was focused with an L+H* accent and one where the prime was unfocused with a flat or falling intonation. We chose to make two recordings, instead of just splicing two versions of the prime word into a carrier sentence, in order to closely mimic the procedure of Braun and Tagliapietra (2010). In that study, the focused sentences were recorded by having the speaker first say a contrasting sentence before the sentence that would be presented as a test item. For instance, in order to record the focused version of the stimulus *Our neighbors assembled an antenna*, the sentence was preceded by the contrasting sentence *We assembled a satellite dish, but...* Our materials were recorded in the same way. Sentences with focused primes were preceded by a contrasting sentence that was not a part of the final recorded stimuli. For instance, (27) was preceded by a sentence such as: *Jackie didn’t work as a teacher.* This method was also used because there is a possibility that focus has effects on the prosody of an utterance beyond the focused constituent\(^{13}\). If hearers use this information to assess focus, we did not want to deprive them of these cues. We took six acoustic measurements to ensure that the focused items differed significantly from the unfocused items. On the stressed syllable of the prime word, we measured the maximum pitch, the total range of the pitch, the height of the pitch rise, and the duration. We also measured the range of the pitch preceding the prime word in the second clause and the range of the pitch in the first clause.

### 2.5.4 Acoustic properties of experimental items

I took six acoustic measurements to ensure that the focused items differed significantly from the unfocused items. On the stressed syllable of the prime word, we measured the maximum pitch, the total range of the pitch, the height of the pitch rise, and the duration. I also measured

\(^{13}\) The duration and pitch of preceding material is not typically measured in acoustic studies of focus.
the range of the pitch preceding the prime word in the second clause and the range of the pitch in
the first clause.

**Maximum Pitch:** The stressed syllable of the prime word had a higher maximum pitch in the
focused condition than in the unfocused condition (t(23)=7.900, p<.001).

![Maximum Stress for Exp. 3 Items](image)

*Figure 7: Focused items have a higher maximum pitch than unfocused in Mouse Tracking
Experiment 3*

**Pitch Range:** The total pitch range was measured by subtracting the lowest pitch from the
highest pitch (maximum pitch – minimum pitch) on the stressed syllable of the prime word.
Focused items have a greater pitch range than unfocused items (t(23)=6.002, p<.001). This is to
be expected if the focused items have an L+H* accent and the unfocused items do not.

![Pitch Range of Items for Exp. 3](image)

*Figure 8: Focused items have a greater pitch range than unfocused for Mouse Tracking
Experiment 3*

**Pitch Rise:** The pitch rise was measured by subtracting the beginning pitch of the prime
word’s stressed syllable from its maximum pitch (maximum pitch – beginning pitch). If the
beginning sound of the prime word’s stressed syllable was unvoiced, then the starting pitch was taken from the nearest preceding voiced sound. We found that the focused items had a greater pitch rise than the unfocused items ($t(23)=7.643$, $p<.001$). This is consistent with the focused items having an H* accent and the focused items having a flatter pitch.

![Figure 9: Focused items have a greater pitch rise than unfocused items in Mouse Tracking Experiment 3](image)

**Duration:** The final measurement on the stressed syllable of the prime word was the duration of the stressed syllable. Katz and Selkirk (2011) and Watson et al (2008) report that contrastively focused syllables have a longer duration. We found that focused syllables were longer than unfocused syllables ($t(23)=4.975$, $p<.001$).

![Figure 10: Focused items have a longer duration than unfocused items in Mouse Tracking Experiment 3](image)

**Pitch Range of Second Clause:** We also measured properties of the utterance preceding the prime. Preceding pitch was measured from the word *So*, which began the clause containing the prime word, until the start of the prime word’s stressed syllable. For example, in (27), the pitch range was measured on *So she worked as a*. To calculate the pitch range, we subtracted the
lowest pitch from the highest pitch (maximum pitch – minimum pitch). The focused items had a smaller pitch range preceding the prime word than the unfocused items (t(23)= -3.072, p<.01).

![Pitch Range Preceding the Prime Word in Exp. 3](image)

*Figure 11: Focused utterances had a more compressed pitch range preceding the stressed syllable in Mouse Tracking Experiment 3*

**Pitch Range of First Clause:** The final measurement was the pitch range of the first clause of the items. For the example item in (27), this measurement was taken on *Jackie went to New York.* Interestingly, we found that the pitch range in the first clause was also compressed. Focused items had a smaller pitch range on the first clause than unfocused items (t(23)= -2.139, p<.05).

![Pitch Range on First Clause of Items in Exp. 3](image)

*Figure 12: The pitch range is compressed in the first clause of the focused items in Mouse Tracking Experiment 3*

In sum, the focused condition had an increased pitch on the prime word and a compressed pitch preceding the prime word as compared to the unfocused condition. This is consistent with
a falling or flat intonation on the unfocused condition and an L+H* pitch accent on the prime word in the focused condition.

2.5.5 Mouse Tracking Experiment 3 procedure

Experiment 3 was a mouse tracking study. Mouse tracking is a relatively new experimental method that allows us to see continuous data for each participant on each trial. It is a more fine grained measure than reaction times. The central logic is that activated objects will attract the mouse (Magnusen 2005, Freeman et al 2011, Spivey et al 2005). For example, Spivey et al (2005) tested mouse tracking in a cohort competitor study. Participants heard a word such as candle while viewing two pictures. The pictures were either of the actual object (ex: candle) and a cohort competitor (ex: candle) or of the actual object and an unrelated item (ex: pickle). Participants were instructed to click on the word that they heard. Spivey et al found that, in trials with a cohort competitor, the mouse trajectories moved towards the competing picture more than in trials with an unrelated item, as shown in Figure 13.

![Figure 13: Spivey et al (2005) results. The cohort competitor attracted the mouse.](image)

We used MouseTracker software (Freeman and Ambady 2010) to present the stimuli and collect data. A trial began with one word in each top corner of the screen. The words were either a target and a nonsense word (semantic focused, semantic unfocused, contextual focused, or contextual unfocused) or else two targets (competition focused, competition unfocused) depending on the condition. After 500ms, a start button appeared at the bottom center of the screen. Participants clicked on the start button. As soon as they clicked, the sentences were
played. Participants were instructed to click on the word that best fit the end of the sentence. The trial ended when they made a selection. There was a one second pause in-between trials. An example of the screen participants saw is in Figure 14.

![Click to START](banker whol)

*Figure 14: Example screen from Mouse Tracking Experiment 3*

In 2/3rds of the filler trials, one of the choices was the actual prime word heard in the stimuli. In half of these, the prime word was a nonsense word so that the participants would always have to listen until the end of the sentence in order to disregard the nonsense word. In 1/3rd of the filler trials and all of the experimental items, though, neither of the choices were the actual prime word heard in the stimuli. This was to avoid an effect of mention that might allow the participants to make a choice just using the acoustic signal. This method was based on an eyetracking study by Huettig and Altmann (2005). In this study, participants heard a word such as piano while viewing a display that did not include a picture of the item they heard, but rather a picture of an item with a high degree of semantic overlap. For piano, participants would see a picture of a trumpet in the display. Huettig and Altmann found that participants consistently looked at the item with semantic overlap as opposed to any distractor items that were not related to the word that the participants heard. This can be the result of activation spreading from the actual object to the semantically related object.

The logic in Mouse Tracking Experiment 3 is that the mouse should be attracted to activated objects and repelled from inhibited objects. This is similar to the expectation in eye tracking that participants should fixate on activated objects. If members of the set of alternatives are facilitated/activated, then the mouse should be attracted to them. If members of the set of alternatives are inhibited/rejected, then the mouse should be repelled away from them.
2.5.5 Mouse Tracking Experiment 3 results

Any trial where the participant answered incorrectly that the nonsense word was the best fit to the end of the sentence was excluded from analysis. This resulted in 16.67% of the data being excluded. No participant responded incorrectly to more than 9 trials. We allowed for a higher percentage of incorrect trials in this experiment than in the other experiments because it was possible that if the semantic associate or contextually predictable associate was inhibited, participants might choose the nonsense word just to avoid it. During debriefing, many participants reported that they clicked the nonsense word whenever they didn’t feel that the real word was a good fit to the end of the sentence (since their task was to click on the best fit to the end of the sentence).

Maximum Deviations (MDs) and Areas Under the Curve (AUCs) were adjusted so that any MD or AUC that was more than two standard deviations from a condition’s mean was adjusted to the maximum (mean + 2 standard deviations) or minimum (mean – 2 standard deviations) allowed value for that condition. This affected 11.86% of the non-error data.

The MDs for the semantic associate and contextually predictable conditions are in Figure 15. The AUCs for these conditions are in Figure 16. The mean actual mouse trajectories are in Figure 17. To analyze the data statistically, we used paired t-tests. The main finding of this study is that there was an effect of focus for the semantic associate conditions but not for the contextually predictable conditions. When the participants saw teller and phrub on the screen, they moved the mouse to the semantic associate (ex: teller) more directly when the prime (ex: banker) was unfocused than when it was focused. The MD of the trajectories (furthest distance between the actual trajectory and an ideal trajectory) was significantly larger in the semantic associate focused condition than in the semantic associate unfocused condition ($t_1(21)= 2.09, p_{1}<.05$; $t_2(23)= 2.10, p_{2}<.05$). The AUC

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14 Throughout this experiment, there is data missing for individual participants and items. It happened that some individual participants always responded with the nonsense word for one of the conditions, and for some individual items, all participants responded with the nonsense word for one of the conditions. The missing data was not systematic. Missing data was excluded on a by analysis basis. In other words, the model took into account that data was missing, but did not remove the entire participant or item. The degrees of freedom throughout this experiment reflect this.
of the trajectories (the area between the actual trajectory and an ideal trajectory) was significant by item ($t_1(22)=1.014$, $p_1=.322$; $t_2(23)=2.10$, $p_2<.05$).

For the contextually predictable conditions, though, there was no difference in how directly the participants moved the mouse to the target when the prime was focused versus unfocused (MD: $t_1(22)=-.004$, $p_1=.997$; $t_2(23)=.57$, $p_2=.58$), (AUC: $t_1(22)=.77$, $p_1=.450$; $t_2(22)=.08$, $p_2=.935$). When participants saw *waitress* and *phrub*, they did not move the mouse any more less directly to the contextual associate (ex: *waitress*) when the prime (ex: *banker*) was focused than when the prime was unfocused. Participants were not more attracted to the contextually predictable associate or more repelled by the contextually predictable associate when the prime was focused.

![Figure 15: Maximum Deviation of Exp. 3](image)

*Figure 15: Maximum Deviation (furthest distance between the actual mouse trajectory and an ideal mouse trajectory) for the Semantically Associated and Contextually Predictable conditions of Mouse Tracking Experiment 3*
Figure 16: Area Under the Curve (area between the actual mouse trajectory and an ideal mouse trajectory) for the Semantically Associated and Contextually Predictable conditions of Mouse Tracking Experiment 3

Figure 17: Mouse Trajectories for the Semantic Associate and Contextually Predictable Conditions of Mouse Tracking Experiment 3.
The competition conditions were divided according to whether the participant ultimately chose the semantically associated target or the contextually predictable target. There was a trend for the participants to choose the semantically associated target (ex: to click on teller instead of waitress) more when the prime was focused, but it was non-significant ($t_1(23)=-1.48$, $p_1=.153$; $t_2(23)=-1.81$, $p_2=.083$). The graph for the participants’ choice is in Figure 18. Similarly, there was no difference in the participants’ mouse trajectories when the prime was focused as opposed to unfocused (difference in MD when the semantic associate was chosen: $t_1(22)=-.77$, $p_1=.447$; $t_2(20)=-.05$, $p_2=.964$) (difference in MD when the contextually predictable associate was chosen: $t_1(10)=.03$, $p_1=.973$; $t_2(8)=1.55$, $p_2=.159$). The graph of MDs for the competition conditions is in Figure 19.

**Figure 18: Final choice in the Competition Conditions of Mouse Tracking Experiment 3**

**Figure 19: Maximum Deviations in the Competition Conditions of Mouse Tracking Experiment 3**
2.5.6 Mouse Tracking Experiment 3 discussion

The only significant result in Mouse Tracking Experiment 3 was that mouse trajectories deviated further from an ideal path in the Semantic Associate Focused Condition than in the Semantic Associate Unfocused Condition. This means that when the participants were presented with a nonsense word (ex: phrub) and a target that was a semantic associate of the prime (ex: teller when the prime was banker), they moved the mouse closer to the nonsense word when the prime was focused than when the prime was unfocused. Mouse trajectories towards an option can be taken to indicate that a participant is considering that option. For instance, in the Spivey et al study detailed in Section 2.5.4, participants moved the mouse towards candy when they heard Click on the candle because candy and candle both start with the same sound. The participants had to wait until the second syllable to know which word was being said. By contrast, participants did not move the mouse much towards pickle because pickle and candle can be immediately disambiguated: they never considered pickle when they heard Click on the candle. In the case of the Semantic Associate conditions in Experiment 3, it appears that participants considered the nonsense word more when the prime was focused than when it was unfocused. However, there is nothing intrinsic to the nonsense word that should make a participant consider it. The nonsense words had no semantic content. Furthermore, the same nonsense word was paired against the contextually predictable target, and yet it did not attract the mouse movements then. It appears then that mouse movements towards the nonsense word indicate that the participant was hesitant to choose the semantically associated target. The semantically associated target was inhibited when the prime was focused.

The results of Experiment 3 suggest two conclusions. Firstly, the set of alternatives appears to be inhibited. The participants were reluctant to choose the semantic associate when the prime was focused. This reluctance is reasonable if the participant is inhibiting alternatives to the focused constituent, suppressing any activation from reaching the alternatives.

Secondly, the semantic associate appears to be a member of the set of alternatives. Participants’ behavior with respect to the semantically associated target was sensitive to the focus manipulation. Surprisingly, the contextually predictable target was not sensitive to the focus manipulation. Because it is a null result, nothing definitive can be said about this (for instance, this task may not have been sensitive enough to record how the participants’ behavior
was changed), but it does raise the possibility that no members of the set of alternatives are
determined purely by association with the context. Results seeming to show that the members of
the set of alternatives are related to the context could be instances of semantic associations. For
instance, in the second experiment of C. Kim (2012), participants seemed to be including *boots*
in their set of alternatives because the context had specified that the characters were in a shoe
store. However, it could have been the semantic relationship between *shoe store* and *boots* that
was driving the result, not the contextual relationship. In the real world, there would be frequent
confounds between semantic associations, especially newly learned associations, and contextual
information. If contextually predictable words are not included in the set of alternatives, this
could indicate that the set of alternatives is generated by focus itself, as in Reich’s Structured
Meanings. If the set of alternatives were already present in the common ground before the
focused word, we would expect its membership to rely, at least in part, on contextual
information. Of course it is also possible that when the hearer is accommodating the set—
building on the spot the set they believe the speaker must have been invoking—they rely on
semantic relations to the focused word as a short cut. More research is certainly required, but the
null result for the contextually predictable word is interesting.

In sum, participants hesitated to choose the semantically associated target when the prime was
focused. This suggests that that the set of alternatives is 1) composed using semantic networks
and 2) inhibited.

2.6 General Discussion

In this chapter, I reported the outcomes of three experiments. Lexical Decision Experiment 1
found that comprehenders do access a set of alternatives when interpreting focus and that newly
learned associations can be members of this set. Alternatives were facilitated in this experiment.
Lexical Decision Experiment 2 also found that comprehenders access a set of alternatives when
interpreting focus, but found that these alternatives were inhibited. Experiment 2 additionally
found that semantic associates were members of the set of alternatives. Mouse Tracking
Experiment 3 supported the results of Lexical Decision Experiment 2. It found that
comprehenders do access a set of alternatives and that the members of this set are inhibited. It
additionally found that semantic associates are members of the set of alternatives, but did not
find any evidence that contextual associates are members of the set of alternatives.
All three experiments in this chapter provided evidence that focus does invoke a set of alternatives. This argues against theories of focus such as Structured Meanings, that do not require a set of alternatives. An additional mechanism, such as was proposed in Reich (2004), would need to invoke alternatives. All three experiments also provided evidence that membership into the set of alternatives is determined, at least in part, by semantic relatedness to the focused word.

Lexical Decision Experiment 1 showed that newly learned associates are included in the set of alternatives while Lexical Decision Experiment 2 and Mouse Tracking Experiment 3 showed that long-term semantic associates are included in the set of alternatives. The experiments disagreed, though, about whether the set of alternatives is facilitated or inhibited. This distinction could be theoretically important. If the set of alternatives is merely invoked—as in Alternative Semantics and Integrated Pragmatics—and no contrast is made between the members of the set and the focused word, then we would expect that the set of alternatives is facilitated. If however, the focused word is contrasted with the members of the set of alternatives—as in Reich’s Structured Meanings where the focused word is selected from the set—then we would expect the set of alternatives to be inhibited.

In Lexical Decision Experiment 1, participants were able to identify a target faster when it was a member of a set of alternatives, but in Lexical Decision Experiment 2, participants were slower on the same task. In both of these experiments, the critical condition associated the focused word with only. The word only is known to access the set of alternatives and to be exhaustive. It isn’t clear whether the facilitation/inhibition in these experiments could be stemming from only instead of any property of focus itself. Also, both of these experiments relied on reaction time which is necessarily a coarse grained, though very important, measure of thought processes.

Mouse Tracking Experiment 3 sought to shed light on the disagreement between the lexical decision tasks. It had two advantages over the previous experiments. Firstly, mouse tracking is a more fine grained measure of thought processes. It allows for continuous data collection so that we can see the entirety of a participants’ thinking instead of just the final outcome as in reaction times. Secondly, it did not use only in the experimental items. All focusing was done with an L+H* accent. Mouse Tracking Experiment 3 found evidence that the set of alternatives is inhibited: participants were reluctant to choose a member of the set of alternatives when the
prime was focused. Because this experimental method was a better measure of participants’ thought processes, it appear then that members of the set of alternatives are inhibited.

Of course, it still remains to reconcile the results from Mouse Tracking Experiment 3 with the results of Lexical Decision Experiment 1 and the lexical decision experiment in Braun and Tagliapietra (2010), which also used a contrastive accent, not only, to focus the prime word. One possibility is that the set of alternatives is only inhibited for a short time. Afterwards, members of the set may even by facilitated. Since reaction time data can only record the end result of processing, a more complicated process as this would not be apparent. Some evidence for this possibility is in Mouse Tracking Experiment 3. Even though semantic associates in that experiment were inhibited when the prime was focused, there was still a trend in the Competition conditions for participants to ultimately click on the semantically associated target—instead of the contextually predictable target—more when the prime was focused than when it was unfocused. This is very preliminary evidence that alternatives are ultimately facilitated. More research would need to be done.

The final question is what the source of the inhibition is. The inhibition may be a nonstructural reflex of the meaning of focus. For instance, if the focused word is being selected from the set of alternatives, a pragmatic implicature would exist that the alternatives are not true of the utterance. They wouldn’t be relevant then for the information at hand and so participants may inhibit them as a way to concentrate on the current task. Another possibility is that the inhibition is part of the meaning of focus. There have been proposals for other languages, such as Hungarian, and for types of focus within English itself, for instance the it-cleft, that the focused constituent exhaustively lists everything that is true of the background. Inhibition could be the psychological reflex of that semantic requirement. Chapter 3 will explore this possibility in depth.

2.7 Conclusion

This chapter presented three experiments investigating the nature of alternatives to a focused word. All three experiments found evidence that there does exist a set of alternatives to a focused word and that membership into this set is determined, at least in part, by semantic relatedness to the focused word. Lexical Decision Experiment 1 found evidence that the set of alternatives is facilitated, but both Lexical Decision Experiment 2 and Mouse Tracking
Experiment 3, which used a more sensitive measurement, found evidence that the set of alternatives is inhibited.

From these experiments, it then appears that the set of alternatives is cognitively real, that semantic associates of the focused constituent are members of the set, and that the set is, at least for a time, inhibited.
Chapter 3
Focus is not Exhaustive

3.1 Introduction

Chapter 2 demonstrated that contrastive focus, as marked by an L+H* accent or associated with only, accesses a set of alternatives and, furthermore, that the members of this set might be inhibited. There are three possible sources for this inhibition. The inhibition could be a cognitive mechanism for correctly identifying the correct word in the presence of salient alternatives. The inhibition could also be a product of the participants rejecting the alternatives due to a pragmatic deduction that the alternatives are not true of the utterance. In either of these instances, the set of alternatives, while contrasting with the focused constituent, would, semantically, be merely invoked. This would be consistent with Reich’s Structured Meanings and also with Alternative Semantics and Integrated Pragmatics. There is another possibility though. It has been proposed that focus has a structural, semantic/syntactic requirement that the focused constituent exhaustively list everything that is true of the utterances’ backgrounded material. For instance, (1) below would contain a structural requirement that John is the only person who left the party early.

1) John left the party early.

The participants might be inhibiting the members of the set of alternatives because of a structural requirement that the alternatives are untrue.

Such a requirement is not usually proposed for in situ contrastive focus, but it is particularly common for a specialized form of contrastive focus: the it-cleft (ex: It was John who left the party early). Because proposing structural exhaustivity is so common for the it-cleft, this chapter will investigate the exhaustivity of both in situ contrastive focus (realized only with an L+H* pitch accent) and the it-cleft. It will treat the it-cleft as a particularly strong case for structural exhaustivity in contrastive focus and find that, even for the it-cleft, the impression of exhaustivity for contrastive focus is best characterized as a conversational implicature, not as a semantic/syntactic requirement. Section 3.2 will review the main theories in support of structural exhaustivity for in situ contrastive focus and clefted contrastive focus and present
evidence from previous literature showing that exhaustivity may not be structural. Section 3.3 will develop a pragmatic account of exhaustivity, and Section 3.4 will present two rating studies in support of pragmatic exhaustivity. Judgment Experiment 1 investigates in situ contrastive focus, while Judgment Experiment 2 investigates it-clefted contrastive focus. Conclusions are in Section 3.5.

3.2 Evidence for and against a structural requirement for exhaustivity in contrastive focus

The central argument for the structural exhaustivity of contrastive focus comes from syntax. Brody (1990) was the first to propose that there is a high structural position for focused constituents. É Kiss (1998, 2007) later elaborated on this, and her account has become the best known. Both of these accounts were designed to explain the exhaustivity of constituents moved to a preverbal position in Hungarian, but they have been frequently elevated to the status of a universal. It is possible that in situ, contrastively focused constituents must raise, covertly, to the preverbal position. This movement would be similar to the movement proposed in the original version of Structured Meanings and is the analysis of contrastive focus given by Chomsky (1976) and Rizzi (1997). Most authors, though, (including É Kiss herself) regard in situ focus as necessarily new-information focus, not contrastive, and would claim that only overtly moved constituents are truly contrastively focused. This would make only the it-cleft in English equivalent to Hungarian preverbal focus. It is for this reason that this chapter will investigate the exhaustivity of both in situ contrastive focus and the it-cleft. This section will review the past literature arguing for and against structural exhaustivity in in situ contrastive focus and the it-cleft.

3.2.1 Syntactic exhaustivity

É Kiss (1998, 2007) is the best known syntactic account of exhaustivity. This work was based on observations by Szabolcsi (1981). Szabolcsi recorded that nouns in the Hungarian pre-verbal position exhaustively listed everything that was true of the utterance’s background. To show this, she points out that contradictions such as (2) are possible, and that modifying numbers in the preverbal position always have the meaning of exactly, as can be seen by comparing (3) to (3).
2) Nem [F Péter] aludt a padlón, hanem [F Péter és Pál].

Not Peter slept on floor but Peter and Paul

‘Not PETER slept on the floor but PETER AND PAUL did.’

3) a) [Topic e] [Focus Három fiú] nem alezik.

Three boys not sleep

‘Either more or less but not three boys are sleeping.’

b) [Topic Három fiú] [Focus e] nem alezik.

Three boys not sleep

‘There are at least three (possibly more) boys not sleeping.’ OR

‘There are at most two (possibly no) boys sleeping.’

(Szabolcsi 1981: 149, 154-155)

In (2), the speaker can deny that Peter slept on the floor even while asserting that Peter and Paul slept on the floor. Szabolcsi claims that this should only be possible if the first conjunct has the meaning of only Peter. Examples (3) and (3) can be distinguished by meaning. In (3), three boys is focused and means that exactly three boys are not sleeping, allowing that two or four boys might be sleeping. This contrasts with (3), where three boys is topicalized, not focused and does not allow for the exhaustive reading in (3). Szabolcsi accounts for these facts by claiming that the first conjunct of (2) has the meaning in (4).

4) For every x, x slept on the floor if and only if x is Peter.

(Szabolcsi 1981, pg. 151, ex. 18)

First Brody (1990) and then É Kiss (1998) grammaticalized this analysis of the Hungarian pre-verbal position by claiming that there is a focus projection (FocP) at the front of a sentence so that a focused constituent has to move to that position. É Kiss (2007) explains that constituents in this position specify the referential content of the set that is denoted by the background. In her view then, “focus is a specificational predicate, representing the main assertion in the sentence” (É Kiss 2007: 76). This explains both the exhaustivity of focus and why it must raise to the front of the sentence. Her analysis of the Hungarian preverbal position is in (5).
5) É Kiss (1998: 256): As for Mary, it was Peter that she voted on.

A critical part of É Kiss’s work is that she distinguishes between the type of focus represented in (5), which she calls Identificational Focus, and in situ focus that does not move. This second type of focus she calls Information Focus and is very clear that it is not exhaustive and does not invoke a set of alternatives. Most treatments of English focus consider the English equivalent of the Hungarian preverbal focus to be the it-cleft, not in situ L+H* focus. É Kiss (1998) herself holds to this analysis, pointing out that in English, as in Hungarian, an it-cleft does not entail any statement where the clefted constituent is a member of a set. She shows this with a test involving contradiction. In (6), Person B can respond No, contradicting Person A, if Mary in fact picked a hat and a coat instead of only a hat for herself. This should only be possible if the meaning of Person A’s statement truth conditionally excludes that Mary bought a coat in addition to the hat. However, in (7), with in situ contrastive focus, contradiction is infelicitous. Additionally, she notes that both the English it-cleft and Hungarian preverbal focus prohibit certain inherently nonexhaustive words such as every, also, and even from being focused (ex. 8), but insitu focus doesn’t have these same restrictions (8). É Kiss takes this as evidence that the clefted constituent of the English it-cleft is in Spec, FocP, just like a preverbally focused constituent in Hungarian.

6) A:  It was a hat that Mary picked for herself.
   B:  No, she picked a coat, too.
7) A: Mary picked herself **A HAT**.
   B: %No, she picked a coat, too.

8) a) It was *everybody/?also John/*even John that Mary invited to her birthday party.
   b) Mari *minden kalapot/*egy kalapot is/*még egy kalapot is nézett ki magának.
      Mary every hat/ a hat also/ even a hat also picked for herself.
      ‘It was *every hat/ *also a hat/ *even a hat that Mary picked for herself.’
   c) Mary invited **EVERYBODY/ALSO** John/ **EVEN** John to her birthday party.
   d) **EGY SZOMZÉDOMAT IS** át hívtam.
      A neighbor.my.ACC also over invited.I
      ‘I called over also a neighbor of mine.’

(Donka Farkas p.c. in É Kiss 1998: 250-253)

There is some trouble, though, with assuming that in situ focus in English is necessarily information focus. First of all, it is still hotly debated whether there are subtypes of focus at all, but, even allowing for this, we saw in Chapter 2 that in situ L+H* focus in English does invoke alternatives. If in situ focus was always information focus, then it should not exhibit this contrastive property. To keep the high focus account, then, we might propose that in situ, contrastively focused constituents move covertly to the high focus position. This proposal was made by Rizzi (1997) when he proposed splitting the CP into multiple projections, among them a FocP. Chomsky (1976), in one of the earliest accounts of focus, also proposes that the focused constituent moves to a high operator. In his account, the high operator is a definiteness operator, and this creates the exhaustivity effect. This movement would be similar to the movement already proposed in Structured Meanings and would result in the it-cleft and in situ contrastive focus having the same structure.

3.2.2 *Other accounts of exhaustivity for the it-cleft*

It is, of course, also possible that the exhaustivity of the it-cleft is independent of focus itself. There have been many accounts that make the exhaustivity of the it-cleft a structural requirement without referencing the meaning of focus. Percus (1997) derives the it-cleft’s structure from a definite description (ex. 9). The exhaustivity of the it-cleft is derived from the uniqueness required by a definiteness operator, not from any property of focus.
Halvorsen (1978) had the same intuition that the exhaustivity of the it-cleft is derived from uniqueness, but used two other implicatum in place of a definiteness operator. First, he claimed that the clefted constituent is identical to the relative pronoun. Second, he stipulated that the cardinality of the relative pronoun is fixed, via a conventional implicature, to be the same as the cardinality of the clefted constituent. For a sentence such as *It was John who left the party*, this would result in a meaning as in (10).

10) \((\forall y)(\text{left the party}(y) \rightarrow y=\text{John})\)

Conventional Implicature: At most n people left the party & n=|John|

Atlas and Levinson (1981) point out that accomplishing uniqueness by limiting the cardinality of the relative clause can’t be quite right. For one, it would require that questions preserve this conventional implicature. A cleft question then, such as in (11), should have to be responded to with an answer that has the same cardinality. However, as (11) shows, it is possible to answer a cleft question that has a cardinality of two with an answer that has a cardinality of three, even though the contradiction shouldn’t be able to target a conventional implicature.
11) Question: Was it John and Rick that Mary kissed?
   => Mary kissed only two persons
   Answer: No, she kissed John, Rick, and Mart.

   (Atlas and Levinson 1981, pg. 25, ex. 74-76)

   Atlas and Levinson (1981) propose instead that exhaustivity is accomplished through an
   identity operator: γ. The operator γ is defined as in (12). It introduces an assertion that if
   anything is true of the relative clause, then that thing must be identical to the clefted constituent.
   Their representation for an it-cleft like *It was John who left the party* is in (13).

   12) B(γxA(x)) is defined as ∃xA(x) & ∀x(A(x) → B(x))

   13) λx(x=John)(γxLeave(x, party)) = ∃x(Leave(x,party)) & ∀x(Leave(x, party) → John(x))

   Cardinality is, therefore, not relevant. A question such as (11) is asking if the x that kissed Mary
   is identical to *John and Rick*.

   This is similar to a more recent proposal by Büring and Kriz (2012) in that Büring and Kriz
   also propose that the exhaustivity of the it-cleft is part of a conditional. However, in Büring and
   Kriz’s account, exhaustivity is the result of maximality: the clefted constituent is the maximal
   thing that is true of the relative clause. Also, exhaustivity, in their account, is again a
   definedness condition. They would represent the it-cleft *It was John who left the party* as

   14) (λX: ∀Y∈Leave [X≠Y]. Leave(X))(John)

   It is therefore possible that contrastive focus itself is exhaustive, in which case both in situ
   contrastive focus and it-clefts should be exhaustive, or that it-clefts are exhaustive by some
   mechanism independent of contrastive focus. In the latter case, in situ contrastive focus
   shouldn’t be exhaustive. A third possibility is that neither it-clefts nor in situ focus is exhaustive.
   This would be the strongest case that contrastive focus is nonexhaustive.
3.2.3 Experimental challenges to structural exhaustivity

Though the findings I presented in Chapter 2 seem very suggestive of the possibility, it is not common to claim that in situ focus is structurally exhaustive. However, even for the it-cleft and equivalent structures that are almost always claimed to be structurally exhaustive, structural exhaustivity has been challenged. This section will present four experimental studies showing that the high focus position may not be structurally exhaustive in German, Greek, Spanish, French, and even Hungarian.

In two experiments on German, Drenhaus, Zimmermann, and Vasishth (2011) compared exhaustive it-clefts to nonexhaustive it-clefts and exhaustive sentences with *only* to nonexhaustive sentences with *only*. They found that violating exhaustivity in a sentence with *only* was more ungrammatical than violating exhaustivity in an it-cleft (ex. 15). Additionally, when tested during an ERP experiment, violations of it-cleft exhaustivity caused N400s, typically associated with semantic/pragmatic integration difficulty as might arise from an utterance such as *I eat books for breakfast*. In contrast, violations of exhaustivity in sentences with *only* caused P600s, typically associated with a semantic violation or general reanalysis as might arise from an utterance such as *The horse ran round the barn fell*.

15) a) **Exhaustive it-cleft**

Es ist Maria, die das Klavier spielen kann und ausserdem noch die Geige sagte…

It is Mary who the piano play can and besides that also the violin says…

‘It is Mary who can play the piano and, additionally, also the violin, says…’

b) **Non-exhaustive it-cleft**

Es ist Maria, die das Klavier spielen kann und ausserdem noch Luise und Jana sagte…

It is Mary who the piano play can and besides her also Luise and Jana says…

‘It is Mary who can play the piano and, additionally, also Luise and Jana, says…’

c) **Exhaustive ‘only’ sentence**

Nur Maria kann das Klavier spielen und ausserdem noch die Geige sagte…

Only Mary can the piano play and besides that also the violin says…
‘Only Mary can play the piano and, additionally, also the violin, says…’

d) **Non-exhaustive ‘only’ sentence**

Nur Maria kann das Klavier spielen und ausserdem noch Luise und Jana sagte…

Only Mary can play the piano and, besides that also Luise and Jana says…

‘Only Mary can play the piano and, additionally, also Luise and Jana, says…’

(Drenhaus et al 2011, pg 327, ex. 14)

Even the preverbal position in Hungarian has recently been questioned. Onea and Beaver (2009) developed a study that tested the contradiction test used in É Kiss (1998) (ex. 6). They presented participants with pictures of two characters accomplishing a task. The pictures were accompanied by a Hungarian spoken sentence in which either 1) the subject was fronted to the preverbal focus position, 2) the subject was in the scope of *only*, or 3) the subject was in a canonical position with default intonation (ex. 16). The participants were then asked to choose between three possible responses. The responses indicated more or less contradiction/acceptance of the spoken sentence, in light of the picture. Beaver and Onea’s study differed from É Kiss’ example in that they allowed participants to respond with a contrasting, but not exhaustive, answer, whereas É Kiss only considered *Yes*, indicating no exhaustivity, and *No*, indicating complete exhaustivity, as possible responses. Below is an example item from their study. The participants would see a picture of Marci and Peter each catching a butterfly, hear one of the three sentences in (16), and then choose between the possible responses in (17).

16) a) **MARCI fogott meg egy lepkét.**

Marci caught a butterfly.

‘Marci caught a butterfly.’

b) Csak **MARCI fogott meg egy lepkét.**

Only Marci caught a butterfly.

‘Only Marci caught a butterfly.’

c) **Marci meg-fogott egy lepkét.**

Marci caught a butterfly

‘Marci caught a butterfly.’
17) a) Yes, and Peter caught a butterfly too.
   b) Yes, but Peter caught a butterfly too.
   c) No, Peter caught a butterfly too.

Onea and Beaver interpreted stronger contradiction (by responding with 17) as the participants understanding the sentence to be more exhaustive, and stronger agreement (by responding with 17) as the participants understanding the sentence to be less exhaustive. They found that participants contradicted (responded with 17) sentences with pre-verbal focus significantly less often than they contradicted sentences with only, but significantly more often than they contradicted the default intonation sentences (p<.05). Participants were most likely to respond with the intermediately contradictory response (17) when the sentence contained a preverbal focus. They interpreted this as indicating that, while the pre-verbal focus position is still interpreted exhaustively, the exhaustivity is not as strong as in a sentence with only. Their study highlights very clearly that the exhaustivity of the pre-verbal focus position is different than the exhaustivity of the focus-sensitive word only.

Destruel (2012) conducted a very similar experiment on French. Instead of pictures, participants were given a question answer pair and then asked what the most natural continuation of the dialogue would be for a third speaker. The answer to the question was either a cleft, was focused with only (seulement), or had a neutral intonation. For instance, participants would hear the question-answer pair in (18), then choose one of the responses in (19).

18) Q: Qu’est-ce que le fermier a brossé?
   What is it that the farmer brushed?
   A: C’est le cheval que le fermier a brossé.
       It’s the horse that the farmer brushed.

19) a) Yes, and the farmer also brushed the goat.
   b) Yes, but the farmer also brushed the goat.
   c) No. The farmer also brushed the goat.

Just as in the Onea and Beaver study, Destruel found that participants chose the contradictory continuation (19) less often when the answer to the question was a cleft than when it contained
only \((p<.05)\). When the answer to the question was a cleft, participants preferred the intermediately contradictory continuation (19).

These three studies provide convincing evidence that the exhaustivity of only is stronger than the exhaustivity of an it-cleft. Since only is taken to assert exhaustivity (exhaustivity is part of its lexical entry), it can therefore be concluded from these studies that the high focus position does not assert exhaustivity, but it is still possible that the high focus position presupposes exhaustivity. Skopeteas and Fanselow (2011) conducted a study on Spanish, Greek, and German object fronted structures that questioned even this possibility. Raised objects in these languages, like clefted constituents, are supposed to be moving to the high focus position. They should be exhaustive as a result of being in this structural position. However, in Skopeteas and Fanselow’s experiments, exhaustivity did not always arise. Skopeteas and Fanselow presented participants with question-answer pairs. They manipulated whether the question was a pseudocleft—which should elicit an exhaustive answer—or a wide focus question—which should elicit a nonexhaustive answer. The answer always had a fronted object. An example item is in (20).

20) Pseudocleft question (elicited an exhaustive interpretation of the answer):

What was it that Matthias/Mateo/Manolis fished?

All focus question (elicited a non-exhaustive interpretation of the answer):

Why are the people on the bridge happy?

(German): [Eine Forelle]$_F$ hat Matthias geangelt.

a trout has Matthias fished

‘Matthias fished A TROUT.’

(Spanish): [Una trucha]$_F$ ha pescado Mateo.

a trout has fished Mateo

‘Mateo fished A TROUT.’

(Greek): [Mia pe´strofa]$_F$ psa´repse o Mano´lis.

a trout fished the Manolis

‘Manolis fished A TROUT.’

(Skopeteas and Fanselow 2011, pg. 1694 & 1696, ex. 1&5)
They found that exhaustivity arose in response to a pseudocleft question significantly more often than in response to an all focus question\(^{15}\). This shows that exhaustivity was sensitive to the context. If exhaustivity was a structural part of the fronted sentences, then they should have been exhaustive regardless of the context. This argues that exhaustivity is not a product of the fronted structure, but of the context, aka that exhaustivity is pragmatic and not structural.

In this paper, we will claim that the exhaustivity of the English it-cleft, argued to be a form of pre-verbal focus, is a conversational implicature, specifically a scalar implicature, and not in any way a part of the syntactic or semantic structure of the it-cleft. This is consistent with context-sensitive exhaustivity, such as was found in Skopeteas and Fanselow (2011), and supports the differences between pre-verbal fronting and only found in Drenhaus et al (2011) and Beaver and Onea (2009).

3.2.4 Non-experimental challenges to structural exhaustivity

Structural exhaustivity for the it-cleft has been challenged without experiments as well. For English, it has long been known that there are nonexhaustive it-clefts. Prince (1978) referred to these as information-presupposition clefts and contrasted them with their exhaustive stress-focus cleft counterparts. Hedberg (1990) also notes these, calling the nonexhaustive it-clefts comment-clause clefts (ex. 21) and the exhaustive it-clefts, topic-clause clefts.

21) It was Lansdale, as much as anyone, who established Diem in power.

   (Mark Frankland, *Predecessor makes North look like an amateur operator*, 3/5/87, taken from Hedberg 1990, Ch. 6, pg. 17, ex. 60)

22) It was in that article, among other places, that Bork expressed his support for California’s anti-open housing referendum…

   (David S. Broder, *The need to be sure on Bork*, 9/20/87, taken from Hedberg 1990, Ch. 6, pg. 17, ex. 60)

Because the two types of clefts have a different stress pattern (the stress is on the clefted constituent in stress focus clefts and the relative clause in information-presupposition clefts) it is

\(^{15}\) Interestingly, though, they did not find this result for Hungarian. Participants seemed to always interpret the Hungarian preverbal focus as exhaustive.
usually considered unproblematic to divide it-clefts into two different types that have their own distinct structures (e.g. Hedberg 1990). However, even stress-focus it-clefts do not display all of the characteristics we would expect if they carried an assertion or presupposition of exhaustivity.

Horn (1981) was the first paper to posit that the exhaustivity of the English it-cleft is a generalized conversational implicature. He points out three problems with the structural exhaustivity theories: it-clefts do not have the same meaning as only, exhaustivity is detachable, and exhaustivity can fail to arise. First, he observes, as Onea and Beaver (2009), Dahan et al (2010), and Destruel (2012) show later experimentally, that it-clefts are not felicitous under all of the same circumstances that utterances with only are (ex. 23) even though a definiteness operator (Chomsky 1977; Percus 1997; Atlas and Levinson 1981) or exhaustive focus feature (É Kiss 1998, 2007) would give the it-cleft a meaning that is similar to only.

23) a) #I know that Mary ate a pizza, but I’ve just discovered that it was a pizza that she ate!
   b) I know that Mary ate a pizza, but I’ve just discovered that it was only a pizza that she ate!

   (Horn 1981, pg. 130, ex 11)

Specifically, only changes the truth conditions of the second conjunct so that it is felicitous to conjoin it with the first conjunct. The it-cleft does not have this truth conditional impact, and so the second conjunct is redundant with the first conjunct. This demonstrates that the exhaustivity of only is asserted, but the exhaustivity of the it-cleft is not.

This test though only gives support to the conclusion that exhaustivity is not asserted in the it-cleft. It is still possible that the it-cleft presupposes exhaustivity. Grice (1975) designed three tests for demonstrating that an intuition is truly an implicature, and not structural. These tests are detachability, failure to arise, and cancelability. Horn (1981) shows that exhaustivity is detachable and can fail to arise.

Non-detachability is the first test for conversational implicatures. Because conversational implicatures are a product of hearer expectations in a conversation (and speaker’s knowledge of these expectations), they should arise any time two utterances have the same meaning, regardless of the syntactic structure of those utterances. Horn attempts to show that the exhaustivity of the
it-cleft appears to be non-detachable by providing four non-it-cleft structures where exhaustivity arises (ex. 24).

24) a) What Mary ate was a pizza. [pseudocleft]
   b) The thing that Mary ate was a pizza. [th-cleft]
   c) A pizza, Mary ate. [Y-movement or focus shift]
   d) Mary ate a pizza. [contrastive or focus intonation]

(Horn 1981, pg. 132, ex 15)

However, this test is problematic. The specific structures that Horn uses have been since claimed to be related derivationally to the it-cleft. For example, Hedberg (1990) posits that th-clefts and it-clefts share a common origin, and Rizzi (1997) would qualify Horn’s Y-movement and contrastive intonation as being instances of exhaustive identificational focus. If the structures in (24) and the it-cleft are related, then it is possible that their exhaustivity is all the result of their syntax, not of the conversational context.

Wedgwood (2005) gives a stronger case of non-detachability. He argues that exhaustivity is the normal interpretation of any utterance by pointing out that nonexhaustive utterances must be marked as such. In effect, he argues that even canonical statements have the same meaning as an it-cleft. For instance, in the dialogue in (25), the only way Mary could avoid having her answer interpreted exhaustively is by using a rise-fall-rise intonation on the word coffee.

25) John: What does Bob want?
   Mary: (Bob wants) a coffee.
   (Wedgwood 2005, pg. 117, ex. 4.13)

   This argument though is also problematic. While it is true that the default interpretation of (25) is exhaustive, the exhaustivity of that structure is not as strong as the exhaustivity of an it-cleft. For instance, using the same rise-fall-rise intonation on an it-cleft does not yield the interpretation that the it-cleft is nonexhaustive as it does for the canonical sentence.

   Non-detachability, however, is going to be difficult to show definitively at this time. The exact structure of the it-cleft is uncertain (e.g. Hedberg 1990, Percus 1997, Destruel 2012).
Additionally, the structure of the constructions in (24) is also debated. Until more is known about the syntactic structure of the it-cleft and seemingly related constructions, it is impossible to say what the it-cleft is derivationally related to. Therefore, while Horn and Wedgwood’s observations are suggestive, it is not yet possible to show for certain that the exhaustivity of the it-cleft is detachable.

The second Gricean test for conversational implicatures is failure to arise. Switching from a positive declarative to a question, negated declarative, or conditional changes the entailments and the conversational purpose of the utterance drastically, but it preserves most of the utterance’s syntactic/semantic structure. Therefore, any meaning that was part of the structure of an utterance should be preserved when the utterance is a question, negated declarative, or conditional, but any meaning that was part of the conversational expectations of the hearer/speaker should not be. Horn (1981) showed that negated and questioned it-clefts do not have an exhaustive interpretation. The negative it-cleft in (26) does not mean that Mary ate everything except a pizza, and the it-cleft question in (27) can be felicitously affirmed even if Mary ate more than just a pizza.\[16\]

26) It wasn’t a pizza that Mary ate. \(\Rightarrow\) The only thing Mary didn’t eat was a pizza.

27) Context: Mary ate multiple things, among them a pizza.

Q: Was it a pizza that Mary ate? A: Yes.

(Horn 1981 & Halvorsen 1978)

Conditional it-clefts, as well, fail to be exhaustive. In (28), the it-cleft does not imply that Paul and Mary are the only people at the party. In (29), the it-cleft is felicitous even though Speaker B knows that Mary ate more than just a pizza.

\[16\] Horn himself points out that the negation and/or question here could be meta-linguistic, affecting not the assertion, but the speaker’s willingness to make such an assertion. In (26), for instance, the speaker could be communicating that she is unwilling to assert that Mary ate a pizza rather than asserting that Mary didn’t eat a pizza. This sort of negation or questioning would not be expected to have the same projection properties as regular negation or questioning. However, it is difficult to claim that the conditionals in (28) and (29) are metalinguistic.
28) If it is Paul and Mary who arrived, the party is about to start. ⇐ Nobody else arrived.  
(Destruel 2012, ex 10)

29) Context: Mary is lactose intolerant.
   Speaker A: I saw Mary eat breadsticks and chicken wings, but I think she also ate a pizza.
   Speaker B: Oh no. If it was a pizza that she ate, then she’ll be sick all night.

All of these examples are evidence that the exhaustivity of the it-cleft can fail to arise, and in turn, that exhaustivity is not a presupposition of the it-cleft, but instead, a conversational implicature.

The final test for conversational implicatures given by Grice (1975) is cancelability. Meanings that are part of the structure of an utterance should always be present, regardless of whether the conversational participants know the meaning to be false, but meanings that arise as part of the context of an utterance should be able to be denied without contradiction arising. Horn (1981) claimed that the exhaustivity of the it-cleft could not be canceled. He suggested that perhaps the strength of the exhaustivity intuition is because of the markedness of structure: it-clefts are very rarely used in English (Hedberg (1988) found only 12 it-clefts, as opposed to 331 wh-clefts, in a corpus study) so it’s possible that hearers assume that a speaker who has gone that far out of his/her way to use an it-cleft must intend the exhaustivity meaning.

É Kiss also claims that exhaustivity cannot be canceled, using examples as in (6), but concludes instead that this shows exhaustivity must therefore be inherent in the structure of the it-cleft. She shows that exhaustivity cannot be canceled by observing, as Szabolcsi (1981) did, that a cleft such as (30) below does not entail a cleft such as (30), where the clefted constituent is a subset of the first cleft’s clefted constituent. She also observes that inherently nonexhaustive words cannot appear in the clefted constituent of the it-cleft as in (8), repeated here as (31).

30) a) It was a hat and a coat that Mary picked for herself. ⇐
    b) It was a hat that Mary picked for herself.

31) a) It was *everybody/*also John/*even John that Mary invited to her birthday party.
    b) Mari *minden kalapot/*egy kalapot is/*még egy kalapot is nézett ki magának.
    Mary every hat/ a hat also/ even a hat also picked for herself.
It was *every hat/ *also a hat/ *even a hat that Mary picked for herself.’

(Donka Farkas p.c. in É Kiss 1998: 250-253)

I disagree with both of these observations, and will attempt, in the next section, to show that exhaustivity can be canceled in the it-cleft.

3.3 A conversational implicature analysis for the exhaustivity of contrastive focus

This section will give a derivation of exhaustivity in in situ contrastive focus and the it-cleft that treats exhaustivity as a conversational implicature. First, though, it will extend the observations in Section 3.2 to show that a conversational implicature analysis is justified.

3.3.1 The exhaustivity of the it-cleft can be canceled

Section 3.2.4 showed that the exhaustivity of the it-cleft can fail to arise and, as far as can be determined at this time, is detachable. These are two of the three properties Grice (1975) predicts for conversational implicatures. The third is cancelability. É Kiss (1998) and, even Horn (1981), assert that exhaustivity cannot be canceled, but I disagree with their observations. First of all, the entailment relationship in (30) is only lacking when the first cleft is interpreted collectively. Gryllia (2012) makes this observation for Greek as she is critiquing Baltazani (2002). Baltazani makes the same claims for Greek as É Kiss makes for Hungarian (ex. 30). Gryllia points out that this test closely resembles a test in Gamut (1991) for a collective reading in coordination (ex. 32).

32) Cheech and Chong are fun at parties. \( \Rightarrow \) Cheech is fun at parties.

(Gamut 1991: 32)

Gamut’s example fails the test in (30), but it is a canonical sentence, which should have a nonexhaustive structure. Gryllia shows, for Greek, that a sentence with a set in the preverbal position will entail a sentence with a subset in the preverbal position if the sentence is interpreted distributively instead of collectively. In (33) and (34) below, the collective reading is excluded, and the first it-cleft does entail the second. We would not expect this if the first it-cleft was exhaustive, as shown by the contradictions used by Szabolcsi (ex. 2) and É Kiss (ex. 6).
33) Context: I bought two pairs of trousers.
   It was for Mary and for John that I bought the trousers. ⇒ It was for Mary that I bought a pair of trousers.

34) Context: Mary made two shopping trips this week. She bought a hat on one and a coat on the other.
   It was a hat and a coat that Mary bought. ⇒ It was a hat that Mary bought.

Furthermore, it is possible for nonexhaustive words, such as also and even to modify the clefted constituent. Recall that one of the arguments in É Kiss (1998) for the noncancelability of exhaustivity in the it-cleft was that nonexhaustive words could not appear in the clefted constituent. The following are all natural language examples of also and even scoping over the clefted constituent of an it-cleft. They result in nonexhaustive, stress-focus it-cLEFTs.

35) Have you ever exchanged a series of emails with someone, only to meet them in person and realize they were totally different than you expected? Or perhaps it was even a telephone call that followed the emails and when you spoke to the individual, there was a personality that emerged that the prior emails didn't accurately convey?

36) Was there someone from your past that you got into a bad argument with? It could have been that annoying guy in high school or maybe it was even a friend that you had a really bad argument with.”
   Vabeech, Hale E. Find Out That Prank Caller's Identity by Doing a Reverse Cell Phone Lookup on That Number Right Now.
37) It was the President, in a rare departure from the diplomacy of caution, who initiated the successful Panama invasion. **It was also Bush who** came up with the ideas of having an early, informal Malta summit with Gorbachev and a second round of troop cuts in Europe after the fall of the Berlin wall.


38) Rough location work is nothing new for Sheen. … **It was also location work that** gave Sheen his first acting break.


It does appear, then, that the exhaustivity of the it-cleft can be canceled. The exhaustivity of the it-cleft passes all three of Grice’s tests for conversational implicatures: it can be canceled; it can fail to arise; and, to the extent that our current knowledge of the structure of the it-cleft allows us to make this conclusion, it is detachable. The exhaustivity of the it-cleft appears to be a conversational implicature, and not an inherent part of its structure.

3.3.2 **In situ contrastive focus shows the properties of a conversational implicature**

Most of Section 3.2 and Section 3.3.1 was devoted to showing that it-clefs behave like conversational implicatures because this claim is controversial. It is much rarer to assert that in situ contrastive focus is exhaustive, but because Chapter 2 raised this possibility, I wish to show here that an exhaustive reading of in situ contrastive focus also behaves like a conversational implicature and not like a part of the structure of focus.

The first test is detachability. This is difficult to show for in situ contrastive focus for the same reasons that it was difficult to show for the it-cleft: there is still a great deal of debate about what the exact structure of the it-cleft should be. Some authors, such as É Kiss, would claim that in situ contrastive focus has no special syntactic structure. Others, such as Rizzi (1997) and Rooth, would claim that there is a distinct syntactic structure for in situ focus, but even then, it remains unclear what other structures focus is related to. For our purposes, it is only possible to
observe that a sentence with a canonical intonation has the same exhaustivity properties as a sentence with a contrastively focused constituent. Whether the speaker utters the first or the second sentence in (Error! Reference source not found.), s/he will expect to receive only a coffee and will probably be quite surprised if s/he receives both a tea and a coffee.

39) I would like a coffee with my breakfast. OR I would like a COFFEE with my breakfast.

The exhaustive structures identified by Horn in (24) would also be examples of potentially unrelated structures having exhaustivity properties similar to those of in situ contrastive focus.

The second property of conversational implicatures is failure to arise. Exhaustivity fails to arise in in situ contrastive focus when the utterance is questioned, negated, or made a conditional.

40) Mary didn’t eat a PIZZA. \(\Rightarrow\) The only thing Mary didn’t eat was a pizza.

41) Context: Mary ate multiple things, among them a pizza.
    Q: Did Mary eat a PIZZA? A: Yes.

42) If PAUL and MARY have arrived, the party is about to start. \(\Rightarrow\) Nobody else arrived.

43) Context: Mary is lactose intolerant.
    Speaker A: I saw Mary eat breadsticks and chicken wings, but I think she also ate a pizza.
    Speaker B: Oh no. If Mary ate a PIZZA, then she’ll be sick all night.

The final property is cancelability. Exhaustivity is canceled much more easily in situ than in it-clefts.
44) Context: I bought two pairs of trousers.
   I bought the trousers for MARY and for PAUL. ⇒ I bought a pair of trousers for
   MARY.

45) Context: Mary made two shopping trips this week. She bought a hat on one and a coat
   on the other.
   Mary bought a HAT and a COAT. ⇒ Mary bought a HAT.

Additionally, in situ contrastive focus is most certainly compatible with nonexhaustive words
such as even and also. It is, in fact, a requirement that these words associate with a contrastively
focused word.

The exhaustivity of in situ contrastive focus, then, also behaves like a conversational
implicature and not like a structural requirement. It is detachable, as far as can be tested; it can
fail to arise; and it is able to be canceled.

3.3.2 Two former implicature analyses of exhaustivity

Horn (1981) and Wedgwood (2005) both presented analyses that treat the exhaustivity of it-
clefs as a conversational implicature. Horn (1981) claims that the exhaustivity of the it-cleft
arises from the conventional implicature of existence in the it-cleft (see 46).

46) The utterance in context C of any sentence which entails Fα and conventionally
implicates ∃xFx will induce a generalized conversational implicature to the effect that
¬∃x(x≠α & Fx), where the variable x ranges over entities in a set determined by the
context C.

(Horn 1981, pg. 132, ex. 16)

Wedgwood (2005) takes a different route and analyzes the exhaustivity implicature within the
framework of Relevance Theory. The central principle of Relevance Theory is that every
utterance carries a presumption of its own optimal relevance, as defined in (47).
47) The Cognitive Principle of Relevance (presumption of optimal relevance)
   a) The ostensive stimulus is relevant enough for it to be worth the addressee’s effort to process it.
   b) The ostensive stimulus is the most relevant one compatible with the communicator’s abilities and preferences.

This allows a hearer to always assume that a speaker’s utterances are relevant and to use this assumption when interpreting an utterance. For instance, if Person A asks an alternative question *Would you like sugar or milk in your coffee?* and Person B responds *Yes*, Person A would assume that *yes*, though infelicitous, was a relevant response and, in searching for how it was relevant, might conclude that Person B desired both sugar and milk.

Wedgwood identifies exhaustivity as a scalar implicature. He claims that Hungarian preverbal focus and the English it-cleft are interpreted exhaustively, as is any utterance not specifically marked as nonexhaustive, because a hearer will presume that the statement is the most relevant one possible and if any other more informative statement was also relevant, the speaker would have made that statement. In the absence, then, of an indication of missing information, all utterances will be interpreted exhaustively.

The analysis I will put forth in this section will follow Wedgwood’s analysis with the exception that, because it is not the intention of this dissertation to analyze the relationship between semantics and pragmatics, I will use Gricean conversational implicatures to encode exhaustivity as a scalar conversational implicature. Nothing theoretical is intended by this choice. Additionally, it should be noted that Horn’s generalization can be seen as a result of Gricean implicatures, specifically as an interaction between quantity and quality: whenever a hearer has reason to believe that a speaker believes X exists, then the hearer can expect the speaker to give as much information (quantity) about X as is relevant and truthful (quality), including what is included in the set that X denotes.
3.3.3 Deriving exhaustivity as a scalar implicature

In this subsection, I will argue that the exhaustivity of the English it-cleft can be derived as a scalar implicature arising from the interaction between the maxims of quantity and quality plus three additional premises:

48) Premises needed to derive exhaustivity

P1) S asserts α correctly.

P2) Opinionated Speaker: S believes that either β or β’. (Fox 2007, Sauerland 2004)

P3) Relevance: S believes that β’ is relevant. (Gamut 1991, Atlas and Levinson 1981)

Any utterance for which all three premises and the two maxims hold will be interpreted as exhaustive by a hearer. This section will show the full derivation of exhaustivity as a conversational implicature.

3.3.3.1 The maxims of quantity and quality: creating a scalar implicature

Grice 1975 defines the maxims of quantity and quality as in (49):

49) Maxim of Quantity:

Make your contribution as informative as is required for the current purposes of the exchange

Do not make your contribution more informative than is required

Maxim of Quality:

Try to make your contribution one that is true

(Grice 1975: 152)

Together, these two maxims create the expectation that the speaker will say the most informative thing that the speaker believes to be true. Any more informative statement that the speaker fails to assert, the hearer can assume was omitted because the speaker believes the more informative statement to be false. Informativity can be defined as in (50) below.
50) Informativity is asymmetric entailment: $\beta$ is more informative than $\alpha$ if $\beta \Rightarrow^{Strawson} \alpha$ but $\alpha \not= \beta$. (Fox 2007, Matsumoto 1995)

The classic demonstration of this is with numbers. If James asserts *Charles has three children*, a hearer will assume that James believes Charles has exactly three children, even though James’ statement would still be true if Charles has four children or twelve. If Charles, in fact, has four children, it is more informative for James to say *Charles has four children* than to say *Charles has three children*, even though both are true, and so, by the maxim of quantity, the hearer expects James to say *Charles has four children*. The hearer assumes that James failed to say the more informative statement because the more informative statement is not true, and by the maxim of quality, James will always make true statements. The result of this is a scalar conversational implicature that James believes Charles to have *exactly* three children. Believing Charles to have four children and failing to assert it violates the maxim of quantity; believing Charles to have two children and asserting that he has three violates the maxim of quality.

3.3.3.2 Applying this to contrastive focus

The following abbreviations will be used throughout this section:

$\alpha =$ the utterance (ex: *It was a chair that Tom painted*. OR *Tom painted a CHAIR*.)

$\beta =$ the exhaustive interpretation (ex: *It was a chair and nothing else in a salient\textsuperscript{17} context that Tom painted*. OR *Tom painted a CHAIR and nothing else in a salient context.*)

\textsuperscript{17} The context set is referred to as ‘salient’ in order to emphasize that the clefted constituent is not chosen from all items in the world, but only from those items that are understood by the speaker and hearer to be relevant or plausible. For instance, in the example below, the context set of the clefted constituent only includes shoes that are likely to be worn to prom and probably excludes hiking boots and sneakers.

i) Jane went shopping for shoes for prom yesterday. It was a pair of flats that she eventually bought.

The requirement of saliency is very common, if not universal. For instance, if a teacher uttered (ii), he/she is not asking for a list of all people in the world who are currently talking, but just for the list of people who are currently talking in his/her classroom. Only the people currently in the classroom are a relevant/plausible/salient answer to the question.
\( \beta' = \) the nonexhaustive interpretation (ex: *There are multiple items in a salient context, one of which is a chair, that Tom painted.* OR *Tom painted multiple items in a salient context, one of which is a chair.*)

The desired conclusion is that when a speaker utters \( \alpha \), the hearer understands that the speaker believes \( \beta \) and not \( \beta' \):

Speaker says: *It was a chair that Tom painted.*

Hearer understands the speaker to believe: *It was a chair and nothing else in a salient context that Tom painted.*

Hearer understands the speaker to not believe: *There are multiple items in a salient context, one of which is a chair, that Tom painted.*

Three premises, in addition to the maxims of quantity and quality, are needed to reach the desired conclusion: (repeated from 48)

51) *Premises needed to derive exhaustivity*

- **P1)** S asserts \( \alpha \) correctly.
- **P2)** Opinionated Speaker: S believes that either \( \beta \) or \( \beta' \). (Fox 2007, Sauerland 2004)
- **P3)** Relevance: S believes that \( \beta' \) is relevant. (Gamut 1991, Atlas and Levinson 1981)

**Premise 1** allows the hearer to safely assume that the speaker is uttering \( \alpha \) in obedience to the Cooperative Principle. Without this, no maxims would be relevant, and so it would not be possible to derive any implicatures. For instance, if an it-cleft or contrastive focus were uttered as part of a children’s language game or in another context that was not a normal conversation, there may not be any expectation that S was conveying information. There would, therefore, not be any expectation that S was conveying all of the relevant information.

**Premise 2** requires that the speaker be committed to either \( \beta \) or \( \beta' \). It does not allow for any situation in which the speaker is uncertain or uncommitted to any statements stronger than \( \alpha \). If

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ii) Who is talking?
the hearer has reason to believe that the speaker is uncertain or uncommitted to more informative statements, then exhaustivity fails to arise. For example, in (52), Jane clearly indicates that she is not committed to more informative statements than the one that she made; therefore, Kevin cannot assume that Jane believes Tom painted a chair and nothing else, $\beta$, when she utters $\alpha$.

52) Jane and Tom refinish all of their furniture each year. This year, Tom painted a chair, a desk, and a table. A week later, Kevin asks Jane: “What did Tom paint?”

a) Jane responds: “I’m only going to tell you that it was a chair that he painted.”

b) Jane responds: “I’m only going to tell you that he painted a CHAIR.”

Premise 3, because of the maxim of quantity, amounts to a requirement that the speaker say the most informative statement that is relevant. If $\beta'$ is relevant, and a speaker says only $\alpha$, then the hearer can assume that the speaker has failed to say $\beta'$ because the speaker believes $\beta'$ to be false, and s/he doesn’t want to violate the maxim of quality. (Alternatively, the speaker could have failed to say $\beta'$ because the speaker is uncertain or uncommitted to $\beta'$, but this is blocked by Premise 2.)

If Premise 3 doesn’t hold—the hearer has reason to believe that a more informative statement is not relevant—then exhaustivity fails to arise. For example, in (53), Jane only needs to mention one non-lamp item in order to prove Kevin wrong. As long as Tom painted one thing that is not a lamp, then anything else he might have painted is irrelevant to Kevin and Jane’s debate. In this case, $\beta'$ is irrelevant, and when Jane utters $\alpha$, it does not need to be exhaustive.

53) Jane and Tom refinish all of their furniture each year. This year, Tom painted a chair, a desk, and a table. A week later, Kevin says to Jane: “I bet Tom painted only lamps again, didn’t he?”

a) Jane responds: “He doesn’t always paint lamps. Last week, it was a chair that he painted.”

b) Jane responds: “He doesn’t always paint lamps. Last week, he painted a CHAIR.”
3.3.3.3 A slight hiccup: The symmetry problem and Horn scales

An immediately apparent problem with the analysis above is that both $\beta$ and $\beta'$ appear, initially, to be more informative than $\alpha$ under the definition in (50). This should require the speaker to assert both $\beta$ and $\beta'$. For example, if the speaker asserts *It was a chair that Tom painted* the hearer can assume that the speaker believes both *It was a chair and nothing else in a salient context that Tom painted* and *There are multiple items in a salient context, one of which is a chair, that Tom painted*. By asserting only $\alpha$, the failure to assert the more informative $\beta$ and the more informative $\beta'$ would lead the hearer to believe a contradiction. However, if we use Horn scales to describe which statements are more or less informative, $\beta'$ does entail $\alpha$, but $\beta$ does not entail $\alpha$.

Horn scales are ordered according to asymmetric entailment. For example, *all* is ordered higher than *some* because *all* entails *some* but *some* does not entail *all* (ex. 54).

54) all > some

George ate all of the apples. $\Rightarrow$ George ate some of the apples.
George ate some of the apples. $\nRightarrow$ George ate all of the apples.

Additionally, Horn scales must be uniformly monotone (Matsumoto 1995). Sentences $\alpha$ and $\beta'$ are both upward strawson entailing (ex. 55) & 56) and so can be included on the same informativity scale; however, $\beta$ is neither upward nor downward strawson entailing (ex. 57) so it cannot be included on the same informativity scale as $\alpha$ or $\beta$.

$Q$: \{x: Tom painted x yesterday morning\} $\subseteq P$: \{x: Tom painted x yesterday\}

55) a) *It was a chair that Tom painted* ($\alpha$): upward entailing (smaller set entails larger set)

$P$: It was a chair that Tom painted yesterday morning $\Rightarrow Q$: It was a chair that Tom painted yesterday.
$Q$: It was a chair that Tom painted yesterday $\nRightarrow P$: It was a chair that Tom painted yesterday morning. (He might have painted it in the afternoon.)
b) *Tom painted a CHAIR* (a): upward entailing (smaller set entails larger set)

P: Tom painted a CHAIR yesterday morning \( \Rightarrow \) Q: Tom painted a CHAIR yesterday.

Q: Tom painted a CHAIR yesterday \( \nRightarrow \) P: Tom painted a CHAIR yesterday morning. (He might have painted it in the afternoon.)

56) a) *It was a chair among other things that Tom painted* (β’): upward entailing (smaller set entails larger set)

P: It was a chair among other things that Tom painted yesterday morning \( \Rightarrow \) Q: It was a chair among other things that Tom painted yesterday.

Q: It was a chair among other things that Tom painted yesterday \( \nRightarrow \) P: It was a chair among other things that Tom painted yesterday morning. (He might have painted it in the afternoon.)

b) *Tom painted a CHAIR among other things* (β’): upward entailing (smaller set entails larger set)

P: Tom painted a CHAIR among other things yesterday morning \( \Rightarrow \) Q: Tom painted a CHAIR among other things yesterday.

Q: Tom painted a CHAIR among other things \( \nRightarrow \) P: Tom painted a CHAIR among other things yesterday morning. (He might have painted it in the afternoon.)

57) a) *It was a chair and nothing else that Tom painted* (β): neither upward nor downward entailing (neither the larger nor the smaller set entails the other)

P: It was a chair and nothing else that Tom painted yesterday morning \( \nRightarrow \) Q: It was a chair and nothing else that Tom painted yesterday. (He might have painted other stuff in the afternoon.)

Q: It was a chair and nothing else that Tom painted yesterday \( \nRightarrow \) P: It was a chair and nothing else that Tom painted yesterday morning. (He could have painted the chair in the afternoon.)
b) *Tom painted a CHAIR and nothing else.* (β): neither upward nor downward entailing (neither the larger nor the smaller set entails the other)

P: Tom painted a CHAIR and nothing else yesterday morning \( \not\Rightarrow \) Q: Tom painted a CHAIR and nothing else yesterday. (He might have painted other stuff in the afternoon.)

Q: Tom painted a CHAIR and nothing else yesterday \( \not\Rightarrow \) P: Tom painted a CHAIR and nothing else yesterday morning. (He could have painted the chair in the afternoon.)

Because \( \alpha \) and \( \beta' \) are on the same informativity scale, by virtue of both being upward entailing, \( \beta' \) is more informative than \( \alpha \), and therefore, a speaker who asserts only \( \alpha \) (*a chair*) can be assumed to believe that \( \beta' \) (*a chair among other things*) is false so long as P1, P2, and P3 are true.

On the other hand, \( \alpha \) and \( \beta \) are not on the same informativity scale, by virtue of not being of the same monotonicity. Therefore, a speaker who asserts only \( \alpha \) cannot be assumed to believe that \( \beta \) (*a chair and nothing else*) is false. To the contrary, if P1, P2, and P3 are true, then a speaker who asserts \( \alpha \) will be assumed to intend \( \beta \).

In conclusion, the exhaustivity of focus can be derived as a conversational implicature, and a conversational implicature explains the contexts in which exhaustivity is true better than proposing that exhaustivity is a part of the structure of focus, even in extreme cases such as the it-cleft.

### 3.4 Testing the implicature experimentally

The analysis in Section 3.3, proposing that exhaustivity is a conversational implicature, crucially rests upon the grammaticality of examples like (52) and (53): speakers need to accept nonexhaustive contrastive foci as grammatical when some of the premises for exhaustivity have not been met. Unfortunately, this is a very difficult thing to get accurate judgments about informally, even for the in situ contrastive focus, and it-clefts have the additional complication that most speakers consider them to be only marginally grammatical under any circumstances.

Therefore, I conducted two psycholinguistic experiments investigating speakers’ judgments of in situ contrastive focus ( Judgment Experiment 1) and it-clefts ( Judgment Experiment 2) in
different contexts, with a focus on testing whether or not nonexhaustive focus is judged as less natural than focus in other contexts. This allowed me to obtain judgments from a sizable number of participants for multiple test items and to test whether people’s responses show statistically significant patterns. In the experiments, people heard in situ focus and it-clefts embedded in different kinds of linguistics contexts. The contexts were presented in writing and the critical sentences (containing the in situ focus or the it-cleft) were presented auditorily, with the appropriate pitch accent on the focused constituent (we discuss this in more detail below).

More specifically, I compared speakers’ judgments on exhaustive in situ foci and it-clefts to noncontrastive versions and to nonexhaustive versions. The speakers’ responses to the exhaustive foci were used as a measure for naturalness and the speakers’ responses to the noncontrastive foci were used as a measure for unnaturalness. To preview the more detailed results section below, what we found is the following: While there was (a) no statistical difference between exhaustive and nonexhaustive focus, (b) speakers did find nonexhaustive focus to be significantly more natural than noncontrastive focus. This is evidence that speakers can accept nonexhaustive focus as natural and is compatible with the claim that the exhaustivity of focus, even of the it-cleft, is a conversational implicature, not a part of the structure of focus.

3.4.1 Design

3.4.1.1 Participants

Twenty-four University of Southern California students participated in each experiment in exchange for $5. None of the same participants participated in both experiments.

3.4.1.2 Materials

Similar to Beaver and Onea (2009), the participants were presented with a context and then a target sentence. The context was shown in writing, and the targets were present auditorily. In Judgment Experiment 1, the target was a sentence that contained an in situ contrastive focus. In Judgment Experiment 2, the target was an it-cleft with a contrastive intonation on the clefted constituent. The same items were used in both experiments except that the focus accented constituent in Judgment Experiment 1 was clefted in Judgment Experiment 2. The participants were told in the instructions that there were three characters in the experiment: Jane, Tom, and Kevin. Jane and Tom are best friends who do everything together, but Kevin is Jane’s boyfriend,
and he’s sometimes upset by their friendship. This tension between the characters was created because pre-testing suggested that speakers tended to find it-clefts more acceptable in confrontational situations.

The target was always uttered by Jane in response to a question by Kevin. Within each item, the target was the same sound file for all conditions. The six conditions were achieved by altering the context that proceeded the target sentence. We manipulated four factors, which are explained in detail in the rest of this section:

1. Exhaustivity was observed or violated
2. Contrastiveness was observed or violated
3. Premise 3—the hearer has reason to believe that a more informative statement is not relevant—was observed or violated
4. Contrastive alternatives to the clefted constituent were explicitly listed in the context or implied as part of a category

There were 30 critical items and 45 fillers (discussed in Section 3.4.2.8.2). We used a Latin square design with six lists.

3.4.1.2.1 Conditions and Predictions

Condition 1: Exhaustive, Contrastive (exh, con)

In the first condition, the context preceding the target sentence was exhaustive and contrastive (abbreviated as: exh, con). As shown in (58), the (exh, con) condition was canonical: Tom performs an action on only one item (ex: *painted a chair*), and Jane’s response, in listing that one item, contrasts with Kevin’s accusation (ex: *that he painted a lamp*). This condition provided a baseline measure for grammaticality, as we expect participants to treat these kinds of sentences as fully grammatical. As mentioned above, participants read the context sentences and then heard the critical sentence (shown in bold in (58) and in the other examples).

58) Jane and Tom painted furniture. Tom painted a chair.

Later, Kevin remarks: “I bet Tom painted only lamps again, didn’t he?”
Jane responds: “He doesn’t always paint lamps.

*Judgment Experiment 1 Target:* Yesterday, he painted a CHAIR.”

*Judgment Experiment 2 Target:* Yesterday, it was a chair that he painted.”

**Condition 2: Exhaustive, Noncontrastive (exh, noncon)**

In the second condition, the context preceding the target sentence was exhaustive and noncontrastive (exh, noncon). As shown in (59), Tom still only performs an action on one item (ex: painted a chair), but Jane’s response does not contrast with Kevin’s accusation. This condition provides a baseline measure for ungrammaticality.

59) Jane and Tom painted furniture. Tom painted a chair.

Later, Kevin remarks: “I bet Tom painted only a chair again, didn’t he?”

Jane responds: “Yes.

*Judgment Experiment 1 Target:* Yesterday, he painted a CHAIR.”

*Judgment Experiment 2 Target:* Yesterday, it was a chair that he painted.”

A noncontrastive target was chosen as the baseline measure for unacceptability because the experiments in Section 3.2 demonstrated that contrastiveness—the presence of contrasting alternatives—is a part of the meaning of focus. This is potentially better than comparing the exhaustivity of focus to the exhaustivity of only as is more typically done (É Kiss 1998, Drenhaus et al 2011, Onea and Beaver 2009). This is because the exhaustivity of only is likely an assertion, by virtue of being part of its lexical entry, (Rooth 1985, 1992; Beaver and Clark 2008), and we cannot expect that violations of an assertion are perceived the same as violations of a presupposition. Integrated Pragmatics, Reich’s Structured Meanings, and Alternative Semantics all encode contrastiveness as a presupposition. Contrastiveness is, therefore, a better comparison for exhaustivity.

**Condition 3: Nonexhaustive, Explicit, Irrelevant (nonexh, exp, irrel)**

In the third condition, the context preceding the target sentence was nonexhaustive and explicitly listed contrastive alternatives to the clefted constituent, but rendered those alternatives irrelevant to the conversation (nonexh, exp, irrel). To illustrate, the context was nonexhaustive
because, while Tom performs an action on multiple items (ex: *painted a chair, a desk, and a table*), Jane only lists one item to contrast with Kevin’s accusation. The other items that Tom performs an action on (the contrastive alternatives) are explicitly listed in the context, but Premise 3 doesn’t hold: Kevin accuses Tom of painting *only* lamps so Jane only needs to list one non-lamp item in order to contradict Kevin. Like in (53) in Section 3.3, a more informative statement listing everything Tom painted would be irrelevant to the conversation; it wouldn’t be any more true that Tom didn’t paint only lamps if he painted three non-lamp items versus one. An exhaustivity conversational implicature should not arise in this context so the (nonexh, exp, irrel) condition is predicted to be acceptable under our account of exhaustivity as a conversational implicature. Notice that if exhaustivity is part of the structure of the it-cleft under any of the accounts in Section 3.2, this condition should be ungrammatical or undefined, thus unnatural for the participants.

60) Jane and Tom painted furniture. Tom painted a chair, a desk, and a table.
   Later, Kevin remarks: “I bet Tom painted only lamps again, didn’t he?”
   Jane responds: “He doesn’t always paint lamps.

   *Judgment Experiment 1 Target:* **Yesterday, he painted a CHAIR.”**
   *Judgment Experiment 2 Target:* **Yesterday, it was a chair that he painted.”**

**Condition 4: Nonexhaustive, Explicit, Relevant (nonexh, exp, rel)**

In the fourth condition, the context preceding the target sentence was nonexhaustive and explicitly listed the contrastive alternatives to the clefted constituent, but, in this condition, the alternatives were relevant to the conversation (nonexh, exp, rel). The context was nonexhaustive because, while Tom performs an action on multiple items (ex: *painted a chair, a desk, and a table*), Jane only lists one item to contrast with Kevin’s accusation. The other items that Tom performs an action on (the contrastive alternatives) are explicitly listed in the context, but Premise 3 holds: Jane should have to list all of the things Tom did to contradict Kevin, not just one (for example: in (61) if Jane’s statement is taken as nonexhaustive, then it is still possible that Tom painted a chair and a lamp; this doesn’t contradict Kevin). Because Jane should have to list all of the items that Tom performed an action on, the contrastive alternatives are relevant
to the conversation. An exhaustivity conversational implicature should arise in this context so the (nonexh, exp, rel) condition is predicted to be unacceptable.

61) Jane and Tom painted furniture. Tom painted a chair, a desk, and a table.
Later, Kevin remarks: “I bet Tom painted lamps again, didn’t he?”
Jane responds: “No, he didn’t.

Judgment Experiment 1 Target: Yesterday, he painted a CHAIR.”
Judgment Experiment 2 Target: Yesterday, it was a chair that he painted.”

Condition 5: Nonexhaustive, Implicit, Irrelevant (nonexh, nonexp, irrel)
In the fifth condition, the context preceding the target sentence was nonexhaustive, but did not explicitly list the contrastive alternatives to the cleft constituent. These alternatives were, though, as in the (nonexh, exp, irrel) condition, irrelevant (nonexh, nonexp, irrel). In this condition, Tom performs an action on multiple items, but they are not explicitly listed in the context, rather implied as part of a category (ex: painted a variety of furniture). Jane only lists one item to contrast with Kevin’s accusation, but Premise 3 doesn’t hold: she only needs to list one thing in order to contradict Kevin.

62) Jane and Tom painted furniture. Tom painted a variety of furniture.
Later, Kevin remarks: “I bet Tom painted only lamps again, didn’t he?”
Jane responds: “He doesn’t always paint lamps.

Judgment Experiment 1 Target: Yesterday, he painted a CHAIR.”
Judgment Experiment 2 Target: Yesterday, it was a chair that he painted.”

The alternatives are implicit in this condition, as opposed to explicit in the (nonexh, exp, irrel) condition, in order to investigate whether increasing the saliency of the alternatives to the clefted constituent increases the strength of the exhaustivity intuition. Horn (1981) proposes that the strength of the exhaustivity intuition in it-clefts derives from the markedness of the it-cleft. If this is true, a nonexhaustive it-cleft should be especially difficult when the alternatives to the it-cleft are highly salient. The (nonexh, nonexp, irrel) condition is, therefore, predicted to be acceptable, and additionally, more acceptable than the (nonexh, exp, irrel) condition.
Condition 6: Nonexhaustive, Implicit, Relevant (nonexh, nonexp, rel)

In the sixth condition, the context preceding the target sentence was nonexhaustive. It did not explicitly list any contrastive alternatives to the clefted constituent, but these alternatives were relevant to the conversation (nonexh, nonexp, rel). In this condition, Tom performs an action on multiple items that are not explicitly listed in the context (ex: painted a variety of furniture), and Jane only lists one item to contrast with Kevin’s accusation, but Premise 3 holds: Jane should have to list all of the things Tom did to contradict Kevin, not just one. An exhaustivity conversational implicature should arise in this context, but, because the alternatives to the clefted constituent are not especially salient, it may not arise as strong as in Condition 4 (nonexh, exp, rel). Therefore, the (nonexh, exp, rel) condition is predicted to be unacceptable, but not as unacceptable as (nonexh, exp, rel).

63) Jane and Tom painted furniture. Tom painted a variety of furniture.

Later, Kevin remarks: “I bet Tom painted lamps again, didn’t he?”

Jane responds: “No, he didn’t.

Judgment Experiment 1 Target: Yesterday, he painted a CHAIR.”

Judgment Experiment 2 Target: Yesterday, it was a chair that he painted.”

Table 4: Predictions for all six conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Abbreviation</th>
<th>Example</th>
<th>Prediction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exhaustive, Contrastive</td>
<td>(exh,con)</td>
<td>(58)</td>
<td>Acceptable</td>
</tr>
<tr>
<td>Exhaustive, Noncontrastive</td>
<td>(exh,noncon)</td>
<td>(59)</td>
<td>Unacceptable</td>
</tr>
<tr>
<td>Nonexhaustive, Explicit, Irrelevant</td>
<td>(nonexh,exp,irrel)</td>
<td>(60)</td>
<td>Acceptable</td>
</tr>
<tr>
<td>Nonexhaustive, Explicit, Relevant</td>
<td>(nonexh,exp,rel)</td>
<td>(61)</td>
<td>Unacceptable</td>
</tr>
<tr>
<td>Nonexhaustive, Implicit, Irrelevant</td>
<td>(nonexh,nonexp,irrel)</td>
<td>(62)</td>
<td>Acceptable</td>
</tr>
<tr>
<td>Nonexhaustive, Implicit, Relevant</td>
<td>(nonexh,nonexp,rel)</td>
<td>(63)</td>
<td>Unacceptable</td>
</tr>
</tbody>
</table>
3.4.1.2.2 Acoustic properties of spoken targets

In Judgment Experiment 1, the object in each target sentence was pronounced with a contrastive intonation. The average pitch rise (ending pitch – starting pitch\(^{18}\)) on the stressed syllable of the focused word was 122.83 Hz, with a maximum rise of 166.34 Hz and a minimum of 81.09 Hz.

In Judgment Experiment 2, the clefted constituent in each target sentence was pronounced with a contrastive intonation. The average pitch rise (ending pitch – starting pitch\(^{19}\)) on the stressed syllable of the clefted constituent was 99.93 Hz (max: 154.26 Hz; min: 45.27 Hz).

In essence, all of the targets that we used in our experiment had a clear contrastive accent on the focused constituent. Furthermore, as stated above, the sound file used in each item was the same file for all conditions of an item. Thus any differences we observe between the different conditions cannot be attributed to any differences in the prosody, but rather must be due to the contextual manipulation.

3.4.1.3 Fillers

The same fillers were used in both experiments. There were 45 fillers in each experiment, for a 1:1.5 ratio. The fillers resembled the experimental items in that Tom did one or multiple things, Kevin commented on them, and then Jane responded to Kevin. The target sentences in the fillers were pseudoclefts and SVO declaratives. These were either contrastive or noncontrastive with a contrastive accent on the appropriate word, a contrastive accent on the inappropriate word, or a flat intonation. All fillers were exhaustive, and I avoided any filler in which the last sentence would be considered unacceptable in isolation (ex: an illicit word order) so that the participants would always remember to consider the context of the utterance.

3.4.1.4 Procedure

Participants were tested using a PC running Perception Research Systems’ Paradigm software to display the items and record the responses. Participants read the items one sentence at a time.

\(^{18}\) If the stressed syllable began or ended with a stop or an unvoiced sound then the closest preceding pitch was used as the starting or ending pitch.

\(^{19}\) See Footnote 18.
on the computer screen, and then heard the target sentence in a female voice. After listening to
the target, they saw on the screen six boxes labeled 1 through 6, arranged from left to right.
They were given an unlimited amount of time to click on the box indicating how they rated the
target sentence. They were instructed to rate *completely natural* sounding utterances as 1 and
*completely unnatural* sounding utterances as 6.

Participants were told to rate the naturalness of the target in light of the preceding context.
We stressed that naturalness should not be evaluated based on prescriptive grammar or the
participant’s opinion of Jane and Tom’s activities. Participants practiced rating naturalness with
five practice trials before the beginning of the experiment.

Randomly distributed throughout the experiment were ten comprehension questions.

3.4.2 Summary of predictions

I expect that participants will find the (exh,con) condition to be the most natural, rating it
close to 1, and the (exh,noncon) condition to be the least natural, rating it close to 6. The
exhaustivity implicature should fail to arise in the (nonexh,exp,irrel) and (nonexh,nonexp,irrel)
conditions, so these should be rated significantly more natural than the (exh,noncon) condition,
but not significantly less natural than the (exh,con) condition. The exhaustivity implicature
should arise though in the (nonexh,exp,rel) and (nonexh,nonexp,rel) conditions so these should
be rated significantly less natural than the (exh,con) condition, but not significantly more natural
than the (exh,noncon) condition. In terms of naturalness then, the conditions should pattern:

64) (exh,con), (nonexh,exp,irrel), (nonexh,nonexp,irrel) <rated closer to 1

(nonexh,exp,rel), (nonexh,nonexp,rel), (exh,noncon)

3.4.3 Results

All 48 participants were at least 70% accurate on the comprehension questions, but one
participant in Judgment Experiment 2 accepted all but three of the it-clefts as perfectly natural.
(Her average rating, collapsing across all conditions, was 1.07, whereas the average rating of the
other participants was 2.42.) This one participant was excluded from the data because it was not
clear that she was sensitive to any of the experimental manipulations.
Figure 21 and Figure 21 show the participants’ average ratings for the six conditions. We conducted paired, two-tailed, Bonferroni corrected t-tests (with $\alpha(0.05)=0.004$) by subjects and by items to compare the conditions to each other. All statistics are in Table 5 and Table 6.

**Figure 20: Results for Judgment Experiment 1: the naturalness of in-situ contrastive focus**

(exh, con) = acceptability baseline; (exh, noncon) = unacceptability baseline

On the six-point scale, 1=completely natural, 6=completely unnatural
The nonexhaustive conditions were compared to two baselines: the (exh,con) condition was the baseline for acceptability and the (exh,noncon) condition was the baseline for unacceptability. The baseline for acceptability was rated to be significantly more natural than the baseline for unacceptability.

**Effect of Exhaustivity manipulation**

The main finding of this study is that participants rated nonexhaustive targets similar to the baseline for acceptability, but significantly worse than the baseline for unacceptability. In Judgment Experiment 1, all of the nonexhaustive in situ foci were rated more natural than the ungrammatical (exh, con) condition while the (nonexh,exp,irrel) and (nonexh,exp,rel) conditions did not differ significantly from the grammatical baseline condition (exh,con). In Judgment Experiment 2, none of the nonexhaustive it-clefts differed significantly from the grammatical (exh,con) condition, but they were all rated more natural than the ungrammatical (exh,noncon) condition. (See Table 5 and Table 6 for statistics.)

Participants did not find the nonexhaustive contrastive foci, whether in situ or clefted, to be unnatural.
**Effect of Relevance manipulation**

Somewhat surprisingly, the conditions in which a more informative statement should have been relevant—(nonexh,exp,rel) and (nonexh,nonexp,rel)—were also judged to be more natural than the unacceptability (exh,noncon) condition in both experiments. (See Table 5 and Table 6 for statistics.) Because the more informative statement was relevant in these examples, Premise 3 held and so an exhaustivity implicature should have arisen, causing these examples to be rated unnatural.

**Effect of the Explicit Alternatives manipulation**

The final manipulation, explicitly listing alternatives to the clefted constituent versus implying them as part of a category, did not seem to make any difference. There was no significant difference in how natural the (nonexh,exp,irrel) and (nonexh,exp,rel) conditions were perceived versus the (nonexh,nonexp,irrel) and (nonexh,nonexp,rel) conditions. (See Table 5 and Table 6 for statistics.)

**Table 5: Results for Judgment Experiment 1: in-situ contrastive focus**

Bonferroni corrected paired t-tests

* = Bonferroni significant  (*) = Bonferroni marginal

<table>
<thead>
<tr>
<th>Condition 2</th>
<th>By subject</th>
<th>By item</th>
</tr>
</thead>
<tbody>
<tr>
<td>*(exh,con) vs. (exh,noncon)</td>
<td>(t_1(23)=-5.072, p_1&lt;.004)</td>
<td>(t_2(29)=-11.691, p_2&lt;.004)</td>
</tr>
<tr>
<td>(exh,con) vs. (nonexh,exp,irrel)</td>
<td>(t_1(23)=.289, p_1=.775)</td>
<td>(t_2(29)=.424, p_2=.674)</td>
</tr>
<tr>
<td>(exh,con) vs. (nonexh,exp,rel)</td>
<td>(t_1(23)=-1.653, p_1=.112)</td>
<td>(t_2(29)=-1.582, p_2=.124)</td>
</tr>
<tr>
<td>(exh,con) vs. (nonexh,nonexp,irrel)</td>
<td>(t_1(23)=-2.195, p_1=.038)</td>
<td>(t_2(29)=-2.100, p_2=.045)</td>
</tr>
<tr>
<td>(exh,con) vs. (nonexh,nonexp,rel)</td>
<td>(t_1(23)=-1.868, p_1=.075)</td>
<td>(t_2(29)=-2.009, p_2=.054)</td>
</tr>
<tr>
<td>*(exh,noncon) vs. (nonexh,exp,irrel)</td>
<td>(t_1(23)=5.403, p_1&lt;.004)</td>
<td>(t_2(29)=10.448, p_2&lt;.004)</td>
</tr>
<tr>
<td>*(exh,noncon) vs. (nonexh,exp,rel)</td>
<td>(t_1(23)=5.210, p_1&lt;.004)</td>
<td>(t_2(29)=8.649, p_2&lt;.004)</td>
</tr>
<tr>
<td>*(exh,noncon) vs. (nonexh,nonexp,irrel)</td>
<td>(t_1(23)=4.107, p_1&lt;.004)</td>
<td>(t_2(29)=7.929, p_2&lt;.004)</td>
</tr>
<tr>
<td>*(exh,noncon) vs. (nonexh,nonexp,rel)</td>
<td>(t_1(23)=3.545, p_1&lt;.004)</td>
<td>(t_2(29)=6.938, p_2&lt;.004)</td>
</tr>
<tr>
<td>(nonexh,exp,irrel) vs. (nonexh,exp,rel)</td>
<td>(t_1(23)=-1.810, p_1=.083)</td>
<td>(t_2(29)=-1.898, p_2=.068)</td>
</tr>
<tr>
<td>Conditions</td>
<td>By Subject</td>
<td>By Item</td>
</tr>
<tr>
<td>------------</td>
<td>------------</td>
<td>--------</td>
</tr>
<tr>
<td>*(exh,con) vs. (exh,noncon)</td>
<td>*$t_1(23)=-4.773, p_1&lt;.004$</td>
<td>*$t_2(29)=-5.525, p_2&lt;.004$</td>
</tr>
<tr>
<td>(exh,con) vs. (nonexh,exp,irrel)</td>
<td>$t_1(23)=-1.590, p_1=.085$</td>
<td>$t_2(29)=-1.804, p_2=.12$</td>
</tr>
<tr>
<td>(exh,con) vs. (nonexh,exp,rel)</td>
<td>$t_1(23)=-2.143, p_1=.043$</td>
<td>$t_2(29)=-1.950, p_2=.061$</td>
</tr>
<tr>
<td>(exh,con) vs. (nonexh,nonexp,irrel)</td>
<td>$t_1(23)=-1.619, p_1=.120$</td>
<td>$t_2(29)=-1.876, p_2=.071$</td>
</tr>
<tr>
<td>*(exh,noncon) vs. (nonexh,exp,irrel)</td>
<td>*$t_1(23)=3.323, p_1&lt;.004$</td>
<td>*$t_2(29)=4.966, p_2&lt;.004$</td>
</tr>
<tr>
<td>(*) (exh,noncon) vs. (nonexh,exp,rel)</td>
<td>(*$t_1(23)=3.318, p_1=.005$</td>
<td>*$t_2(29)=4.868, p_2&lt;.001$</td>
</tr>
<tr>
<td>*(exh,noncon) vs. (nonexh,nonexp,irrel)</td>
<td>*$t_1(23)=3.382, p_1&lt;.004$</td>
<td>*$t_2(29)=3.3537, p_2&lt;.004$</td>
</tr>
<tr>
<td>*(exh,noncon) vs. (nonexh,nonexp,rel)</td>
<td>*$t_1(23)=3.220, p_1&lt;.004$</td>
<td>*$t_2(29)=4.078, p_2&lt;.001$</td>
</tr>
<tr>
<td>(nonexh,exp,irrel) vs. (nonexh,exp,rel)</td>
<td>$t_1(23)=-1.127, p_1=.272$</td>
<td>$t_2(29)=-.792, p_2=.435$</td>
</tr>
<tr>
<td>(nonexh,nonexp,irrel) vs. (nonexh,nonexp,rel)</td>
<td>$t_1(23)=-.211, p_1=.827$</td>
<td>$t_2(29)=-.174, p_2=.863$</td>
</tr>
<tr>
<td>(nonexh,exp,irrel) vs. (nonexh,nonexp,irrel)</td>
<td>$t_1(23)=-.346, p_1=.733$</td>
<td>$t_2(29)=-.213, p_2=.833$</td>
</tr>
</tbody>
</table>

3.4.4 Discussion

This study compared nonexhaustive contrastive foci to two baseline conditions in order to investigate whether participants would accept nonexhaustive contrastive foci as natural. The acceptability baseline was set by a fully canonical, exhaustive, contrastive in situ focus or it-cleft (exh,con), and the unacceptability baseline was set by an exhaustive but noncontrastive in situ focus or it-cleft (exh,noncon). Since contrast is usually considered a presupposition of
contrastive focus, it was then possible to compare nonexhaustive foci to a different violation of a presupposition. If exhaustivity is a presupposition of contrastive focus, we would expect that it is always present, and participants would find any violations of it to be as unnatural as violating the presupposition of contrast. If, however, exhaustivity is a conversational implicature of contrastive focus, we would expect that there are times when the implicature doesn’t arise. Conditions (nonexh,exp,irrel) and (nonexh,nonexp,irrel) were designed to be times when Premise 3 (a more informative statement is relevant) does not hold, and so, if exhaustivity is a conversational implicature, exhaustivity should not arise in these two conditions. The experiments did indeed find that participants judged nonexhaustive targets to be significantly more natural than (exh,noncon) targets, and they did not judge them significantly worse than the grammatical (exh,con) targets. This is the major finding of this study: speakers do not reject nonexhaustive in situ contrastive foci or even clefted contrastive foci.

There is further evidence in the [+relevant] conditions that exhaustivity is nonstructural. In both experiments, [+relevant] conditions were rated as more natural than the ungrammatical (exh,noncon) baseline condition. At first glance, this seems to argue against the implicature analysis in Section 3.3, because when a more informative statement is relevant, exhaustivity should arise. However, contrastiveness is a part of the structure of contrastive focus, and it is more unnatural to violate a structural requirement than it is to violate an implicature. This is the result we see: violating the exhaustivity implicature that arises in conditions (nonexh,exp,rel) and (nonexh,nonexp,rel) is more natural than violating the structural requirement for contrastiveness of condition (exh,noncon).

Somewhat harder to explain is that the [+relevant] conditions did not differ from their [−relevant] counterparts, but this could be a result of the complexity of the task. Judgment tasks are well known to be difficult for participants, and this one asked the participants to take into account many very subtle differences in the contexts of the target sentences. There is some evidence in these experiments that, in a more nuanced task, the [+relevant] conditions would be rated less natural than their [−relevant] counterparts: in both experiments, there was a steady trend, however slight, for the [+relevant] conditions to be rated less natural than their [−relevant] counterpart. Further word with more sensitive measures would need to be undertaken to determine for sure whether relevance makes a difference or not, but in general, the lack of
difference between [+relevant] and [-relevant] conditions does not challenge the main result that participants failed to rate nonexhaustive focus as unnatural.

Overall, Judgment Experiments 1 and 2 show that nonexhaustive contrastive foci, whether in situ or clefted, are not perceived as being unnatural, but rather seem to pattern more like fully canonical, exhaustive foci. They support analyzing the exhaustivity of in situ contrastive focus and the it-cleft as a conversational implicature arising from the maxims of quantity and quality.

3.5 Conclusion

Section 3.2 found that speakers inhibited alternatives to a contrastively focused constituent. It was possible that this inhibition was the result of exhaustivity: speakers interpret contrastive focus to mean that the focused item is the only item true of the utterance and so they reject any other alternatives because they are false. It is not common to claim that in situ focus is exhaustive, but this claim is extremely common for clefted foci. This chapter, therefore, looked at the exhaustivity of in situ focus and it-clefts, using it-clefts as an extreme example of exhaustive focus. The chapter found, though, that the exhaustivity of in situ contrastive focus and clefted contrastive foci behaves like a conversational implicature and not like a structural part of contrastive focus. Exhaustivity shows the three properties of conversational implicatures identified by Grice: exhaustivity is detachable (as far as can be determined while the structure of contrastive focus is still unclear); exhaustivity can fail to arise; and exhaustivity can be canceled. Exhaustivity is most likely the result of an interaction between the maxims of quality and quantity plus three additional premises:

**P1**) S asserts $\alpha$ correctly.

**P2**) Opinionated Speaker: S believes that either $\beta$ or $\beta'$. (Fox 2007, Sauerland 2004)

**P3**) Relevance: S believes that $\beta'$ is relevant. (Gamut 1991, Atlas and Levinson 1981)

Hearers assume that utterances with contrastive foci are exhaustive because, if a more informative statement were relevant and true, the speaker would have said that statement instead.

This conversational implicature analysis was tested in two grammaticality judgment experiments. Judgment Experiment 1 compared nonexhaustive in situ contrastive foci to fully
canonical, exhaustive targets and ungrammatical noncontrastive targets. Judgment Experiment 2 compared nonexhaustive it-clefts to fully canonical, exhaustive targets and ungrammatical noncontrastive targets. Even the it-cleft experiment found that nonexhaustive targets behaved like canonical targets, but were more unnatural than the noncontrastive targets. This is further evidence that the conversational implicature analysis of exhaustivity is correct. Contrastive focus is not structurally exhaustive. This means that, even though the set of alternatives is inhibited, semantically, the set of alternatives is merely invoked, not rejected. This is consistent with the analysis in Integrated Pragmatics, Alternative Semantics, and Reich’s Structured Meanings.
Chapter 4
The Set of Alternatives is Semantically Encoded, but not Truth Conditional

4.1 Introduction

Chapters 2 and 3 show that comprehenders consider alternative propositions upon encountering an L+H* accent and that these alternatives, while inhibited at some point in being processed, are not prohibited from being true. The remaining question is how to represent these alternatives in the derivation of an utterance’s meaning. Do comprehenders consider these alternatives simply because they are available in the context or does the meaning of contrastive focus require that a set of alternatives be under consideration? In other words: Is the existence of a set of alternatives a conversational implicature, presupposition, or assertion of a focused utterance.

Some work has been done investigating how focus is represented. It has yet to reach a consensus, but the different research programs have also been using different definitions for what the meaning contribution of focus is. For instance, Kratzer (2004) concentrates on backgrounding as the meaning of focus; the discussion in Rooth (1999) concentrates on the status of the existential intuition (that something exists which fulfills the background), and Büring (2007) concentrates on focus as the answer to a question. Little has been said about the status of contrast in deriving the meaning of an utterance with focus. This chapter therefore looks at the literature on encoding focus in general and then presents evidence that the presence of a set of alternatives is semantically encoded, but not truth conditional. This chapter is organized as follows: Section 4.2 presents the previous literature on how to encode focus. Section 4.3 demonstrates that the presence of a set of alternatives does not have the properties of a conversational implicature. Section 4.4 demonstrates that the presence of a set of alternatives does not have the properties of an assertion. Conclusions are in Section 4.5.

4.2 Previous Analyses

Focus has been encoded in an utterance in a variety of ways: as a conversational implicature, a discourse definedness condition, an expressive meaning component, a presupposition, and an assertion. This section evaluates the different ways for encoding focus and uses these past theories to create a framework for the discussion in Sections 4.3 and 4.4.
4.2.1 Focus as a conversational implicature

An example of defining focus as a conversational implicature can be found in the Relevance Theory approach (Sperber and Wilson 1995; Breheny 1998). Under Relevance Theory, the meaning of focus is to mark information that the hearer should pay attention to. It’s non-structural emphasis. The hearer’s job is to determine why the speaker chose to emphasize that constituent, and the many meanings that have been attributed to focus are the result of pragmatically determining the relevance of that particular emphasis. For instance, question-focus congruence occurs because the only relevant information that could follow a question is the answer to the question, and a good reason to emphasize a constituent would be to ensure that the answer is maximally salient. Wedgwood (2005) points out that this theory might be desirable because the flexibility of it allows it to account for question-focus congruence as part of a more general principle of answering a question with relevant information. For instance, a topic-comment structure in an answer would also be the result of answering a question with the most relevant information. In (1) below, the question already establishes Henry as a topic and whatever Henry did as the answer to the question. A hearer then, attempting to understand the answer, would know this, and conclude that importance-marking on Henry was relevant because it established that the answer and question were on the same topic while importance-marking on lake was relevant because it answered the question.

1) Q: Tom went to the park, and Anna went to the zoo, but what about Henry?
   A: As for Henry, he went to the lake.

There might be three objections to the relevance theory account. The first objection is raised in Glanzberg (2005). He observes that it will be difficult, though not impossible, with a purely pragmatic theory of focus to account for the differences in truth conditions that result when focus sensitive operators, such as only, associate with different focused words. To a certain extent, Relevance Theory dodges this objection by allowing pragmatic processes to have truth conditional effects.

The second objection is that a purely pragmatic theory wouldn’t necessarily expect different phonetic realizations for different types of ‘emphasizing,’ because the difference between topics

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The second objection is that a purely pragmatic theory wouldn’t necessarily expect different phonetic realizations for different types of ‘emphasizing,’ because the difference between topics
and foci is determined pragmatically, but there is evidence of such distinctions (e.g. Jackendoff 1972’s A-accent vs. B-accent; Pierrehumbert 1980).

The final objection is that focus doesn’t reliably correspond to accent placement (for instance: second occurrence focus) and so a more abstract notion of focus marking must be employed.

4.2.2 Focus as a definedness condition

Büring (2007) makes use of this final objection. His theory agrees that focus is a product of the discourse, but formalizes its contribution using Update Semantics. In his account, focus’ contribution to meaning is to establish a definedness condition on the context such that any updates are undefined in all contexts that don’t satisfy the Question-Answer Congruence Condition:

2) Question-Answer Congruence:
   A is a felicitous answer to Q only if
   a) $\llbracket Q \rrbracket^0 \subseteq \llbracket A \rrbracket^F$ and\(^{20}\)
   b) there is no alternative focusing $A'$ of $A$ which has fewer F-markings and meets (2).

(Büring 2007: pg. 451, ex. 11)

This analysis appears similar to a presupposition, but, formally, cannot be a presupposition because it operates over the discourse itself.

4.2.3 Focus as an expressive meaning

Kratzer (2004) gives a similar analysis. She concludes that the meaning of focus is to constrain the set of possible situations that could be the actual utterance situation. This matches the definition of expressive meanings given in Kaplan (1999), and, according to Potts (2003), expressives are conventional implicatures, not presuppositions.

Kratzer considers it desirable that focus is not a presupposition. In her account, the meaning of focus is to make it given that someone or something fulfills the background. For instance, if the sentence is *John was late*, with focus on *John*, then the meaning of this focus is that it is given that someone was late. This is known as the existential intuition. Using Schwarzschild’s

\(^{20}\) $\llbracket Q \rrbracket^0$ is the ordinary value of the question, and $\llbracket A \rrbracket^F$ is the focus value of the question as defined in Rooth (1985).
Givenness Theory, she proposes that the existential intuition arises because it is used to search the discourse for antecedents so that no given material receives a pitch accent. She points out that it would be too strong to consider focus, under this meaning, to be an assertion or a presupposition. Focus cannot be an assertion because incorrect focusing in the answer to a question does not seem to make the answer false, but rather just inappropriate. If making the background given were an assertion, then assigning a pitch accent to the wrong word should deprive the answer of a truth condition. Instead, the answer can still be true, just used wrong. In this way, focus seems to be acting like a presupposition, but the presuppositional analysis also appears to be too strong. In (3) below, **too** introduces a presupposition that *Jill attended the meeting* has an antecedent earlier in the discourse. This antecedent (*Ed attended the meeting*) cannot be accessed, though, because it’s contained within a doubt-island. However in (3), focus should introduce the presupposition that *attended the meeting* has an antecedent earlier in the sentence (aka: that something previous in the discourse entails $\exists x. x \text{ attended the meeting}$, à la Schwarzschild 1999). Otherwise, *attended the meeting* shouldn’t be considered Given and so the pitch accent on JILL would be inappropriate. The pitch accent would instead go on *meeting* in order to mark the entire proposition as new. The antecedent for *attended the meeting* is also contained in a doubt island, but, unlike in (3), focus is able to access the antecedent.

3) a) #Sue doubts that Ed attended the meeting, but we all agree that Jill attended the meeting too.

b) Sue doubts that Ed attended the meeting, but we all agree that JILL {attended the meeting/did}.

It should be noted, though, that Kratzer’s objection to a presuppositional analysis relies heavily on the account of accent placement in Givenness Theory. It would be possible, as was done in Büring (2007) to propose a theory in which the pitch accent constraints of Givenness Theory act only at the pragmatic/intonational level. The existential intuition could then still be presuppositional.

Rooth (1999) offers more reasons for thinking that focus does not presuppose the existential intuition. He derives the existential intuition as the union of all of the alternative propositions contained in the set C. He begins with Dretske counterfactual environments (Dretske 1972).
The context of a Dretske counterfactual is that there is a man named Clyde has been seeing Bertha, but Bertha is out of the country a lot and so their affair is only intermittent. Clyde, though, discovers that he would inherit a lot of money if he marries before he’s 30, so he arranges to marry Bertha, expecting that they wouldn’t see each other any more than before, because he reasons that that relationship wouldn’t be too much of a commitment. Under this scenario, (4) is felicitous.

4) If Clyde hadn’t married [Bertha], he would not have qualified because he would not have married anyone. (It would have been too much of a commitment to marry anyone else.)

(Rooth 1999: pg. 242, ex. 38)

If, however, the existential intuition was presupposed, the first clause would presuppose that Clyde hadn’t married anyone. The final clause should then be redundant with the first, rendering the statement infelicitous. This is not the case.

Example (5) gives an additional reason for thinking that the existential intuition is not presupposed. In (5), a presupposition such as Someone won the football pool should be introduced by focus on Mary, but this proposition would contradict the first part of the utterance which asserts that it’s unlikely that anyone won the football pool.

5) Q: Did anyone win the (office) football pool this week?  
A: Probably not, because it’s unlikely that [Mary] won it, and she’s the only person who ever wins.

(Rooth 1999: pg. 241, ex. 36)

As additional evidence for this observation, Rooth compares the answer in (5) with the answer in (6) where an it-cleft is used. He assumes that it-clefts do have an existential presupposition and so finds that when an existential presupposition is present, the answer is infelicitous.
6) A: Probably not, because it’s unlikely that it’s [Mary]$_r$ who won it, and she’s the only person who ever wins.

(Rooth 1999: pg. 241, ex. 36)

This all appears to be strong evidence against focus introducing an existential presupposition, but Rooth notes (based on a p.c. with David Beaver) that these objections disappear if we allow C to optionally include quantifiers such as *nobody*. For instance, in (5), if *nobody won the football pool* is a member of C, then the union of the propositions in C will be trivially true of any utterance. The final clause in (4) would then be informative, and the focus on *Mary* in (5) would no longer be contradicting the assertion that it’s unlikely anyone won the football pool. Some other aspect of the it-cleft would need to be invoked to explain the infelicity of (6). There are independent reasons for thinking that the set C can include *nobody*. The best known is Jackendoff’s (1972) observation that 1) *nobody* can be focused and 2) when *nobody* is focused, there is no existential intuition.

7) **NOBODY** likes Bill. \(\iff\) Someone likes Bill.

In sum then, there are no conclusive reasons to believe that focus doesn’t introduce an existential presupposition, and while there are some objections to focus being entirely pragmatic, none of these have been shown to be insurmountable. The best evidence so far is Kratzer’s observation that inappropriate focusing doesn’t deprive an utterance of a truth value. This seems to argue against focus being asserted, but even this is mostly just an intuition.

None of these accounts, however, have so far dealt directly with the status of the set of alternatives, but have rather defined focus according to its backgrounding function. Kratzer (2004) mentions briefly that, in addition to the expressive meaning she proposes for focus in general, contrastive focus might have to also introduce a separate presupposition or assertion in order to associate with focus sensitive words. She uses the distinction between *always* and *only* raised in Beaver and Clark (2003) to suggest that focus association is semantic. Beaver and Clark noted that the difference in grammaticality judgments between (8) and (9) suggests an analysis where some focus sensitive particles, such as *always*, associate with focus pragmatically, but others, such as *only*, associate semantically. This would make the intuition in
(8) (that events of Sandy feeding Nutrapup to someone are maximally events of Sandy feeding Nutrapup to Fido) a conversational implicature that can be canceled, but the same intuition in (9) has the force of assertion, causing the contradiction.

8) Sandy always feeds Nutrapup to FIDO, and she also always feeds Nutrapup to BUTCH.
9) *Sandy only feeds Nutrapup to FIDO, and she also only feeds Nutrapup to BUTCH.

(Beaver and Clark 2008: 327)

Rooth (1999) makes a similar move, separating contrast from the existential intuition, but instead takes contrast to be the basic case. The explorations of the existential intuition in Rooth (1999) are meant to determine whether an existential presupposition should be added to the meaning of focus, but the article, in general, assumes the definition of focus given in Rooth (1992): focus definitely introduces a presupposition that there is a set C that is a subset of the focus value of the utterance and contains at least the ordinary value of the utterance plus one alternative proposition.

The status of contrast, therefore, remains even more open-ended than other potential properties of focus. The next two sections will show that the introduction of a set of alternatives does not have the properties of a conversational implicature or an assertion.

4.3 The set of alternatives is not a conversational implicature

This section will attempt to demonstrate that the presence of a set of alternatives does not have the properties of a conversational implicature. As was discussed in Chapter 3, Grice (1975) identified three properties of conversational implicatures: 1) detachability, 2) suspension/cancelability, and 3) failure to arise.

Detachability is difficult to demonstrate for in situ contrastive focus for two reasons. Firstly, like with it-clefts, the exact structure of contrastive focus is still much debated. It then becomes difficult to say what other structures should qualify as being derivable from contrastive focus. Secondly, the pitch accents that allow us to observe whether contrastive focusing is present or not are optional (see for example Schwarzschild 1999). It is therefore difficult to say whether a structure is truly focused. With these caveats in mind, though, there are some observations we can make that seem to suggest that the presence of a set of alternatives is not detachable. In (10)
below, the context introduces the set of dessert items. When *cookie* is contrastively focused (10), it is incoherent to continue the story with an alternative from this set of dessert items (10), unless the alternatives are also contrastively focused (10). The story can easily continue, though, with a proposition that is not part of the set of alternatives (10). It appears that a set of alternatives is invoked when *cookie* is focused, such that there is an implicature that the alternatives are not true. The alternatives must also be contrastively focused in order to cancel this implicature. In (10) however, we don’t see this implicature arising, even though the alternative set is in fact given in the context. As further evidence that no set of alternatives is invoked for *She ate a cookie* in (10), we see that it is in fact incoherent to focus other members of the set. It would appear that the focused form of the utterance has a contrastive meaning that the unfocused form does not, even though the alternative set is highly salient.

10) a) Jane arrived back at the table from the dessert buffet. She ate a **COOKIE**21.
   i. ??Then she ate a cupcake and a sundae.
   ii. Then she ate a **CUPCAKE** and a **SUNDAE**.
   iii. Then she ate a salad and a sandwich.

b) Jane arrived back at the table from the dessert buffet. She ate a cookie.
   i. Then she ate a cupcake and a sundae.
   ii. ??Then she ate a **CUPCAKE** and a **SUNDAE**.
   iii. Then she ate a salad and a sandwich.

Examples like (10) suggest that accessing a set of alternatives isn’t just a matter of the conversational circumstances, but part of the meaning of focus itself.

The second test is suspension/cancelability. Examples (11) and (12) are both attempts to suspend the presence of a set of alternatives. In the A context, a set of alternatives is part of the context, but in the B context, no set of alternatives is possible. The B context attempts to suspend the presence of a set of alternatives by creating an environment in which it would be unnatural to conclude that alternatives exist. In examples (11) and (12), the focused utterance is felicitous in Context A, but infelicitous in Context B. Notice that the unfocused utterance is felicitous in all contexts.

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21 L+H* accenting is indicated with bold font and capital letters.
11) CONTEXT A: Ever since Cindy’s husband died, there’ve been three people who’ve remembered to treat her on her anniversary: Carlos, Edwin, and Peggy.

CONTEXT B: Ever since Cindy’s husband died, Carlos is the only person who’s remembered to treat her on her anniversary.

Yesterday was her anniversary so CARLOS/Carlos took her out.

12) CONTEXT A: Fred went to a charity event that had multiple raffles throughout the night. The raffles were for a car, a timeshare, and a bottle of wine.

CONTEXT B: Fred went to a charity event that had only one raffle. The raffle was for a car.

Fred won the CAR/car raffle.

It can also be observed in examples (11) and (12) that the focused utterance has a clearly different meaning than the unfocused utterance. This can be taken as further evidence that the presence of a set of alternatives is nondetachable: even in the same context, the focused sentence does not have the same meaning as the focused sentence.

Example (13) addresses the question of cancelability directly. In both cases, someone tries to deny that there was a possible set of alternatives after Lucy is contrastively accented. Denying alternatives, in both examples, is infelicitous. It is useful to compare (13) to (14). Example (14) is a classic example of a scalar conversational implicature: the hearer understands that Tom has exactly three children when the first sentence is uttered. The implicature is easily canceled by additional information in the second sentence after being established.

13) Person A: Which of the invitees came to dinner?

Person B: LUCY came. #In fact, she was the only person invited.

14) Tom has three children. In fact, he has four.

It does not appear that the set of alternatives for a focused utterance can be canceled or suspended.

The third test is failure to arise. In Chapter 3, exhaustivity failed to arise in situations where the alternatives were irrelevant or where the focused constituent was in the scope of a downward
entailing logical operator. It would be particularly important to show that alternatives still arise when they are irrelevant because Relevance Theory attempts to claim that the relevance of the alternatives is why hearers understand focused constituents to invoke a set of alternatives. Example (15) is a variant of (10). In (15), the speaker’s only concern is that Jane eats one dessert item. In this case, the speaker’s wager, that Jane would like dessert items, is satisfied when Jane eats a cookie and likes it. Other dessert items don’t matter, and so the set of alternatives is irrelevant. Still though, it is infelicitous to continue the story with an alternative to the focused utterance whether the wager includes the possibility of other desserts (at least one dessert item) or not (just one dessert item).

15) Jane is way too uptight about her diet, so yesterday, I encouraged her to eat {at least one/just one} dessert item to see if she’d like it. To my surprise, she ate a COOKIE. And, just like I thought, she liked it.
   i. ??She then ate a cupcake and a sundae.
   ii. She then ate a CUPCAKE and a SUNDAE.
   iii. She then ate a salad and a sandwich.

It can also be shown that the set of alternatives continues to arise even when the focus is in the scope of downward entailing logical operators. Example (16) below repeats the two contexts from (11): in Context A, there are possible alternatives to Carlos, but in Context B, no alternatives are possible. Notice that the focused versions of the sentences/question in (16) are all infelicitous in Context B where no alternatives are possible, despite that they occur in the scope of negation, the scope of a conditional, and the scope of a question, all of which are downward entailing operators. The focused versions are fine though in Context A, where alternatives are possible, and the nonfocused versions are always fine. The existence of a set of alternatives is never negated, made conditional, or questioned.

16) CONTEXT A: Ever since Cindy’s husband died, there’ve been three people who’ve remembered to treat her on her anniversary: Carlos, Edwin, and Peggy.
   CONTEXT B: Ever since Cindy’s husband died, Carlos is the only person who’s remembered to treat her on her anniversary.
i. This year CARLOS/Carlos couldn’t take her out.
ii. If CARLOS/Carlos didn’t remember to do this, I think she’d be really distraught.
iii. Did CARLOS/Carlos remember to take her out this year?

To make it clearer that the focus is in the scope of the downward entailing operator, (17) repeats the paradigm in (16), but with focus on the modifier of the object. Notice that focus is still infelicitous in Context B where no alternatives are possible.

17) CONTEXT A: Fred went to a charity event that had multiple raffles throughout the night. The raffles were for a car, a timeshare, and a bottle of wine.

CONTEXT B: Fred went to a charity event that had only one raffle. The raffle was for a car.

i. Fred didn’t win the CAR/car raffle.
ii. If Fred won the CAR/car raffle, then he’s really happy right now.
iii. Did Fred win the CAR/car raffle?

Contrastive focus continues to invoke alternatives even when the alternatives are not relevant and in the scope of downward entailing logical operators.

From these examples, then, it does not appear that invoking a set of alternatives is detachable, able to be suspended/canceled, or that it ever fails to arise. Contrast in contrastive focus does not appear to be a conversational implicature.

4.4 The set of alternatives is not an assertion

This section will attempt to demonstrate that the presence of a set of alternatives does not have the properties of an assertion. If the set of alternatives was asserted, we would expect two properties: different focusing should result in different truth conditions and logical operators should be able to operate on the presence of the set of alternatives.

Firstly, focusing different words within an utterance should result in different truth conditions. Kratzer (2004) already observed that inappropriate focus marking does not deprive an utterance of a truth condition, but rather just makes it infelicitous. This is already some evidence that the set of alternatives is not asserted. It has additionally been noted that truth
conditional effects for different focusing only result in cases of focus association (Jackendoff 1972, Rooth 1985). This suggests that the different truth conditions are the result of different restrictions for the focus sensitive words associating with them. For instance, if the restrictor of *only* is the set of alternatives in (18) and (19), the restrictor of *only* in (18) is \{Tom watches movies, Tom watches gameshows, Tom watches television\} while the restrictor of *only* in (19) is \{Tom watches movies, Tom directs movies, Tom writes movies\}. The different meanings of the utterances can be traced to the semantics of *only* and are not directly the result of the semantics of focus. Focusing different words does not result in different truth conditions independent of the focus sensitive operators.

18) Tom only watches **MOVIES**.
19) Tom only **WATCHES** movies.

The second test for assertion is whether logical operators can operate on the set of alternatives. Examples (16) and (17) already provided evidence that downward entailing operators (negation, conditions, and questions) do not operate on the existence of the set of alternatives. Upward entailing operators also fail to operate on the existence of the set of alternatives. The operator *might* is upward entailing.

20) *might*: upward entailing (smaller set entails larger set)

\[ Q: \{x: \text{Tom painted } x \text{ yesterday morning}\} \subseteq P: \{x: \text{Tom painted } x \text{ yesterday}\} \]

\[ P: \text{Tom might have painted a chair yesterday morning} \Rightarrow Q: \text{Tom might have painted a chair yesterday.} \]

\[ Q: \text{Tom might have painted a chair yesterday} \nRightarrow P: \text{Tom might have painted a chair yesterday morning. (He might have painted it in the afternoon.)} \]

The intuition that a focused word is being compared to a set of alternatives survives when embedded under this upward entailing operator. When focus is in the scope of *might* in (21) and (22), the utterance does not mean that there is uncertainty about whether there is a set of alternatives. There is only uncertainty about whether Carlos will take Cindy out or whether Fred won the car raffle. Notice that the focused utterance is still felicitous in Context A, when a set of
alternatives is provided by the context, but not in Context B where no alternatives are possible. The unfocused utterance is still felicitous in either context.

21) CONTEXT A: Ever since Cindy’s husband died, there’ve been three people who’ve remembered to treat her on her anniversary: Carlos, Edwin, and Peggy.
   CONTEXT B: Ever since Cindy’s husband died, Carlos is the only person who’s remembered to treat her on her anniversary.
   Tomorrow is her anniversary so **CARLOS**/Carlos might take her out.

22) CONTEXT A: Fred went to a charity event that had multiple raffles throughout the night. The raffles were for a car, a timeshare, and a bottle of wine.
   CONTEXT B: Fred went to a charity event that had only one raffle. The raffle was for a car.
   Fred might win the **CAR**/car raffle.

In sum, then, differences in focus do not affect the truth conditions of an utterance and the existence of a set of alternatives projects through logical operators. Projection is a classic property of presuppositions, suggesting that an account of focus such as Alternative Semantics or Integrated Pragmatics is desirable, but projection is also characteristic of expressive meanings and discourse definedness conditions. The characteristic differences between these three types of non-truth conditional yet semantically encoded meaning are still debated, and so there isn’t much that can be said at the moment about which best describes the set of alternatives for focus.

4.5 Conclusion

This section has attempted to show that presence of a set of alternatives is not a conversational implicature or assertion of focus. The intuition that a focused utterance is being contrasted with other alternatives is semantically encoded in the meaning of focus. This is consistent with an analysis that assigns focus an abstract representation, such as F-marking, and does not rely on pitch accenting or other overt cues to invoke a set of alternatives as a conversational implicature.
Additionally, the set of alternatives is not an assertion of a focused utterance. This would mean that the presence of a set of alternatives is either a presupposition, expressive meaning, or discourse definedness condition. Theories such as Reich’s structured meanings would need to be weakened, but this is consistent with the claims of Integrated Pragmatics and Alternative Semantics.
Chapter 5
Conclusion

This dissertation has attempted to show that focus accesses a set of possibly true alternatives as part of its semantic, but non-assertional, meaning. The requirement that the actual utterance be part of a set of possible alternatives is either a presupposition, expressive meaning, or context definedness condition of focus. Chapter 2 asked whether focus accesses a set of alternatives. Some semantic theories for the meaning of focus, such as Alternative Semantics and Integrated Pragmatics, require that comprehenders use a set of alternatives in order to interpret focus, but other semantic theories, such as Structured Meanings, do not. Chapter 2 conducted three experiments to shed light on this issue. Lexical Decision Experiment 1 showed that newly learned associates of the focused word are included in the set of alternatives. Lexical Decision Experiment 2 and Mouse Tracking Experiment 3 showed that free word associates of the focused word are included in the set of alternatives, and this set is likely made less salient in the mind of the hearer. Taken together, these three studies provide evidence that comprehenders do access a set of alternatives when interpreting a focused word. This argues that semantic theories of focus should include a mechanism for accessing sets of alternatives. The studies also argue that members of the set are related to the focused word through the same semantic networks that are active in semantic priming. Curiously, though, Mouse Tracking Experiment 3 did not find evidence that words related only to the context can be included in the set of alternatives. This might suggest that alternatives are generated by the comprehender upon encountering the focused word.

The final result of Chapter 2 was that members of the set of alternatives appear to be inhibited. In Lexical Experiment 2, participants were slower to respond to a target word when the prime was focused than when the prime was unfocused, and in Mouse Tracking Experiment 3, the participants were reluctant to click on the semantic associate, veering the mouse towards the nonsense word instead. This result is difficult to interpret in light of participants speeding up when the prime was focused in Lexical Decision Experiment 1 and Braun and Tagliapietra (2010), but it suggests that processing focus might involve a combination of inhibition and facilitation. For instance, the members of the set might be initially inhibited (due to the processing costs of compiling the set) and then facilitated (once the set is brought to mind). It
might also be the case that the members of the set are initially facilitated (by being brought to mind) and then inhibited (as the comprehender realizes they aren’t true).

Chapter 3 investigated whether the source of this inhibition might be an exhaustivity presupposition. The chapter tested both it-clefts and in situ L+H* focus for an exhaustivity presupposition because theories that account for exhaustivity with a high focus position (É Kiss 1998) would consider all in situ focus to be noncontrastive and so only the it-cleft is truly expected to be exhaustive. Chapter 3 showed that the intuition that the members of the set of alternatives are false can fail to arise and is able to be canceled. Instead of a presupposition or other structural requirement, it attributed the exhaustivity intuition to a conversational implicature that arises as a result of the maxims of quality and quantity plus the premises:

\[
\begin{align*}
P1) & \text{ S asserts } \alpha \text{ correctly.} \\
P2) & \text{ Opinionated Speaker: S believes that either } \beta \text{ or } \beta'. \text{ (Fox 2007, Sauerland 2004)} \\
P3) & \text{ Relevance: S believes that } \beta' \text{ is relevant. (Gamut 1991, Atlas and Levinson 1981)}
\end{align*}
\]

Chapter 3 then conducted two rating studies. Judgment Experiment 1 compared the naturalness of nonexhaustive in situ focus to canonical and noncontrastive in situ focus. Judgment Experiment 2 compared the naturalness of nonexhaustive it-clefts to canonical and noncontrastive it-clefts. Both experiments found that participants rated nonexhaustive focus similar to how they rated canonical focus, but noncontrastive focus was found to be significantly less natural. This lends further support to the conclusion that exhaustivity is a conversational implicature and not a structural part of focus.

Chapter 4 attempted to determine whether the presence of a set of alternatives is a part of the semantic definition of focus or a pragmatic consequence of the context surrounding a focused element. It found that contrast was not detachable, never failed to arise, and wasn’t able to be canceled. The presence of a set of alternatives does not have the attributes of a conversational implicature. Additionally, contrast projects through logical operators, demonstrating that it is not an assertion either. Chapter 4 was not able to distinguish whether the presence of a set of alternatives is a presupposition, expressive meaning, or contextual restriction, but it is a non-truth conditional part of the semantic meaning of focus.
In sum then, this dissertation has observed two important properties of focus: it accesses a set of alternatives and at least this part of its meaning is semantically encoded. Additionally, it has identified that members of the set of alternatives can be true and are semantic relations of the focused word. This has many consequences for the future of focus research.

Firstly, the conclusions of this dissertation recommend against purely pragmatic accounts of focus. A hybrid theory such as Büring (2007) which accesses alternatives semantically but decides pitch accent placement pragmatically would still be viable, but a theory of focus such as in Relevance Theory that accounts for all properties of focus pragmatically would not be. Focus has a semantic contribution. At least the presence of a set of alternatives must be part of the semantics of focus.

Secondly, these conclusions demonstrate that any theory of focus must include access to a set of alternatives. It still remains an open question, though, whether all types of focus access a set of alternatives. This dissertation looked exclusively at L+H* accent focus. It investigated the L+H* accent associated with only, in situ by itself, and in an it-cleft, but it did not look at H* focus or newness. It is still possible that there are multiple types of focus, one of which accesses a set of alternatives. These different types might be distinct: for instance, Vallduvi and Vilkuna (1998) suggest that there are two features, rhyme and kontrast, that can overlap ([+rheme], [+kontrast]) or not ([−rheme], [+kontrast] or [+rheme], [−kontrast]) to form different types of focus. Different types of focus might be variants of each other as well: for instance, Katz and Selkirk (2011) suggest that contrastive focus might be a special case of new-information focus based on the fact that contrastive focus seems to have an exaggerated version of the same prosody seen in new-information focus (ex: both types of focus have an H* accent, but contrastive focus’ accent tends to be higher in pitch). Of course, it is also possible that all types of focus are instances of contrastive focus, as advocated in Rooth’s work, and the apparent meaning differences can be attributed some other feature. For instance, the difference between so-called alternative focus (ex: Q: Do you drink coffee or tea? A: I drink TEA.) and broad focus (Q: What do you do in the morning? A: I drink TEA.) might be the size of the set of alternatives. Alternative focus has just two members to the set of alternatives while broad focus could have an almost infinite membership.

There are, though, two possibilities, with respect to types of focus, that are ruled out by the conclusions in this dissertation. The first possibility is that all focus is a matter of
newness/givenness or theme/rheme status and the contrastive nature of some types of focus is a result of the context. The second ruled out possibility is that exhaustivity is the feature that distinguishes contrastive focus from other types of focus. Horvath (2006) advocates this view for Hungarian focus, but because English contrastive focus is not structurally exhaustive, such an analysis would not work for English.

The third and final consequence of this dissertation is that it-clefts do not use a different type of focus than is found in situ. É Kiss (1998) analyzes English as having a high identificational focus position and an in situ information focus position, but this dissertation has demonstrated that the it-cleft can be nonexhaustive and in situ L+H* can be contrastive. There might still be other differences between the clefted constituent and an in situ focused constituent (e.g., an existential presupposition), but Chapter 3 calls into question the strategy of accounting for differences between the clefted constituent and in situ contrastive focus by appealing to different types of focus.

These consequences suggest several possible avenues for future research. Firstly, it is important to establish the time course of how focus is processed. This dissertation found evidence for both facilitation and inhibition, but was unable to establish which came first and for how long. Knowing the time course of processing focus would shed light on the source of the facilitation and inhibition. Mouse tracking is one method that could be further exploited to shed light on this, as could eye tracking or a lexical decision task that presented the target word at different distances from the onset of the focused constituent.

A second future research question is the relationship between the members of the set of alternatives to each other, to the focused constituent, and to the context surrounding the focused utterance. This dissertation only found evidence that members are related to the focused constituent. Knowing more about how membership into the set of alternatives is determined could shed light on when and how the set is created.

Finally, this dissertation highlights the need for more research into the processing of pragmatic meaning versus presuppositional meaning versus asserted meaning. Past research on exhaustivity has compared nonpresuppositional focus to violations of the exhaustivity of only, but this compares a potential violation of a presupposition (nonexhaustive focus) to a violation of an assertion (nonexhaustive only). Judgment Experiments 1 and 2, on the other hand, compared violations of exhaustivity to violations of contrast in order to compare a potential violation of a
presupposition to a known violation of presupposition, but none of these experiments can know what processing differences to expect from violating an assertion versus a presupposition or even from violating two different presuppositions. It would be worthwhile to investigate which types of meaning are harder/easier to process, faster/slower to process, easier/harder to violate, etc. It would then be easier to compare different types of exhaustivity to one another, and even the question in Chapter 4 about how contrast is encoded could have perhaps been answered by investigating participants react to contrast.

In conclusion, part of the semantics of focus is that it accesses a set of alternatives. This set is composed of possibly true alternatives that are semantic associates of the focused constituent itself.
Appendix A

Lexical Decision Experiment 1: Items

(slash marks indicate what words were presented at the same time to the participant)

Order of Conditions:  Unfocused Associated
                     Focused Associated
                     Unfocused Unassociated (newly learned)
                     Focused Unassociated (newly learned)
                     Unfocused Unmentioned (not learned)
                     Focused Unmentioned (not learned)

1) orange
Jane loves to eat oranges, oats, and apples.
She has them for breakfast most mornings.
A month ago, she discovered a sale at the store.
The next morning she ate an apple.
The next morning she ate only an apple.
The next morning she ate oats.
The next morning she ate only oats.
The next morning she ate chocolate.
The next morning she ate only chocolate.

2) Sergeant
Little Martin pretends to be a sergeant, a scientist, and a lieutenant.
He wants to have these careers when he grows up.
Last Christmas, he got a costume as a present.
For the next two weeks he pretended to be a lieutenant.
For the next two weeks he pretended to be only a lieutenant.
For the next two weeks he pretended to be a scientist.
For the next two weeks he pretended to be only a scientist.
For the next two weeks he pretended to be a policeman.
For the next two weeks he pretended to be only a policeman.

3) Lock
Christina wants to buy a lock, nails, and a bolt.
She needs these to fix her front entrance.
Two days ago, she went to a store that didn't have a wide selection.
At the store she was able to buy a bolt.
At the store she was able to buy only a bolt.
At the store she was able to buy nails.
At the store she was able to buy only nails.
At the store she was able to buy a lamp.
At the store she was able to buy only a lamp.

4) Butter
Carolyn tries to always have butter, vegetables, and toast.
She usually buys these once a week.
Last week, she wasn't able to go to the store.
   Now she has toast.
   Now she has only toast.
   Now she has vegetables.
   Now she has only vegetables.
   Now she has peas.
   Now she has only peas.

5) Cabinet
Tom knew how to fix his cabinet, his clock, and his shelf.
He learned to fix these while in college.
Last year, he moved and replaced many of his things.
   Now he can fix his shelf.
   Now he can fix only his shelf.
   Now he can fix his clock.
   Now he can fix only his clock.
   Now he can fix his couch.
   Now he can fix only his couch.

6) Mouse
Mallory has to feed a mouse, a sheep, and a cat.
Her neighbor owns these.
Yesterday, he hired someone to help feed.
   Today she fed the cat.
   Today she fed only the cat.
   Today she fed the sheep.
   Today she fed only the sheep.
   Today she fed the cow.
   Today she fed only the cow.

7) Potato
Jack intended to eat a potato, a sandwich, and a chip.
He already had these on his plate.
Before he could eat, he dropped his plate.
   At lunch he ate a chip.
   At lunch he ate only a chip.
   At lunch he ate a sandwich.
At lunch he ate only a sandwich.
At lunch he ate a candy.
At lunch he ate only a candy.

8) Prize
Mark dreads losing prizes, debates, and contests.
Three years ago, he always lost these.
Two years ago, he read several books on how to win.
Last year he lost a contest.
Last year he lost only a contest.
Last year he lost a debate.
Last year he lost only a debate.
Last year he lost a challenge.
Last year he lost only a challenge.

9) Nut
Mitch forgets to use a nut, icing, and a walnut.
These decorate his bakery’s signature cupcakes.
Two hours ago, he started making cupcakes.
On the cupcakes he used a walnut.
On the cupcakes he used only a walnut.
On the cupcakes he used icing.
On the cupcakes he used only icing.
On the cupcakes he used a berry.
On the cupcakes he used only a berry.

10) Doorway
Kyle is supposed to build a doorway, a hallway, and a threshold.
His new house needs these to be complete.
Two months ago, he bought lumber.
During the next month he built a threshold.
During the next month he built only a threshold.
During the next month he built a hallway.
During the next month he built only a hallway.
During the next month he built a patio.
During the next month he built only a patio.

11) Creator
Carla was chosen to meet some of a company’s creators, supervisors, and inventors.
These were the people who made the company successful.
The day before, there were some changes in the plan.
At lunch she met an inventor.
At lunch she met only an inventor.
At lunch she met a supervisor.
At lunch she met only a supervisor.
At lunch she met a receptionist.
At lunch she met only a receptionist.

12) Woods
Paula was raised to fear the woods, demons, and the wilderness. These were her mother’s worst fears. Six months ago, she started seeing a therapist.
   Three months later she feared the wilderness.
   Three months later she feared only the wilderness.
   Three months later she feared a demon.
   Three months later she feared only a demon.
   Three months later she feared a flood.
   Three months later she feared only a flood.

13) Candy
Carmen prefers to give children candy, bananas, and gum. She gives these to the neighbor children. Last week, the children came over often.
   This week she gave them gum.
   This week she gave them only gum.
   This week she gave them a banana.
   This week she gave them only a banana.
   This week she gave them a coke.
   This week she gave them only a coke.

14) Label
Tina needed to use a label, a binder, and a tag. She needed these to organize her office. When she started, she found that her office was actually pretty organized.
   The whole time she used a tag.
   The whole time she used only a tag.
   The whole time she used a binder.
   The whole time she used only a binder.
   The whole time she used a folder.
   The whole time she used only a folder.

15) Theater
Kevin expected to go to a theater, a cafe, and a movie. He was planning these for his date with Diana. The night before, Diana called to say that she wouldn’t have much time.
   For the date he went to a movie.
   For the date he went to only a movie.
   For the date he went to a cafe.
   For the date he went to only a cafe.
   For the date he went to a stadium.
   For the date he went to only a stadium.
16) Purse
Martha hopes to receive a new purse, necklace, and wallet. She gave her husband these on a Christmas wish list. On Christmas Eve, he remembered to go shopping.
- On Christmas, she received a wallet.
- On Christmas, she received only a wallet.
- On Christmas, she received a necklace.
- On Christmas, she received only a necklace.
- On Christmas, she received pajamas.
- On Christmas, she received only pajamas.

17) Button
Emily labored to sew a button, a cuff, and a zipper. These were all on the dress she was making. After a month, she decided to simplify the design.
- On her dress, she sewed a zipper.
- On her dress, she sewed only a zipper.
- On her dress, she sewed a cuff.
- On her dress, she sewed only a cuff.
- On her dress, she sewed a hem.
- On her dress, she sewed only a hem.

18) Singer
Little Jackie wanted to work as a famous singer, painter, and dancer. These were the careers she saw the most on television. When she was older, she learned that it was difficult to be famous.
- In college, she worked as a dancer.
- In college, she worked as only a dancer.
- In college, she worked as a painter.
- In college, she worked as only a painter.
- In college, she worked as an architect.
- In college, she worked as only an architect.

19) String
Ted hated losing his string, his marble, and his violin. These were his favorite things to play with. One summer day, he tried to be very careful with all of his toys.
- That day, he lost his violin.
- That day, he lost only his violin.
- That day, he lost his marble.
- That day, he lost only his marble.
- That day, he lost his bat.
- That day, he lost only his bat.

20) Stars
Bill prefers to hang up pictures of stars, waterfalls, and planets.
These are his favorite posters.
Last week, he bought a new poster.
Yesterday he hung up a picture of planets.
Yesterday he hung up a picture of only planets.
Yesterday he hung up a picture of a waterfall.
Yesterday he hung up a picture of only a waterfall.
Yesterday he hung up a picture of a cartoon.
Yesterday he hung up a picture of only a cartoon.

21) Tomb
Rose lives to search old tombs, temples, and graves.
She studies these as an archeologist.
This year, she couldn't find very many new sites.
The whole year she searched a grave.
The whole year she searched only a grave.
The whole year she searched a temple.
The whole year she searched only a temple.
The whole year she searched a palace.
The whole year she searched only a palace.

22) Map
Joseph was attributed with designing a famous type of map, strategy, and chart.
These established him as an important early explorer.
Last month, his autobiography was discovered.
In the book he designed a chart.
In the book he designed only a chart.
In the book he designed a strategy.
In the book he designed only a strategy.
In the book he designed a saddle.
In the book he designed only a saddle.

23) Coin
Tracy was prepared to iron a collar, a sleeve, and a lapel.
These were the most likely parts of the shirt to wrinkle.
An hour later, she was still drying the wash.
That evening she ironed the lapel.
That evening she ironed only the lapel.
That evening she ironed the sleeve.
That evening she ironed only the sleeve.
That evening she ironed the sash.
That evening she ironed only the sash.

24) Hip
Tony avoids hurting his hip, wrist, and waist.
He has old injuries in these places.
Last week, he fell down the stairs.
  After the fall he hurt his waist.
  After the fall he hurt only his waist.
  After the fall he hurt his wrist.
  After the fall he hurt only his wrist.
  After the fall he hurt his toe.
  After the fall he hurt only his toe.

25) Angel
Mandy was taught to believe in angels, destiny, and saints.
She learned about these in religion class.
In her teenage years, she rebelled against her upbringing.
  Now she believes in an angel.
  Now she believes in only an angel.
  Now she believes in destiny.
  Now she believes in only destiny.
  Now she believes in a devil.
  Now she believes in only a devil.

26) Slug
Little Claire enjoys catching slugs, moths, and snails.
She puts these in a bucket of dirt.
Last Tuesday, her bucket was kicked over.
  On Wednesday she caught a snail.
  On Wednesday she caught only a snail.
  On Wednesday she caught a moth.
  On Wednesday she caught only a moth.
  On Wednesday she caught a grasshopper.
  On Wednesday she caught only a grasshopper.

27) Cabin
Patrick prefers to rent a cabin, a jeep, and a lodge.
He rents these when he travels through Minnesota fishing.
Last trip, he stayed for a weekend.
  For that weekend he rented a lodge.
  For that weekend he rented only a lodge.
  For that weekend he rented a jeep.
  For that weekend he rented only a jeep.
  For that weekend he rented a trailer.
  For that weekend he rented only a trailer.

28) Crops
Doug recommends inspecting crops, hay, and harvests.
These make the most money for his farm.
Last fall, he was a little short handed.
  That year he inspected his harvest.
That year he inspected only his harvest.
That year he inspected his hay.
That year he inspected only his hay.
That year he inspected his pasture.
That year he inspected only his pasture.

29) Deer
Justin loves to watch deer, hawks, and bucks.
These live in the woods behind his house.
Last winter, it was very dry and too cold.
This spring he watched a buck.
This spring he watched only a buck.
This spring he watched a hawk.
This spring he watched only a hawk.
This spring he watched a rabbit.
This spring he watched only a rabbit.

30) Cliff
Roberta dislikes painting cliffs, architecture, and ledges.
She has to paint these for her art class.
That semester, she was really busy with other classes.
By finals she painted a ledge.
By finals she painted only a ledge.
By finals she painted architecture.
By finals she painted only architecture.
By finals she painted a creek.
By finals she painted only a creek.
Appendix B
Lexical Decision Experiment 2: Items

(last sentence presented auditorily)

Order of Conditions: Referentially new
Lexically new
Given
Contrastive with Only
Contrastive Accent

1) Orange
Jane's friend ate a salad with an apple. Later, Jane was hungry. So she ate an apple.
Jane ate something. Jane was hungry. So she ate an apple.
Jane ate an apple. Jane was hungry. So she ate an apple.
Jane ate an apple. Jane wasn't hungry. So she ate only an apple.
Jane ate an apple. Jane wasn't hungry. So she ate an apple.

2) Sergeant
Little Martin's mother pretended to talk to a lieutenant. Later, Martin got a new costume.
So he pretended to be a lieutenant.
Little Martin pretended to be something. Martin got a new costume. So he pretended to be a lieutenant.
Little Martin pretended to be a lieutenant. Martin got a new costume. So he pretended to be a lieutenant.
Little Martin pretended to be a lieutenant. Martin got a new costume. So he pretended to be only a lieutenant.
Little Martin pretended to be a lieutenant. Martin got a new costume. So he pretended to be a lieutenant.

3) Lock
Christina's roommate bought a fixture with a strange bolt. Later, Christina fixed her front entrance.
So she bought a bolt.
Christina bought something. Christina fixed her front entrance. So she bought a bolt.
Christina bought a bolt. Christina fixed her front entrance. So she bought a bolt.
Christina bought a bolt. Christina fixed her front entrance. So she bought only a bolt.
Christina bought a bolt. Christina fixed her front entrance. So she bought a bolt.

4) Butter
Carolyn's mother had eggs with toast. Later, Carolyn made tuna. So she had toast.
Carolyn had something. Carolyn made tuna. So she had toast.
Carolyn had toast. Carolyn made tuna. So she had toast.
Carolyn had toast. Carolyn made tuna. So she had only toast.
Carolyn had toast. Carolyn made tuna. So she had toast.
5) Cabinet
Tom’s brother fixed a clock on the top shelf. Later, Tom had a day off. So he fixed a shelf.
Tom fixed something. Tom had a day off. So he fixed a shelf.
Tom fixed a cabinet. Tom had a day off. So he fixed a shelf.
Tom fixed a cabinet. Tom had a day off. So he fixed only a shelf.
Tom fixed a cabinet. Tom had a day off. So he fixed a shelf.

6) Mouse
Mallory’s neighbor fed her dog instead of her cat. Later, Mallory went to a shelter. So she fed a cat.
Mallory fed something. Mallory went to a shelter. So she fed a cat.
Mallory fed a cat. Mallory went to a shelter. So she fed a cat.
Mallory fed a cat. Mallory went to a shelter. So she fed only a cat.
Mallory fed a cat. Mallory went to a shelter. So she fed a cat.

7) Potato
Jack’s sister ate some dip with a chip. Later, Jack went to a party. So he ate a chip.
Jack ate something. Jack went to a party. So he ate a chip.
Jack ate a chip. Jack went to a party. So he ate a chip.
Jack ate a chip. Jack went to a party. So he ate only a chip.
Jack ate a chip. Jack went to a party. So he ate a chip.

8) Prize
Mark’s father lost his money in a contest. Later, Mark was at a casino. So he lost a contest.
Mark lost something. Mark was at a casino. So he lost a contest.
Mark lost a contest. Mark was at a casino. So he lost a contest.
Mark lost a contest. Mark was at a casino. So he lost only a contest.
Mark lost a contest. Mark was at a casino. So he lost a contest.

9) Cliff
Roberta’s favorite artist painted a mountain with a high ledge. Later, Roberta took an art class. So she painted a ledge.
Roberta painted something. Roberta took an art class. So she painted a ledge.
Roberta painted a ledge. Roberta took an art class. So she painted a ledge.
Roberta painted a ledge. Roberta took an art class. So she painted only a ledge.
Roberta painted a ledge. Roberta took an art class. So she painted a ledge.

10) Doorway
Kyle’s contractor built a big house with a marble threshold. Later, Kyle was renovating his home. So Kyle build a threshold.
Kyle built something. Kyle was renovating his home. So Kyle build a threshold.
Kyle built a threshold. Kyle was renovating his home. So Kyle build a threshold.
Kyle built a threshold. Kyle was renovating his home. So Kyle build only a threshold.
Kyle built a threshold. Kyle was renovating his home. So Kyle build a threshold.
11) Creator
Carla’s secretary met a CEO with his favorite inventor. Later, Carla was at a convention. So Carla met an inventor.
Carla met someone. Carla was at a convention. So Carla met an inventor.
Carla met an inventor. Carla was at a convention. So Carla met an inventor.
Carla met an inventor. Carla was at a convention. So Carla met only an inventor.
Carla met an inventor. Carla was at a convention. So Carla met an inventor.

12) Woods
Paula’s son feared darkness in the wilderness. Later, Paula had a bad camping trip. So Paula feared the wilderness.
Paula feared something. Paula had a bad camping trip. So Paula feared the wilderness.
Paula feared wilderness. Paula had a bad camping trip. So Paula feared the wilderness.
Paula feared wilderness. Paula had a bad camping trip. So Paula feared only the wilderness.
Paula feared wilderness. Paula had a bad camping trip. So Paula feared the wilderness.

13) Candy
Carmen’s godmother gave away cards with gum. Later, Carmen needed raffle prizes. So she gave away gum.
Carmen gave away something. Carmen needed raffle prizes. So she gave away gum.
Carmen gave away gum. Carmen needed raffle prizes. So she gave away only gum.
Carmen gave away gum. Carmen needed raffle prizes. So she gave away gum.

14) Label
Tina’s officemate used files with tags. Later, Tina was organizing her desk. So Tina used a tag.
Tina used something. Tina was organizing her desk. So Tina used a tag.
Tina used a tag. Tina was organizing her desk. So Tina used a tag.
Tina used a tag. Tina was organizing her desk. So Tina used only a tag.
Tina used a tag. Tina was organizing her desk. So Tina used a tag.

15) Theater
Kevin’s girlfriend went to a store to rent a movie. Later, Kevin was very bored. So Kevin went to a movie.
Kevin went to something. Kevin was very bored. So Kevin went to a movie.
Kevin went to a movie. Kevin was very bored. So Kevin went to a movie.
Kevin went to a movie. Kevin wasn’t very bored. So Kevin went to only a movie.
Kevin went to a movie. Kevin wasn’t very bored. So Kevin went to a movie.

16) Purse
Martha’s husband received a repair kit for his fancy wallet. Later, Martha had a birthday. So Martha received a wallet. Martha received something. Martha had a birthday. So Martha received a wallet. Martha received a wallet. Martha had a birthday. So Martha received only a wallet. Martha received a wallet. Martha had a birthday. So Martha received a wallet.

17) Button
Emily’s grandmother sewed a stitch around a zipper. Later, Emily designed a simple skirt. So she sewed a zipper. Emily sewed something. Emily designed a simple skirt. So she sewed a zipper. Emily sewed a zipper. Emily designed a simple skirt. So she sewed only a zipper. Emily sewed a zipper. Emily designed a simple skirt. So she sewed a zipper.

18) Singer

19) String
Ted’s teacher lost her career with her violin. Later, Ted was moving. So he lost a violin. Ted lost something. Ted was moving. So he lost a violin. Ted lost a violin. Ted was moving. So he lost only a violin. Ted lost a violin. Ted wasn’t moving. So he lost a violin.

20) Stars
Bill’s lab assistant hung up a picture of the moons around planets. Later, Bill was redecorating. So he hung up a picture of planets. Bill hung up a picture of something. Bill was redecorating. So he hung up a picture of planets. Bill hung up a picture of planets. Bill was redecorating. So he hung up a picture of only planets. Bill hung up a picture of planets. Bill was redecorating. So he hung up a picture of planets.

21) Tomb
Rose’s mentor searched the grounds around a grave. Later, Rose led her own dig. So she searched a grave. Rose searched something. Rose led her own dig. So she searched a grave.
Rose searched a grave. Rose led her own dig. So she searched a grave. Rose searched a grave. Rose led her own dig. So she searched only a grave. Rose searched a grave. Rose led her own dig. So she searched a grave.

22) Map
Joseph’s uncle designed a spreadsheet with a complicated chart. Later, Joseph had to present some new data clearly. So he designed a chart. Joseph designed something. Joseph had to present some new data clearly. So he designed a chart. Joseph designed a chart. Joseph had to present some new data clearly. So he designed a chart. Joseph designed a chart. Joseph had to present some new data clearly. So he designed only a chart. Joseph designed a chart. Joseph had to present some new data clearly. So he designed a chart.

23) Collar
Tracy’s cleaner ironed a shirt with a blue label. Later, Tracy was preparing for work. So she ironed a lapel. Tracy ironed something. Tracy was preparing for work. So she ironed a lapel. Tracy ironed a lapel. Tracy was preparing for work. So she ironed only a lapel. Tracy ironed a lapel. Tracy wasn’t preparing for work. So she ironed only a lapel. Tracy ironed a lapel. Tracy wasn’t preparing for work. So she ironed a lapel.

24) Hip
Tony’s trainer hurt his abs near his waist. Later, Tony fell while running. So he hurt his waist. Tony hurt something. Tony fell while running. So he hurt his waist. Tony hurt his waist. Tony fell while running. So he hurt only his waist. Tony hurt his waist. Tony fell while running. So he hurt his waist.

25) Angel

26) Slug
Little Claire’s playmate caught a snake using, for bait, a snail. Later, Claire wanted to fill a bucket of dirt. So she caught a snail.
Little Claire caught something. Claire wanted to fill a bucket of dirt. So she caught a snail.
Little Claire caught a snail. Claire wanted to fill a bucket of dirt. So she caught a snail.
Little Claire caught a snail. Claire didn’t want to fill a bucket of dirt. So she caught only a snail.
Little Claire caught a snail. Claire didn’t want to fill a bucket of dirt. So she caught a *snail*.

**27) Cabin**
Patrick’s wife rented a farm with a quaint lodge. Later, Patrick went on a ski trip. So he rented a lodge.
Patrick rented something. Patrick went on a ski trip. So he rented a lodge.
Patrick rented a lodge. Patrick went on a ski trip. So he rented a lodge.
Patrick rented a lodge. Patrick went on a ski trip. So he rented only a lodge.
Patrick rented a lodge. Patrick went on a ski trip. So he rented a *lodge*.

**28) Deer**
Justin’s hunting partner watched a fawn approach a buck. Later, Justin went on a hunting trip. So he watched a buck.
Justin watched something. Justin went on a hunting trip in Georgia. So he watched a buck.
Justin watched a buck. Justin went on a hunting trip in Georgia. So he watched a buck.
Justin watched a buck. Justin went on a hunting trip in Georgia. So he watched only a buck.
Justin watched a buck. Justin went on a hunting trip in Georgia. So he watched a *buck*.

**29) Nut**
Mitch’s baker used a garnish that had a walnut. Later, Mitch was decorating cupcakes. So he used a walnut.
Mitch used something. Mitch was decorating cupcakes. So he used a walnut.
Mitch used a walnut. Mitch was decorating cupcakes. So he used a walnut.
Mitch used a walnut. Mitch was decorating cupcakes. So he used only a walnut.
Mitch used a walnut. Mitch was decorating cupcakes. So he used a *walnut*.

**30) Crops**
Doug’s overseer inspected the barn for the wheat harvest. Later, Doug went out to the corn fields. So he inspected the harvest.
Doug inspected something. Doug went out to the corn fields. So he inspected the harvest.
Doug inspected the harvest. Doug went out to the corn fields. So he inspected the harvest.
Doug inspected the harvest. Doug went out to the corn fields. So he inspected only the harvest.
Doug inspected the harvest. Doug went out to the corn fields. So he inspected the *harvest*. 
Appendix C
Mouse Tracking Experiment 3: Items

Order of Conditions:  
- Competition  
- Semantically Associated  
- Contextually Predictable

<table>
<thead>
<tr>
<th>Item</th>
<th>Presented in LEFT corner</th>
<th>Presented in RIGHT corner</th>
<th>Auditory Stimuli</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>noodles</td>
<td>apple</td>
<td>Jane was hungry so she ate pasta.</td>
</tr>
<tr>
<td>1</td>
<td>shrumpe</td>
<td>noodles</td>
<td>Jane was hungry so she ate pasta.</td>
</tr>
<tr>
<td>1</td>
<td>shrumpe</td>
<td>apple</td>
<td>Jane was hungry so she ate pasta.</td>
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<tr>
<td>2</td>
<td>tomato</td>
<td>cabbage</td>
<td>Eliza grew a garden so she planted lettuce.</td>
</tr>
<tr>
<td>2</td>
<td>cabbage</td>
<td>shround</td>
<td>Eliza grew a garden so she planted lettuce.</td>
</tr>
<tr>
<td>2</td>
<td>tomato</td>
<td>shround</td>
<td>Eliza grew a garden so she planted lettuce.</td>
</tr>
<tr>
<td>3</td>
<td>toast</td>
<td>lunch</td>
<td>Carolyn made tuna so she had butter.</td>
</tr>
<tr>
<td>3</td>
<td>rop</td>
<td>toast</td>
<td>Carolyn made tuna so she had butter.</td>
</tr>
<tr>
<td>3</td>
<td>rop</td>
<td>lunch</td>
<td>Carolyn made tuna so she had butter.</td>
</tr>
<tr>
<td>4</td>
<td>friend</td>
<td>boys</td>
<td>Little Simon went to the playground so he played with some girls.</td>
</tr>
<tr>
<td>4</td>
<td>boys</td>
<td>grourn</td>
<td>Little Simon went to the playground so he played with some girls.</td>
</tr>
<tr>
<td>4</td>
<td>friend</td>
<td>grourn</td>
<td>Little Simon went to the playground so he played with some girls.</td>
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<tr>
<td>5</td>
<td>mouse</td>
<td>homeless</td>
<td>Mallory went to a shelter so she fed some rat.</td>
</tr>
<tr>
<td>5</td>
<td>clett</td>
<td>mouse</td>
<td>Mallory went to a shelter so she fed some rat.</td>
</tr>
<tr>
<td>5</td>
<td>clett</td>
<td>homeless</td>
<td>Mallory went to a shelter so she fed some rat.</td>
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<tr>
<td>6</td>
<td>cake</td>
<td>chip</td>
<td>Jack went to a party so he ate a potato.</td>
</tr>
<tr>
<td>6</td>
<td>chip</td>
<td>snurf</td>
<td>Jack went to a party so he ate a potato.</td>
</tr>
<tr>
<td>6</td>
<td>cake</td>
<td>snurf</td>
<td>Jack went to a party so he ate a potato.</td>
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<tr>
<td>7</td>
<td>plates</td>
<td>bathrooms</td>
<td>Lucinda was expecting company so she cleaned dishes.</td>
</tr>
<tr>
<td>7</td>
<td>steaves</td>
<td>plates</td>
<td>Lucinda was expecting company so she cleaned dishes.</td>
</tr>
<tr>
<td>7</td>
<td>steaves</td>
<td>bathrooms</td>
<td>Lucinda was expecting company so she cleaned dishes.</td>
</tr>
</tbody>
</table>
Roberta took an art class so she painted a cliff.

Jerrett had a hot date so he took her to a presentation.

Matilda bought a farm so she planted rice.

Paula had a bad camping trip so she feared a tree.

Carmen needed raffle prizes so she gave away a candy.

Patricia had a circus act so she rode a buggy.

Emily designed a simple skirt so she sewed a button.

Martha had a birthday so she received a card.

Jackie went to New York so she worked as a teller.

Seth wrote a book so he used an essay.

Mitch was decorating cupcakes so he used a nut.
<table>
<thead>
<tr>
<th>19</th>
<th>chart</th>
<th>graph</th>
<th>Joseph had to present some new data clearly so he used a map.</th>
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<td>chart</td>
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</tr>
<tr>
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<td>stilch</td>
<td>graph</td>
<td>Joseph had to present some new data clearly so he used a map.</td>
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<td>cuff</td>
<td>Tracy was preparing for work so she ironed a sleeve.</td>
</tr>
<tr>
<td>20</td>
<td>cuff</td>
<td>shourn</td>
<td>Tracy was preparing for work so she ironed a sleeve.</td>
</tr>
<tr>
<td>21</td>
<td>waist</td>
<td>ankle</td>
<td>Tony fell while running so he hurt his hip.</td>
</tr>
<tr>
<td>21</td>
<td>clulch</td>
<td>waist</td>
<td>Tony fell while running so he hurt his hip.</td>
</tr>
<tr>
<td>21</td>
<td>clulch</td>
<td>ankle</td>
<td>Tony fell while running so he hurt his hip.</td>
</tr>
<tr>
<td>22</td>
<td>folder</td>
<td>paperclip</td>
<td>Tina was organizing her desk so she used a staple.</td>
</tr>
<tr>
<td>22</td>
<td>paperclip</td>
<td>phrup</td>
<td>Tina was organizing her desk so she used a staple.</td>
</tr>
<tr>
<td>22</td>
<td>folder</td>
<td>phrup</td>
<td>Tina was organizing her desk so she used a staple.</td>
</tr>
<tr>
<td>23</td>
<td>ram</td>
<td>superman</td>
<td>Little Martin got a new costume so he pretended to be a goat.</td>
</tr>
<tr>
<td>23</td>
<td>vapse</td>
<td>ram</td>
<td>Little Martin got a new costume so he pretended to be a goat.</td>
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<tr>
<td>23</td>
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<td>superman</td>
<td>Little Martin got a new costume so he pretended to be a goat.</td>
</tr>
<tr>
<td>24</td>
<td>deer</td>
<td>bunny</td>
<td>Justin went on a hunting trip in Georgia so he watched a rabbit.</td>
</tr>
<tr>
<td>24</td>
<td>bunny</td>
<td>fusk</td>
<td>Justin went on a hunting trip in Georgia so he watched a rabbit.</td>
</tr>
<tr>
<td>24</td>
<td>deer</td>
<td>fusk</td>
<td>Justin went on a hunting trip in Georgia so he watched a rabbit.</td>
</tr>
</tbody>
</table>
Appendix D

Judgment Experiments 1 & 2: Items

Order of Conditions:

<table>
<thead>
<tr>
<th>Conditions</th>
<th>(exh, con)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exhaustive, Contrastive</td>
<td></td>
</tr>
<tr>
<td>Exhaustive, Noncontrastive</td>
<td>(exh, noncon)</td>
</tr>
<tr>
<td>Nonexhaustive, Explicit, Irrelevant</td>
<td>(nonexh, exp, irrel)</td>
</tr>
<tr>
<td>Nonexhaustive, Implicit, Irrelevant</td>
<td>(nonexh, nonexp, irrel)</td>
</tr>
<tr>
<td>Nonexhaustive, Explicit, Relevant</td>
<td>(nonexh, exp, rel)</td>
</tr>
<tr>
<td>Nonexhaustive, Implicit, Irrelevant</td>
<td>(nonexh, nonexp, irrel)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Target sentence for Judgment Experiment 1: in situ focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yesterday, he bought a t-shirt.</td>
</tr>
<tr>
<td>Yesterday, it was a t-shirt that he bought.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Target sentence for Judgment Experiment 2: it-cleft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yesterday, it was a t-shirt that he bought.</td>
</tr>
</tbody>
</table>

1. Jane and Tom went shopping. Tom bought a t-shirt. Later, Kevin remarks: "I bet Tom bought only shoes again, didn't he?" Jane responds: "He doesn't always buy shoes."

Jane and Tom went shopping. Tom bought a t-shirt. Later, Kevin remarks: "I bet Tom bought only a t-shirt again, didn't he?" Jane responds: "Yes."

Jane and Tom went shopping. Tom bought a tank top, a t-shirt, and a sweater. Later, Kevin remarks: "I bet Tom bought only shoes again, didn't he?" Jane responds: "He doesn't always buy shoes."

Jane and Tom went shopping. Tom bought a variety of clothing. Later, Kevin remarks: "I bet Tom bought only shoes again, didn't he?" Jane responds: "He doesn't always buy shoes."

Jane and Tom went shopping. Tom bought a tank top, a t-shirt, and a sweater. Later, Kevin remarks: "I bet Tom bought only shoes again, didn't he?" Jane responds: "No, he didn't."

Jane and Tom went shopping. Tom bought a variety of clothing. Later, Kevin remarks: "I bet Tom bought only shoes again, didn't he?" Jane responds: "No, he didn't."

Yesterday, he bought a t-shirt.
Yesterday, it was a t-shirt that he bought.

2. Jane and Tom went to the zoo. Tom pet a llama. Later, Kevin remarks: "I bet Tom pet only rabbits again, didn't he?" Jane responds: "He doesn't always pet rabbits."

Jane and Tom went to the zoo. Tom pet a llama. Later, Kevin remarks: "I bet Tom pet only a llama again, didn't he?" Jane responds: "Yes."

Jane and Tom went to the zoo. Tom pet a llama, a goat, and a sheep. Later, Kevin remarks: "I
bet Tom pet only rabbits again, didn't he?" Jane responds: "He doesn't always pet rabbits."

Yesterday, he pet a llama.

Yesterday, it was a llama that he pet.

Jane and Tom went to lunch. Tom ordered a sandwich. Later, Kevin remarks: "I bet Tom ordered only a salad again, didn't he?" Jane responds: "He doesn't always order salad."

Yesterday, he ordered a sandwich.

Yesterday, it was a sandwich that he ordered.

Jane and Tom went to dinner. Tom ate a burrito. Later, Kevin remarks: "I bet Tom ate only a taco again, didn't he?" Jane responds: "He doesn't always eat tacos."

Yesterday, he ate a burrito.

Yesterday, it was a burrito that he ate.
Jane and Tom went to dinner. Tom ate a variety of Mexican food. Later, Kevin remarks: "I bet Tom ate a taco again, didn't he?" Jane responds: "No, he didn't"

Yesterday, he ate a burrito.
Yesterday, it was a burrito that he ate.

5.

Jane and Tom went to a café. Tom drank a jasmine tea. Later, Kevin remarks: "I bet Tom drank only a black tea again, didn't he?" Jane responds: "He doesn't always drink black tea."

Jane and Tom went to a café. Tom drank a jasmine tea. Later, Kevin remarks: "I bet Tom drank only a jasmine tea again, didn't he?" Jane responds: "Yes."

Jane and Tom went to a café. Tom drank a jasmine tea, a chai tea, and a chamomile tea. Later, Kevin remarks: "I bet Tom drank only a black tea again, didn't he?" Jane responds: "He doesn't always drink black tea."

Jane and Tom went to a café. Tom drank a variety of green teas. Later, Kevin remarks: "I bet Tom drank only a black tea again, didn't he?" Jane responds: "He doesn't always drink black tea."

Jane and Tom went to a café. Tom drank a jasmine tea, a chai tea, and a chamomile tea. Later, Kevin remarks: "I bet Tom drank only a black tea again, didn't he?" Jane responds: "No, he didn't"

Jane and Tom went to a café. Tom drank a variety of green teas. Later, Kevin remarks: "I bet Tom drank only a black tea again, didn't he?" Jane responds: "No, he didn't"

Yesterday, he drank a jasmine tea.
Yesterday, it was a jasmine tea that he drank.

6.

Jane and Tom went to a bar. Tom drank vodka. Later, Kevin remarks: "I bet Tom drank only tequila again, didn't he?" Jane responds: "He doesn't always drink tequila."

Jane and Tom went to a bar. Tom drank vodka. Later, Kevin remarks: "I bet Tom drank only vodka again, didn't he?" Jane responds: "Yes."

Jane and Tom went to a bar. Tom drank vodka, whiskey, and kalhua. Later, Kevin remarks: "I bet Tom drank only tequila again, didn't he?" Jane responds: "He doesn't always drink tequila."

Jane and Tom went to a bar. Tom drank a variety of shots. Later, Kevin remarks: "I bet Tom drank only tequila again, didn't he?" Jane responds: "He doesn't always drink tequila."

Jane and Tom went to a bar. Tom drank vodka, whiskey, and kalhua. Later, Kevin remarks: "I bet Tom drank tequila again, didn't he?" Jane responds: "No, he didn't"

Jane and Tom went to a bar. Tom drank a variety of shots. Later, Kevin remarks: "I bet Tom drank tequila again, didn't he?" Jane responds: "No, he didn't"

Yesterday, he drank vodka.
Yesterday, it was vodka that he drank.
7.

Jane and Tom went to the library. Tom read a newspaper. Later, Kevin remarks: "I bet Tom read only a novel again, didn't he?" Jane responds: "He doesn't always read novels."

Jane and Tom went to the library. Tom read a newspaper. Later, Kevin remarks: "I bet Tom read only a newspaper again, didn't he?" Jane responds: "Yes."

Jane and Tom went to the library. Tom read a newspaper, a magazine, and a comic book. Later, Kevin remarks: "I bet Tom read only a novel again, didn't he?" Jane responds: "He doesn't always read novels."

Jane and Tom went to the library. Tom read a variety of publications. Later, Kevin remarks: "I bet Tom read only a novel again, didn't he?" Jane responds: "He doesn't always read novels."

Jane and Tom went to the library. Tom read a newspaper, a magazine, and a comic book. Later, Kevin remarks: "I bet Tom read a novel again, didn't he?" Jane responds: "No, he didn't"

Jane and Tom went to the library. Tom read a variety of publications. Later, Kevin remarks: "I bet Tom read a novel again, didn't he?" Jane responds: "No, he didn't"

Yesterday, he read a newspaper.

Yesterday, it was a newspaper that he read.

8.

Jane and Tom went to a farmer's market. Tom bought an orange. Later, Kevin remarks: "I bet Tom bought only an apple again, didn't he?" Jane responds: "He doesn't always buy apples."

Jane and Tom went to a farmer's market. Tom bought an orange. Later, Kevin remarks: "I bet Tom bought only an orange again, didn't he?" Jane responds: "Yes."

Jane and Tom went to a farmer's market. Tom bought an orange, a tomato, and a sunflower. Later, Kevin remarks: "I bet Tom bought only an apple again, didn't he?" Jane responds: "He doesn't always buy apples."

Jane and Tom went to a farmer's market. Tom bought a variety of vegetables. Later, Kevin remarks: "I bet Tom bought only an apple again, didn't he?" Jane responds: "He doesn't always buy apples."

Jane and Tom went to a farmer's market. Tom bought an orange, a tomato, and a sunflower. Later, Kevin remarks: "I bet Tom bought an apple again, didn't he?" Jane responds: "No, he didn't"

Jane and Tom went to a farmer's market. Tom bought a variety of vegetables. Later, Kevin remarks: "I bet Tom bought an apple again, didn't he?" Jane responds: "No, he didn't"

Yesterday, he bought an orange.

Yesterday, it was an orange that he bought.
9.

<table>
<thead>
<tr>
<th>Jane and Tom made hotdogs. Tom used ketchup. Later, Kevin remarks: &quot;I bet Tom used only mustard again, didn't he?&quot; Jane responds: &quot;He doesn't always use mustard.&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jane and Tom made hotdogs. Tom used ketchup. Later, Kevin remarks: &quot;I bet Tom used only ketchup again, didn't he?&quot; Jane responds: &quot;Yes.&quot;</td>
</tr>
<tr>
<td>Jane and Tom made hotdogs. Tom used ketchup, relish, and cheese. Later, Kevin remarks: &quot;I bet Tom used only mustard again, didn't he?&quot; Jane responds: &quot;He doesn't always use mustard.&quot;</td>
</tr>
<tr>
<td>Jane and Tom made hotdogs. Tom used a variety of condiments. Later, Kevin remarks: &quot;I bet Tom used only mustard again, didn't he?&quot; Jane responds: &quot;He doesn't always use mustard.&quot;</td>
</tr>
</tbody>
</table>

| Yesterday, he put on his hotdog ketchup. |
| Yesterday, it was ketchup that he put on his hotdog. |

10.

<table>
<thead>
<tr>
<th>Jane and Tom planted a garden. Tom planted a rose. Later, Kevin remarks: &quot;I bet Tom planted only a lily again, didn't he?&quot; Jane responds: &quot;He doesn't always plant lilies.&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jane and Tom planted a garden. Tom planted a rose. Later, Kevin remarks: &quot;I bet Tom planted only a rose again, didn't he?&quot; Jane responds: &quot;Yes.&quot;</td>
</tr>
<tr>
<td>Jane and Tom planted a garden. Tom planted a rose, a daisy, and a geranium. Later, Kevin remarks: &quot;I bet Tom planted only a lily again, didn't he?&quot; Jane responds: &quot;He doesn't always plant lilies.&quot;</td>
</tr>
<tr>
<td>Jane and Tom planted a garden. Tom planted several types of flowers. Later, Kevin remarks: &quot;I bet Tom planted only a lily again, didn't he?&quot; Jane responds: &quot;He doesn't always plant lilies.&quot;</td>
</tr>
</tbody>
</table>

| Yesterday, he planted a rose. |
| Yesterday, it was a rose that he planted. |

11.

<table>
<thead>
<tr>
<th>Jane and Tom baked desserts. Tom baked a cake. Later, Kevin remarks: &quot;I bet Tom baked only a pie again, didn't he?&quot; Jane responds: &quot;He doesn't always bake pies.&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jane and Tom baked desserts. Tom baked a cake. Later, Kevin remarks: &quot;I bet Tom baked only a cake again, didn't he?&quot; Jane responds: &quot;Yes.&quot;</td>
</tr>
</tbody>
</table>

| Yesterday, he baked a cake. |
| Yesterday, it was a cake that he baked. |
only a cake again, didn't he?” Jane responds: "Yes."

Jane and Tom baked desserts. Tom baked a cake, a sweet bread, and a torte. Later, Kevin remarks: "I bet Tom baked only a pie again, didn't he?" Jane responds: "He doesn't always bake pies."

Jane and Tom baked desserts. Tom baked several types of deserts. Later, Kevin remarks: "I bet Tom baked only a pie again, didn't he?" Jane responds: "He doesn't always bake pies."

Jane and Tom baked desserts. Tom baked a cake, a sweet bread, and a torte. Later, Kevin remarks: "I bet Tom baked a pie again, didn't he?" Jane responds: "No, he didn't.

Jane and Tom baked desserts. Tom baked several types of deserts. Later, Kevin remarks: "I bet Tom baked a pie again, didn't he?" Jane responds: "No, he didn't.

<table>
<thead>
<tr>
<th>Yesterday, he baked a cake.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yesterday, it was a cake that he baked.</td>
</tr>
</tbody>
</table>

12.

Jane and Tom grilled barbeque. Tom grilled a steak. Later, Kevin remarks: "I bet Tom grilled only a hamburger again, didn't he?" Jane responds: "He doesn't always grill hamburgers."

Jane and Tom grilled barbeque. Tom grilled a steak. Later, Kevin remarks: "I bet Tom grilled only a steak again, didn't he?" Jane responds: "Yes."

Jane and Tom grilled barbeque. Tom grilled a steak, a drumstick, and a pork loin. Later, Kevin remarks: "I bet Tom grilled only a hamburger again, didn't he?" Jane responds: "He doesn't always grill hamburgers."

Jane and Tom grilled barbeque. Tom grilled several types of meat. Later, Kevin remarks: "I bet Tom grilled only a hamburger again, didn't he?" Jane responds: "He doesn't always grill hamburgers."

Jane and Tom grilled barbeque. Tom grilled a steak, a drumstick, and a pork loin. Later, Kevin remarks: "I bet Tom grilled a hamburger again, didn't he?" Jane responds: "No, he didn't."

Jane and Tom grilled barbeque. Tom grilled several types of meat. Later, Kevin remarks: "I bet Tom grilled a hamburger again, didn't he?" Jane responds: "No, he didn't.

<table>
<thead>
<tr>
<th>Yesterday, he grilled a steak.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yesterday, it was a steak that he grilled.</td>
</tr>
</tbody>
</table>

13.

Jane and Tom cooked dinner. Tom cooked a soup. Later, Kevin remarks: "I bet Tom cooked only chicken again, didn't he?" Jane responds: "He doesn't always cook chicken."

Jane and Tom cooked dinner. Tom cooked a soup. Later, Kevin remarks: "I bet Tom cooked only soup again, didn't he?" Jane responds: "Yes."

Jane and Tom cooked dinner. Tom cooked a soup, a sausage, and a potato. Later, Kevin remarks: "I bet Tom cooked only chicken again, didn't he?" Jane responds: "He doesn't always cook chicken."

Jane and Tom cooked dinner. Tom cooked a variety of entrees. Later, Kevin remarks: "I bet
Tom cooked only chicken again, didn't he?" Jane responds: "He doesn't always cook chicken."

Jane and Tom cooked dinner. Tom cooked a soup, a sausage, and a potato. Later, Kevin remarks: "I bet Tom cooked chicken again, didn't he?" Jane responds: "No, he didn't"

Jane and Tom cooked dinner. Tom cooked a variety of entrees. Later, Kevin remarks: "I bet Tom cooked chicken again, didn't he?" Jane responds: "No, he didn't"

Yesterday, he cooked a soup.
Yesterday, it was a soup that he cooked.

Jane and Tom went dancing. Tom danced a salsa. Later, Kevin remarks: "I bet Tom danced only a waltz again, didn't he?" Jane responds: "He doesn't always dance waltzes."

Jane and Tom went dancing. Tom danced a salsa. Later, Kevin remarks: "I bet Tom danced only a salsa again, didn't he?" Jane responds: "Yes."

Jane and Tom went dancing. Tom danced a salsa, a tango, and a cha-cha. Later, Kevin remarks: "I bet Tom danced only a waltz again, didn't he?" Jane responds: "He doesn't always dance waltzes."

Jane and Tom went dancing. Tom danced a variety of Latin dances. Later, Kevin remarks: "I bet Tom danced only a waltz again, didn't he?" Jane responds: "He doesn't always dance waltzes."

Jane and Tom went dancing. Tom danced a salsa, a tango, and a cha-cha. Later, Kevin remarks: "I bet Tom danced only a waltz again, didn't he?" Jane responds: "No, he didn't"

Jane and Tom went dancing. Tom danced a variety of Latin dances. Later, Kevin remarks: "I bet Tom danced a waltz again, didn't he?" Jane responds: "No, he didn't"

Yesterday, he danced a salsa.
Yesterday, it was a salsa that he danced.

Jane and Tom went wine tasting. Tom tried a merlot. Later, Kevin remarks: "I bet Tom tried only a riesling again, didn't he?" Jane responds: "He doesn't always try rieslings."

Jane and Tom went wine tasting. Tom tried a merlot. Later, Kevin remarks: "I bet Tom tried only a merlot again, didn't he?" Jane responds: "Yes."

Jane and Tom went wine tasting. Tom tried a merlot, a cabernet, and a shiraz. Later, Kevin remarks: "I bet Tom tried only a riesling again, didn't he?" Jane responds: "He doesn't always try rieslings."

Jane and Tom went wine tasting. Tom tried a variety of red wines. Later, Kevin remarks: "I bet Tom tried only a riesling again, didn't he?" Jane responds: "He doesn't always try rieslings."

Jane and Tom went wine tasting. Tom tried a merlot, a cabernet, and a shiraz. Later, Kevin remarks: "I bet Tom tried a riesling again, didn't he?" Jane responds: "No, he didn't"

Jane and Tom went wine tasting. Tom tried a variety of red wines. Later, Kevin remarks: "I
bet Tom tried a riesling again, didn't he?" Jane responds: "No, he didn't"

Yesterday, he tried a merlot.
Yesterday, it was a merlot that he tried.

16.

Jane and Tom went fishing. Tom caught a trout. Later, Kevin remarks: "I bet Tom caught only a bass again, didn't he?" Jane responds: "He doesn't always catch bass."

Jane and Tom went fishing. Tom caught a trout. Later, Kevin remarks: "I bet Tom caught only a trout again, didn't he?" Jane responds: "Yes."

Jane and Tom went fishing. Tom caught a trout, a salmon, and a catfish. Later, Kevin remarks: "I bet Tom caught only a bass again, didn't he?" Jane responds: "He doesn't always catch bass."

Jane and Tom went fishing. Tom caught a trout, a salmon, and a catfish. Later, Kevin remarks: "I bet Tom caught only a bass again, didn't he?" Jane responds: "No, he didn't"

Jane and Tom went fishing. Tom caught a trout, a salmon, and a catfish. Later, Kevin remarks: "I bet Tom caught only a trout again, didn't he?" Jane responds: "Yes."

Jane and Tom went fishing. Tom caught a trout, a salmon, and a catfish. Later, Kevin remarks: "I bet Tom caught only a bass again, didn't he?" Jane responds: "No, he didn't"

Yesterday, he caught a trout.
Yesterday, it was a trout that he caught.

17.

Jane and Tom toured a new city. Tom visited a history museum. Later, Kevin remarks: "I bet Tom visited only an art museum again, didn't he?" Jane responds: "He doesn't always visit art museums."

Jane and Tom toured a new city. Tom visited a history museum. Later, Kevin remarks: "I bet Tom visited only an history museum again, didn't he?" Jane responds: "Yes."

Jane and Tom toured a new city. Tom visited a history museum, a monument, and a battlefield. Later, Kevin remarks: "I bet Tom visited only an art museum again, didn't he?" Jane responds: "He doesn't always visit art museums."

Jane and Tom toured a new city. Tom visited a history museum, a monument, and a battlefield. Later, Kevin remarks: "I bet Tom visited only an art museum again, didn't he?" Jane responds: "Yes."

Jane and Tom toured a new city. Tom visited several types of museums. Later, Kevin remarks: "I bet Tom visited only an art museum again, didn't he?" Jane responds: "He doesn't always visit art museums."

Jane and Tom toured a new city. Tom visited several types of museums. Later, Kevin remarks: "I bet Tom visited only an art museum again, didn't he?" Jane responds: "No, he didn't"

Jane and Tom toured a new city. Tom visited several types of museums. Later, Kevin remarks: "I bet Tom visited only an art museum again, didn't he?" Jane responds: "No, he didn't"

Yesterday, he visited a history museum.
Yesterday, it was a history museum that he
18.

Jane and Tom attended a writing conference. Tom wrote a short story. Later, Kevin remarks: "I bet Tom wrote only a poem again, didn't he?" Jane responds: "He doesn't always write poems."

Jane and Tom attended a writing conference. Tom wrote a short story. Later, Kevin remarks: "I bet Tom wrote only a short story again, didn't he?" Jane responds: "Yes."

Jane and Tom attended a writing conference. Tom wrote a short story, an essay, and a character sketch. Later, Kevin remarks: "I bet Tom wrote only a poem again, didn't he?" Jane responds: "He doesn't always write poems."

Jane and Tom attended a writing conference. Tom wrote a variety of manuscripts. Later, Kevin remarks: "I bet Tom wrote only a poem again, didn't he?" Jane responds: "He doesn't always write poems."

Yesterday, he wrote a short story.

Yesterday, it was a short story that he wrote.

19.

Jane and Tom played sports. Tom played baseball. Later, Kevin remarks: "I bet Tom played only tennis again, didn't he?" Jane responds: "He doesn't always play tennis."

Jane and Tom played sports. Tom played baseball. Later, Kevin remarks: "I bet Tom played only baseball again, didn't he?" Jane responds: "Yes."

Jane and Tom played sports. Tom played baseball, basketball, and frisbee. Later, Kevin remarks: "I bet Tom played only tennis again, didn't he?" Jane responds: "He doesn't always play tennis."

Jane and Tom played sports. Tom played a variety of sports. Later, Kevin remarks: "I bet Tom played only tennis again, didn't he?" Jane responds: "He doesn't always play tennis."

Jane and Tom played sports. Tom played baseball, basketball, and frisbee. Later, Kevin remarks: "I bet Tom played tennis again, didn't he?" Jane responds: "No, he didn't"

Jane and Tom played sports. Tom played a variety of sports. Later, Kevin remarks: "I bet Tom played tennis again, didn't he?" Jane responds: "No, he didn't"

Yesterday, he played baseball.

Yesterday, it was baseball that he played.
20.

<table>
<thead>
<tr>
<th>Jane and Tom test drove cars. Tom drove a Honda. Later, Kevin remarks: &quot;I bet Tom drove only a Ford again, didn't he?&quot; Jane responds: &quot;He doesn't always drive Fords.&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jane and Tom test drove cars. Tom drove a Honda. Later, Kevin remarks: &quot;I bet Tom drove only a Honda again, didn't he?&quot; Jane responds: &quot;Yes.&quot;</td>
</tr>
<tr>
<td>Jane and Tom test drove cars. Tom drove a Honda, a Toyota, and a Nissan. Later, Kevin remarks: &quot;I bet Tom drove only a Ford again, didn't he?&quot; Jane responds: &quot;He doesn't always drive Fords.&quot;</td>
</tr>
<tr>
<td>Jane and Tom test drove cars. Tom drove a Honda, a Toyota, and a Nissan. Later, Kevin remarks: &quot;I bet Tom drove a Ford again, didn't he?&quot; Jane responds: &quot;No, he didn't&quot;</td>
</tr>
</tbody>
</table>

Yesterday, he drove a **Honda**.
Yesterday, it was a Honda that he drove.

21.

<table>
<thead>
<tr>
<th>Jane and Tom played boardgames. Tom played Monopoly. Later, Kevin remarks: &quot;I bet Tom played only Scrabble again, didn't he?&quot; Jane responds: &quot;He doesn't always play Scrabble.&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jane and Tom played boardgames. Tom played Monopoly. Later, Kevin remarks: &quot;I bet Tom played only Monopoly again, didn't he?&quot; Jane responds: &quot;Yes.&quot;</td>
</tr>
<tr>
<td>Jane and Tom played boardgames. Tom played Monopoly, Risk, and Sorry. Later, Kevin remarks: &quot;I bet Tom played only Scrabble again, didn't he?&quot; Jane responds: &quot;He doesn't always play Scrabble.&quot;</td>
</tr>
<tr>
<td>Jane and Tom played boardgames. Tom played Monopoly, Risk, and Sorry. Later, Kevin remarks: &quot;I bet Tom played Scrabble again, didn't he?&quot; Jane responds: &quot;No, he didn't&quot;</td>
</tr>
</tbody>
</table>

Yesterday, he played **Monopoly**.
Yesterday, it was Monopoly that he played.

22.

| Jane and Tom drew pictures. Tom drew a portrait. Later, Kevin remarks: "I bet Tom drew only landscapes again, didn't he?" Jane responds: "He doesn't always draw landscapes." |
Jane and Tom drew pictures. Tom drew a portrait. Later, Kevin remarks: "I bet Tom drew only a portrait again, didn't he?" Jane responds: "Yes."

Jane and Tom drew pictures. Tom drew a portrait, a still life, and a fantasy. Later, Kevin remarks: "I bet Tom drew only landscapes again, didn't he?" Jane responds: "He doesn't always draw landscapes."

Jane and Tom drew pictures. Tom drew a variety of pictures. Later, Kevin remarks: "I bet Tom drew landscapes again, didn't he?" Jane responds: "No, he didn't"  

Jane and Tom drew pictures. Tom drew landscapes again, didn't he?" Jane responds: "No, he didn't" 

Yesterday, he drew a **portrait**.  
Yesterday, it was a portrait that he drew.

23.  

Jane and Tom watched movies. Tom watched a comedy. Later, Kevin remarks: "I bet Tom watched only dramas again, didn't he?" Jane responds: "He doesn't always watch dramas."

Jane and Tom watched movies. Tom watched a comedy. Later, Kevin remarks: "I bet Tom watched only a comedy again, didn't he?" Jane responds: "Yes."

Jane and Tom watched movies. Tom watched a comedy, a cartoon, and a farce. Later, Kevin remarks: "I bet Tom watched only dramas again, didn't he?" Jane responds: "He doesn't always watch dramas."

Jane and Tom watched movies. Tom watched several types of movies. Later, Kevin remarks: "I bet Tom watched only dramas again, didn't he?" Jane responds: "He doesn't always watch dramas."

Jane and Tom watched movies. Tom watched a comedy, a cartoon, and a farce. Later, Kevin remarks: "I bet Tom watched dramas again, didn't he?" Jane responds: "No, he didn't"

Yesterday, he watched a **comedy**.  
Yesterday, it was a comedy that he watched.

24.  

Jane and Tom went to a casino. Tom played poker. Later, Kevin remarks: "I bet Tom played only slot machines again, didn't he?" Jane responds: "He doesn't always play slot machines."

Jane and Tom went to a casino. Tom played poker. Later, Kevin remarks: "I bet Tom played only poker again, didn't he?" Jane responds: "Yes."

Jane and Tom went to a casino. Tom played poker, blackjack, and craps. Later, Kevin remarks: "I bet Tom played only slot machines again, didn't he?" Jane responds: "He doesn't
Jane and Tom went to a casino. Tom played a variety of games. Later, Kevin remarks: "I bet Tom played only slot machines again, didn't he?" Jane responds: "He doesn't always play slot machines."

Jane and Tom went to a casino. Tom played poker, blackjack, and craps. Later, Kevin remarks: "I bet Tom played slot machines again, didn't he?" Jane responds: "No, he didn't."

Jane and Tom went to a casino. Tom played a variety of games. Later, Kevin remarks: "I bet Tom played slot machines again, didn't he?" Jane responds: "No, he didn't."

Yesterday, he played poker.
Yesterday, it was poker that he played.

Jane and Tom painted furniture. Tom painted a chair. Later, Kevin remarks: "I bet Tom painted only lamps again, didn't he?" Jane responds: "He doesn't always paint lamps."

Jane and Tom painted furniture. Tom painted a chair. Later, Kevin remarks: "I bet Tom painted only a chair again, didn't he?" Jane responds: "Yes."

Jane and Tom painted furniture. Tom painted a chair, a desk, and a table. Later, Kevin remarks: "I bet Tom painted only lamps again, didn't he?" Jane responds: "He doesn't always paint lamps."

Jane and Tom painted furniture. Tom painted a variety of furniture. Later, Kevin remarks: "I bet Tom painted only lamps again, didn't he?" Jane responds: "He doesn't always paint lamps."

Yesterday, he painted a chair.
Yesterday, it was a chair that he painted.

Jane and Tom went swimming. Tom swam the backstroke. Later, Kevin remarks: "I bet Tom swam only the doggie paddle again, didn't he?" Jane responds: "He doesn't always swim the doggie paddle."

Yesterday, it was a chair that he painted.

Jane and Tom went swimming. Tom swam the backstroke. Later, Kevin remarks: "I bet Tom swam only the backstroke again, didn't he?" Jane responds: "Yes."

Jane and Tom went swimming. Tom swam the backstroke, the breaststroke, and freestyle. Later, Kevin remarks: "I bet Tom swam only the doggie paddle again, didn't he?" Jane responds: "He doesn't always swim the doggie paddle."

Yesterday, he played poker.
swim the doggie paddle."

Jane and Tom went swimming. Tom swam the backstroke, the breaststroke, and freestyle. Later, Kevin remarks: "I bet Tom swam the doggie paddle again, didn't he?" Jane responds: "No, he didn't."

Jane and Tom went swimming. Tom swam several types of strokes. Later, Kevin remarks: "I bet Tom swam the doggie paddle again, didn't he?" Jane responds: "No, he didn't."

Yesterday, he swam the *backstroke*.

Yesterday, it was the backstroke that he swam.

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27.

Jane and Tom registered for classes. Tom registered for calculus. Later, Kevin remarks: "I bet Tom registered only for creative writing again, didn't he?" Jane responds: "He doesn't always register for creative writing."

Jane and Tom registered for classes. Tom registered for calculus. Later, Kevin remarks: "I bet Tom registered only for calculus again, didn't he?" Jane responds: "Yes."

Jane and Tom registered for classes. Tom registered for calculus, electrical engineering, and physics. Later, Kevin remarks: "I bet Tom registered only for creative writing again, didn't he?" Jane responds: "He doesn't always register for creative writing."

Jane and Tom registered for classes. Tom registered for a variety of classes. Later, Kevin remarks: "I bet Tom registered only for creative writing again, didn't he?" Jane responds: "He doesn't always register for creative writing."

Jane and Tom registered for classes. Tom registered for calculus, electrical engineering, and physics. Later, Kevin remarks: "I bet Tom registered for creative writing again, didn't he?" Jane responds: "No, he didn't."

Jane and Tom registered for classes. Tom registered for a variety of classes. Later, Kevin remarks: "I bet Tom registered for creative writing again, didn't he?" Jane responds: "No, he didn't."

Yesterday, he registered for *calculus*.

Yesterday, it was calculus that he registered for.

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28.

Jane and Tom made ice cream. Tom made chocolate. Later, Kevin remarks: "I bet Tom made only vanilla again, didn't he?" Jane responds: "He doesn't always make vanilla."

Jane and Tom made ice cream. Tom made chocolate. Later, Kevin remarks: "I bet Tom made only chocolate again, didn't he?" Jane responds: "Yes."

Jane and Tom made ice cream. Tom made chocolate, strawberry, and banana. Later, Kevin remarks: "I bet Tom made only vanilla again, didn't he?" Jane responds: "He doesn't always make vanilla."

Jane and Tom made ice cream. Tom made a variety of flavors. Later, Kevin remarks: "I bet Tom made only vanilla again, didn't he?" Jane responds: "He doesn't always make vanilla."
Jane and Tom made ice cream. Tom made chocolate, strawberry, and banana. Later, Kevin remarks: "I bet Tom made vanilla again, didn't he?" Jane responds: "No, he didn't."

Jane and Tom made ice cream. Tom made a variety of flavors. Later, Kevin remarks: "I bet Tom made vanilla again, didn't he?" Jane responds: "No, he didn't."

| Yesterday, he made chocolate. |
| Yesterday, it was chocolate that he made. |

Jane and Tom went jogging. Tom jogged around the park. Later, Kevin remarks: "I bet Tom jogged around only the track again, didn't he?" Jane responds: "He doesn't always jog around the track."

Jane and Tom went jogging. Tom jogged around the park. Later, Kevin remarks: "I bet Tom jogged around only the park again, didn't he?" Jane responds: "Yes."

| Jane and Tom went jogging. Tom jogged around the park, the rec center, and the neighborhood. Later, Kevin remarks: "I bet Tom jogged around only the track again, didn't he?" Jane responds: "He doesn't always jog around the track." |

| Jane and Tom went jogging. Tom jogged around several types of paths. Later, Kevin remarks: "I bet Tom jogged around only the track again, didn't he?" Jane responds: "He doesn't always jog around the track." |

| Jane and Tom went jogging. Tom jogged around the park, the rec center, and the neighborhood. Later, Kevin remarks: "I bet Tom jogged around the track again, didn't he?" Jane responds: "No, he didn't." |

Jane and Tom went jogging. Tom jogged around several types of paths. Later, Kevin remarks: "I bet Tom jogged around the track again, didn't he?" Jane responds: "No, he didn't."

| Yesterday, he jogged around the park. |
| Yesterday, it was the park that he jogged around. |

Jane and Tom went to the park. Tom played with the children. Later, Kevin remarks: "I bet Tom played only with the dogs again, didn't he?" Jane responds: "He doesn't always play with the dogs."

Jane and Tom went to the park. Tom played with the children. Later, Kevin remarks: "I bet Tom played only with the children again, didn't he?" Jane responds: "Yes."

| Jane and Tom went to the park. Tom played with the children, the birds, and his family. Later, Kevin remarks: "I bet Tom played only with the dogs again, didn't he?" Jane responds: "He doesn't always play with the dogs." |

| Jane and Tom went to the park. Tom played with a variety of people and animals. Later, Kevin remarks: "I bet Tom played only with the dogs again, didn't he?" Jane responds: "He doesn't always play with the dogs." |

Jane and Tom went to the park. Tom played with the children, the birds, and his family.
Later, Kevin remarks: "I bet Tom played with the dogs again, didn't he?" Jane responds: "No, he didn't."

Jane and Tom went to the park. Tom played with a variety of people and animals. Later, Kevin remarks: "I bet Tom played with the dogs again, didn't he?" Jane responds: "No, he didn't."

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<thead>
<tr>
<th>Yesterday, he played with the <strong>children</strong>.</th>
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<tr>
<td>Yesterday, it was the children that he played with.</td>
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Bibliography


