1. Introduction

Current theories on the meaning of focus predict that a speaker, upon encountering a focused constituent, creates in his/her mind a list of alternatives to the focused constituent. For instance, if a speaker were to assert “Jane loves Mark” with Jane prosodically focused, current theories predict that a hearer would have to generate a set of possible people who might love Mark, such as {Kim, Jane, Sandy,…}, in order to interpret the focus. Despite though the ubiquitous use of the set of alternatives in the literature about focus, little is still known about the circumstances under which speakers/hearers build a set of alternatives. This paper will present two lexical decision task experiments that aim to answer three questions about the focus set of alternatives:

1) Is the focus set of alternatives cognitively real? (aka: Do hearers actually build a set of alternatives in their minds when they encounter a focused constituent?)

2) How is the set of alternatives built?

3) If the set of alternatives is cognitively real, do hearers build it for all types of focus or only some types?

Experiment 1 found that participants were faster to respond to a target word in a lexical decision task when the prime word was preceded by the focus sensitive particle only. This is evidence that comprehenders do indeed build a set of alternatives for a focused constituent. Experiment 1 found, additionally, that participants were faster to respond to the focused target even when the target was only related to the prime word by previous context. To explain, Experiment 1 made use of contextually related primes. This means that if a speaker were given this prime word and asked to state what words the prime invokes, the speaker would not
normally say the target word. For example, if a speaker was given *grass*, he/she would not normally say that *city* is one of the words that *grass* invokes. Experiment 1 included these normally unrelated word pairs in the same set in the linguistic context so that they were related, not semantically, but by context. That the prime related only by the context was still able to cause the participants to react faster to the target indicates that the focus set of alternatives is built using context.

Experiment 2 used the same procedure as Experiment 1 to investigate new-information focus and contrastive focus. It found that participants were slower to respond to a target word when the prime word was focused by *only* (‘strong focus’ a la Clark and Beaver 2008), but not when it was focused by lexical newness (first time a word appeared in a discourse), referential newness (first time an object is referenced in a discourse), or, interestingly, a contrastive accent with no focus sensitive particle (‘weak focus’ a la Clark and Beaver 2008). Because Experiment 2 did not provide the participants with a set of alternatives in the item’s context the way Experiment 1 did, it is highly probable that the participants were generating a set of alternatives for the prime word that did not include the target word. When participants encountered the target word, there was then a conflict between their expectations and the target word. This could cause a slower reaction time. It can therefore be said that, in Experiment 2, a slowdown indicates the presence of a set of alternatives. By this logic, Experiment 2 showed that association with *only* requires a set of alternatives, but new-information does not. It was not able to conclude anything about contrastive accent focus (because it was not significantly slower than the given condition or the contrastive *only* condition).

The paper is organized as follows: Section 2 reviews the major theories of the meaning of focus, showing that alternative semantics, structured meanings, focus with events, Roberts’
(1996) integrated theory of pragmatics, and Schwarzschild’s (1999) theory of focus, directly or indirectly, evoke a set of alternatives to the focused constituent. Section 3 presents the previous experimental evidence for the set of alternatives. Experiment 1 is presented in section 4. Section 5 reviews the literature on types of focus, and Experiment 2 is presented in section 6 with a conclusion in section 7.

2. Theories of the Meaning of Focus Predict a Set of Alternatives

Although semantic theories for the meaning of focus differ widely, they are all capable of 1) generating alternatives to a proposition with a focused constituent and 2) restricting the alternatives to a contextually relevant set. In some cases, they require that alternatives be generated and explicitly set up mechanisms for ensuring that the set of alternatives is derived from the context of the utterance. Rooth’s Alternative Semantics is the most popular theory of this type.

Rooth’s Alternative Semantics (1985, 1992) 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 factor such as relevance or saliency. 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 $(e(e,t))$. 


1a) [Mary]_F loves John.

Ordinary value: \([Mary]^0 = Mary\)

Focus value: \([Mary]^f = \{x: x \in D_e\} = \{Mary, Tom, the horse^1, the television, \ldots\}\)

b) Mary [loves]_F John.

Ordinary value: \([loves]^0 = loves(x,y)\)

Focus Value: \([loves]^f = \{P: P \in D_{e(t)}\} = \{loves(x,y), hates(x,y), cleans(x,y), \ldots\}\)

Speakers, though, do not use the focus value of a constituent when calculating the meaning of an utterance with a focused constituent. Rooth (1992) introduces a variable, \(\Gamma_k\), whose antecedent is a subset of the focus value. He suggests that the members of this subset are determined by context, relevance, frequency, recency, and other cognitive and pragmatic factors. Other authors (e.g. Beaver and Clark 2008) make similar assumptions, but there has been surprising little work done experimentally to determine how this subset is composed (but see for an example Kim et al 2010).

This variable is indexed to a constituent in the sentence, and it is introduced into LF by the operator ~. This operator also introduces one of two presuppositions depending on whether the focused constituent is a set of words (the set case) or a single word (the individual case). These presuppositions are written out in (2) below. The Focus Interpretation Principle in (3) summarizes all of this.

1) Presuppositions introduced by ~ (Rooth 1992: 93)

1 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 (e,t).
**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 $[\phi]^{0}$.

2) **Focus Interpretation Principle:** Adjoin an operator $\sim \nu$ to a phrase $\alpha$ in LF, where $\nu$ 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).

The antecedent 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 [introduced [Bill]$_{F}$ to Sue].

4) Rooth 1992: 89

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S
  NP     VP
    Mary only(C)
        VP
          ~C
            V introduced NP$_{F}$ PP
                  Bill to Sue
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The placement of $\sim \Gamma_{k}$ might also be constrained by the phonology as the operator has phonological consequences. The variable is covert.

By Rooth 1996a, Rooth had concluded that the definition of *only* must include reference to $\sim$, making the presence of a variable mandatory when *only* is part of the utterance. It is unclear,
though, what the antecedent of the variable is because it is set noncompositionally as part of a pragmatic process. The meaning of (4) would be as in (6). The definition of *only* is given in (5).

5) Non-technical definition of *only*: *only* combining with a clause \( \phi \) yields the assertion 
\[
\forall p \; [p \in [p]^\top \land \; \forall q \rightarrow p = [\phi]^0] \text{ and the presupposition } p.
\]
Technical definition of *only*: 
\[
\lambda C \lambda p \forall q \; [q \in C \land \; \forall q \leftrightarrow q=p]
\]

6) \[
\exists C \forall q \; [C = \{\text{introduced (y, Bill, Sue), introduced (y, Tom, Sue), introduced (y, Jill, Sue)} \} \land \; q \in C \land \; \forall q = \text{introduced(Mary, x, Sue) } \leftrightarrow q = \text{introduced}(y, Bill, Sue)]
\]

This theory requires, as part of the definition of focus and of *only* that a speaker/hearer generates a frame for the domain of quantification that substitutes a variable in for the focused constituent then considers other alternatives to the focused constituent that might fill in for that variable. Additionally, the speaker/hearer should only be considering those alternatives to a constituent containing focus that are contained in \( C \), which is defined according to pragmatic and cognitive considerations, derived in part from the context of the utterance. This theory then predicts that upon hearing a focused constituent, a hearer should activate alternatives to the focused constituent based, in part, upon the context of the utterance. The experiments in this paper aim to give support for the cognitive reality of the alternative set and to investigate the role of context in determining what is included in \( C \).

Robert’s theory of Integrated Pragmatics (1996, building on work by Stalnaker 1978) is a very different theory of the meaning of focus that also explicitly requires alternatives to a proposition with a focused constituent built from the context of the utterance. Roberts, unlike Rooth, takes the meaning of focus to be a matter of pragmatics, not 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 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?” 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 then, 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 (7a), 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 (7b), and a true answer is necessary by the maxim of Quality (7c). This question becomes the Question Under Discussion (QUD).

7) a) Relevance: “Be relevant” (Grice 1972: 152)  
b) Quantity: “Make your contribution as informative as is required for the current purposes of the exchange” (Grice 1972: 152)  
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 QUDs should be partially ordered by entailment. Entailment for questions, in Integrated Pragmatics, is defined as in Groenendijk and Stokhof (1984: 16).

8) Entailment for Questions: $Q_1$ entails another $Q$ iff every proposition that answers $Q_1$ answers $Q_2$. 
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. 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 so that it can be entered into the common ground. In this theory, the set of alternatives is the set of possible responses to the QUD. There is no explicit 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 derived from the context. The goal of the conversation is to determine which world is the actual world. Therefore, the conversational partners have a motivation to consider only those worlds that are likely candidates for being the actual world. In other words, considering possible responses to the QUD that are contextually inappropriate would make it more difficult to determine what the actual world is. 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 the context of the utterance. In this way, Integrated Pragmatics also predicts a set

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2 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.
of alternatives determined by context that should be very similar to the set generated by C in Alternative Semantics.

Other theories of focus do not explicitly require a set of alternatives, but a set of alternatives could be easily incorporated into the theory. One such theory is Focus with Events (Bonomi and Casalegno 1993; Herburger 2000). Focus with Events is built within a theory that treats verbs as event descriptions. The arguments of the verb are added to the derivation with the help of thematic predicates. So in a sentence such as Mary walks Fido, walks is an event description and Mary and Fido contributes to it the events of agency and thematicity, respectively, as in (9).

9) \[ [\text{Mary walks Fido}]^O = \lambda e. \text{walk}(e) \land \text{AG}(e, m) \land \text{TH}(e, f) \]

In Focus with Events, every utterance has two meaning components, as in Alternative Semantics. The first is just the ordinary meaning of the utterance. The second is the background meaning which is a less specified version of the ordinary meaning. Focused constituents contribute a trivial event description that removes them from the derivation, leaving open an unfulfilled thematic event description. This is the event semantics equivalent of replacing the focused constituent with a variable. If Fido in (9) were focused, then the background meaning of the sentence would be as in (10).

10) \[ [\text{Mary walks [Fido]}^B_f = \lambda e. \text{walk}(e) \land \text{AG}(e, m) \]

In Focus with Events, then, in order to accommodate a set of alternatives, it is only a matter of changing the type of the background meaning from being equivalent to the ordinary meaning to
being a set of objects of the same type as the ordinary meaning. Since all of the arguments in the background meaning are fixed except the focused constituent, the objects in this set would then only differ by the focused argument. This would produce a set identical to Alternative Semantic’s focus value. Further constraining the set of alternatives to only contain objects relevant to the context could be done by perhaps introducing the exact operator and variable used by Rooth ($[[\text{Mary walks } \text{Fido}]] \sim_\text{C} = \exists e \forall c. \{[[\text{walk}(e) \land \text{AG}(e,m)) \land \text{TH}(e, \text{fido})],
\{\text{walk}(e) \land \text{AG}(e,m)) \land \text{TH}(e, \text{butch})\} \land \text{walk}(e) \land \text{AG}(e,m))$, or by appealing to cognitive limitations, such as memory, that would prohibit a speaker/hearer from considering every alternative of the same type as the ordinary meaning of the utterance. It would be reasonable, given this limitation, to expect that a speaker/hearer would adopt a strategy of prioritizing those alternatives that are the best competitors to the ordinary meaning. In this way, without any reference to the semantics, the functional, though not the theoretical, set of alternatives will be limited to those alternatives that are most salient, where saliency is determined by the context of the utterance. Therefore, while there is currently no explicit mechanism in Focus with Events that creates sets of alternatives, contextually determined or otherwise, there is nothing in Focus with Events that prohibits this move.

Structured Meanings, in its original design, does not contain any reference to sets of alternatives, but, like Focus with Events, it is compatible with creating sets of alternatives (von Stechow 1981, 1982; Cresswell and von Stechow 1982; Krifka 1991, 2001, Reich 2003). Reich (2004), though, shows that adding sets of alternatives into the theory solves the problem of movement islands that Structured Meanings has consistently had to deal with. He also makes use of a definition for only that employs sets of alternatives.
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 (11).

11) \[ [\text{Mary introduced } [\text{Bill}]_F \text{ to John}] = (\text{Bill}, \lambda x. \text{introduced}(\text{Mary}, x, \text{John})) \]

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.

12) \[ [\text{Who did Mary introduce to John?}] = \lambda x. \text{introduced}(\text{Mary}, x, \text{John}) \]

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 \( c \).

13) a) \[ [\text{only}] = (\langle a, P \rangle) = 1 \text{ iff } \forall x \in \text{alt}_c(a) (P(x) = 1 \Rightarrow x = a) \]
b) \[\text{Mary only introduced } [\text{Bill}]_F \text{ to John} \] =

only (\([\text{Bill}]_F, \lambda y. \text{introduced}(\text{Mary}, y, \text{John}))\) =

\((\text{Bill}, \lambda y. \text{introduced}(\text{Mary}, y, \text{John})) = 1 \text{ iff } \forall x \in \text{alt}_c(\text{Bill}) ((\lambda y. \text{introduced}(\text{Mary}, y, \text{John}))(x) = 1 \rightarrow x = \text{Bill})\)

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.

14) a) Dr. Svenson only rejected the proposal that [John]_F submitted. (from: Rooth 1996, 281)

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

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 insitu 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 *only*, and a choice function that picks from the set of alternatives exactly the ordinary meaning of the expression. In (15) below, \( \text{alt}_c(Bill) \) creates alternatives to *Bill*; \( f_{Bill} \) is the choice function that picks out *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 *only*, and if we apply functional application to this structured meaning, we apply \( f_{Bill} \) to every instance of \( f_1 \), arriving at the unstructured meaning because \( f_a(\text{alt}_c(a)) = a \).

15) a) \[ \text{[Mary introduced [Bill]}_F \text{ to John]} = \langle f_{Bill}, \lambda f_1. \text{Mary introduced } f_1(\text{alt}_c(Bill)) \text{ to John} \rangle \]

In this way, the most recent Structured Meaning proposal (Reich 2004) explicitly includes a set of alternatives. The experiments in this paper investigate, by investigating the existence of a cognitively real set of alternatives, whether this is the correct route to take with Structured Meanings or whether perhaps Krifka’s fix better reflects a speaker/hearer’s actual processing.

Finally, Schwarzschild (1999) is another theory that, while not explicitly proposing that speakers/hearers generate sets of alternatives to focused constituents, would be compatible with sets of alternatives and may, in fact, if we look at the processing necessary to implement his theory of focus, predict that sets of alternatives are being formed. Schwarzschild relies heavily on the notion of givenness. His informal definition of GIVEN is in (16) below, and his formal definition is in (17) below.

16) 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 \( U \).
17) 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, \( \forall \langle w, g \rangle \in c \exists h[\langle A \rangle^g = \langle B \rangle^{g,h}] \)
b) if the semantic type of B is conjoinable:
\[ \forall \langle w, g \rangle \in c \exists h[\text{ExClo}(\langle A \rangle^g)(w) \rightarrow \text{ExClo}(\langle B \rangle^{g,h})(w)] \]

Schwarzschild follows Krazter (1991) in treating all focused constituents as special variables, F, that each have their own unique index (according to Kratzer’s Novelty Condition). If sentence (18) below has two focused constituents, then it would be interpreted as in (19).

18) (Who did what to the house?) [John]_F [cleaned]_F the house.
19) F₁ F₂ the house.

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, as in (18) above, are not themselves propositions. To get around this problem, Schwarzschild proposes that GIVEN compares expressions after they have undergone a process of existential type shifting. Constituents of type e are excluded from this and get a special rule for determining if they are GIVEN.

20) Existential Type Shift: ExClo (ex. 26, pg. 152)
a) If \( \omega \in D_0 \) 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 VP of a sentence like *Jane painted the house* was given, we would be searching for an antecedent to *Someone painted the house*.

The F variables are then interpreted according to two assignment functions: g and h. The assignment function g yields the standard interpretation. The assignment functions g and h together, though, yield an interpretation equivalent to leaving free variables in the location of the focused constituents.

21) (ex. 26, pg. 152)
If α is F-marked, then:
\[\llbracket [\alpha] F_n \rrbracket^{g,h} = h(Fn)\]
\[\llbracket [\alpha] F_n \rrbracket^g = \llbracket [\alpha] \rrbracket^g\]
If α has no F-marking, then:
\[\llbracket [\alpha] \rrbracket^g = \llbracket [\alpha] \rrbracket^g\] if α is not complex;
if α has components β₁…βₙ, then \[\llbracket [\alpha] \rrbracket^{g,h}\] is the result of applying the semantic rule for α to \[\llbracket [\beta_1] \rrbracket^{g,h} \ldots \llbracket [\beta_n] \rrbracket^{g,h}\]

So the verb phrase in (18) would become, after existential type shifting, the proposition in (22) under the assignment function g, h.

22) \(\exists P \exists u[P \in D_{(c,c)} \land u \in D_c \land [(P(u)(\text{the house}))]]\)

This proposition, under the definition of GIVEN in (17) can then be applied to all of the other propositions in a context, c, to see if there is an appropriate antecedent. For instance, the VP of a sentence such as *Jane painted the house* could serve as an antecedent for the VP in (18) since the
existential closure of this VP under the assignment function $g$ entails the existential closure of
the VP in sentence (18) under the assignment function $g, h$.

$$23) \text{ExClo}(\llbracket \text{painted the house} \rrbracket^g(w) \rightarrow \text{ExClo}(\llbracket \text{cleaned the house} \rrbracket^{g,h}(w))$$

$$\exists u \in D_c \land [(\text{painted}(u)(\text{the house}))] \rightarrow \exists P \exists u \in D_{\langle e,t \rangle} \land u \in D_c \land [(P(u)(\text{the house}))]$$

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

Schwarzschild’s theory then does not explicitly provide for a set of alternatives to the focused
constituent, but he does propose that people create propositions with existentially closed
variables substituted in for the focused constituents that they then compare to everything salient
and applicable to the conversation, searching for possible antecedents. Schwarzschild does not
assign a specific meaning to focus, stipulating instead only that focused items cannot be given. It
would be an easy addition to Schwarzschild’s theory to say that the meaning of focus is to
generate alternatives, perhaps according to a rule like in Alternative Semantics. There may in
fact be cognitive advantages to this addition. If speakers/hearers are actually implementing a
search for antecedents to focused items in a discourse, to make sure that the constraint against
focusing given items is not violated, then they are constantly searching enormous amounts of
material. Under this theory, antecedents can come from any previous part of the discourse,
world knowledge, current surroundings, etc. In order to conduct these searches as quickly as
possible, it shouldn’t be necessary for speakers/hearers to search everything in their long and
short term memory and surroundings, but rather to adopt a strategy where they limit themselves
to just those things that are 1) the best candidates for an antecedent and 2) most salient. The best
candidates for an antecedent are those semantic objects of the same type as the focused constituent that could serve as an alternative to it, and among the most salient objects are those under discussion in the conversation. By this strategy then, speakers/hearers, even under a theory that relies on givenness, would be generating sets of alternatives to focused constituents to aid their search for an antecedent.

In sum, we see that all major theories of focus are at least compatible with a set of alternatives determined somehow by the context, and some theories explicitly require it. The question remains though whether this is actually occurring in the mind of a listener upon hearing a focused constituent. Two notable studies have sought to answer that question; they are reviewed in the next section. The experiments in sections 5 and 7 also seek to show that the set of alternatives is cognitively real, and, crucially, extend the results of the previous studies by testing whether newly-learned, contextual relations between items help to compose the set of alternatives and whether the set of alternatives is used for all the different types of focus.

3. Previous Studies Support the Existence of a Set of Alternatives

A number of studies have shown that focusing a constituent enhances the availability of that concept and related concepts in memory (for spoken language: Gernsbacher and Jescheniak 1995, Gernsbacher and Shroyer 1989; for written language: Birch and Garnsey 1995, Birch and Rayner 1997, Carpenter and Just 1977, McKoon, Ward, Ratcliff, and Sproat 1993, Singer 1976; for recognition of referents in a pictorial display: Tanenhaus and Spivey-Knowlton 1995.). These studies, though, did not investigate whether the facilitation was due to the additional prominence, and therefore salience, that a focused word enjoys or due to a set of alternatives being generated for the focused constituent.
For the cognitive reality of the focus set of alternatives, there still exists rather minimal experimental evidence. Below I will review two studies that have investigated whether speakers actually create a set of alternatives when they hear a focused constituent: Kim et al 2010 and Braun and Tagliapietra 2009.

3.1 Kim, Gunlogson, Tanenhaus, Runner 2010

Kim et al (2010) conducted a series of eye tracking studies that provided evidence for the cognitive reality of the focus set of alternatives. The first two used almost the same procedure. Participants heard a set of sentences such as ex.(24a,b), where sentence (a) contained a set of items and sentence (b) contained the focus particle only.

24) a) Mark has candy and apples.
    b) Jane (only) has some apples.

The relationship between the items that Mark has and the items that Jane has was altered in the different experiments to investigate how the set of alternatives is composed. In the first experiment, Jane always has an item that is identical to one of the items that Mark has, as in ex.(24). This was to investigate whether previously mentioned items were considered for the set of alternatives. In the second experiment, Jane has an item that is semantically related to an item that Mark has. Specifically, the item that Mark has and the item that Jane has are of the same semantic kind. For instance, if sentence (a) was kept the same, Mark has candy and apples, then Jane might have oranges: Jane (only) has some oranges. since apples and oranges are the same semantic kind: fruit. This was to investigate whether semantic kinds were considered for the set of alternatives.
In both experiments, participants saw a display with four regions (e.g. Fig.1) and were asked to click on the item that Jane has.

![Fig. 1 Display for Kim et al (2010)](image)

The display would include (i) the actual item that Jane has (target item: *apples*), (ii) a cohort competitor for the target item (i.e., an item starting with the same sound as the target item, e.g. *axes*), (iii) a cohort competitor for the second item that Mark had (e.g. *candles*), and (iv) an unrelated distractor item (e.g. *shoes*). The logic was that when participants heard the word *only*, they would build a set of alternatives to choose the next word from. If they are using sentence (a) to build the set of alternatives, then they will want to include the items that Mark has (Experiment 1) or items related to the ones Mark has (Experiment 2) in their set of alternatives. Eye movements to objects in a display are closely timelocked to the referents that are being considered (Cooper, 1974; Tanenhaus, Spivey-Knowlton, Eberhard, and Sedivy, 1995; for a review see Tanenhaus & Trueswell, 2006), but since it takes approximately 200ms to plan and launch an eye movement (see e.g., Matin, Shao, & Boff 1993; see also Altmann & Kamide, 2004; Dahan, Magnuson, Tanenhaus, & Hogan, 2001; Saslow, 1967), participants’ looks to an object will lag slightly behind the phonological information as they hear the word. If participants are using additional information from the focus set of alternatives to determine what word is
being mentioned, they should look at “apples” faster when hearing a sentence with the focus particle *only* than when hearing a sentence without a focus particle. However, if participants are not using sentence (a) to build a set of alternatives or are not building a set of alternatives at all, participants will only be guided by the sounds that they hear. 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 *apples*, at which point, participants should be as likely to look at “axes” as “apples” (as the initial vowel is the same). In other words, if participants are building a set of alternatives when they hear *only*, they should be faster to look at the target item after hearing *only* than they would be with no focus-sensitive word in the sentence.

Kim et al found that this effect did indeed exist; 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 the set of alternatives is cognitively real. This can also be taken as evidence that speakers use previous context to build the set of alternatives. However, it should be noted that this study only made use of words from the same semantic kind that would have been associated prior to this study and so the context of the utterance was not responsible for establishing the relationship between the items. Because of this, it still remains uncertain whether the set of alternatives was being built based on context or prior knowledge about word associations.

### 3.2 Braun and Tagliapietra 2009

Braun and Tagliapietra (2009) also investigated whether the focus set of alternatives is cognitively real. They used 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, e.g.
doctor) commonly causes another word to become more salient (known as the target, e.g. nurse).

It is commonly proposed that words require a certain amount of activation in order to be produced or present in a person’s mind. 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.

Braun and Tagliapietra used two different types of targets: a contrastive associate and a non-contrastive associate. If the prime word was flamingo, then the contrastive associate would be pelican because pelican is a semantic associate of flamingo and could also be grammatically substituted for flamingo. Pink would be the non-contrastive associate because even though flamingo primes pink (they are semantic associates), pink could not be grammatically substituted for flamingo. An unrelated, non-associated word was also used. For this example, a word such as celebrity could be used.

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 (e.g., 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 the prime word (e.g. *flamingo*) with either a neutral or a contrastive accent. For contrastive conditions, the sentences containing the prime word had two clauses connected by *but* that contrasted with each other at two points. For example: *We assembled a satellite dish, but our neighbors assembled an antenna.*

Noncontrastive conditions used the same sentence, but without the first clause. For example: *Our neighbors assembled an antenna.* 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, e.g. *pelican*), (ii) a related, non-contrastive word (e.g. *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 (e.g. *pelican, pink*) should be recognized faster than the unrelated word (e.g. *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 (e.g. 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 (e.g. 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 (e.g. flamingo) was heard with a neutral intonation, both of the related words (e.g. pelican, pink) were recognized faster than the unrelated word (e.g. 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 (e.g. pink) faster than the unrelated word (e.g. celebrity), but they recognized the related contrastive word (e.g. 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. However, it should again be noted that this study, as well as Norris et al (2006), only used previously associated target-prime pairs. For example, 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 (e.g. 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. Also, this study only made use of contrastive accent. Because of this, it remains unclear whether the set of alternatives is used in non-contrastive contexts (e.g. new-information focus) and whether it is built from context.
3.3 Evidence that the Set of Alternatives Might be Built from Context

There is reason to believe that the focus set of alternatives is built not just from previous semantic knowledge as has been tested in past experiments, but also from the context of the focused utterance. First of all, this seems to be necessary for ordinary communication. For instance, if a person were to hear the word *candlestick* in an out of the blue context and was asked to state the next word that comes to mind, as in a free association task, chances are that person would produce a word like *wax*. However, if that same person were to perform the same task, but the word was now embedded in a sentence about the game of Clue such as *Professor Green killed him in the kitchen with the candlestick*, they would most likely respond that the next word that comes to mind is *revolver or rope*, the other possible weapons in Clue. The context of an utterance alters what we associate with it.

There is some experimental evidence that suggests that priming between newly learned associations might be as strong as that between previously learned semantic associations. McKoon and Ratcliff 1979, 1986 present a series of experiments showing that episodic information can be primed as readily as semantic information. The distinction between episodic memory and semantic memory was first proposed by Tulving 1972. Episodic memory receives and stores information about personal experience, temporally dated events, and temporal-spatial relations among these events, while semantic memory stores, like a thesaurus, knowledge of words, referents, and relations (Tulving 1972: 385-386). McKoon and Ratcliff conducted seven lexical decision tasks and one episodic memory task. In these experiments, participants were

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3 Whether it is only the linguistic context of an utterance (e.g. the discourse) or also the extra-linguistic context (e.g. the physical location of the speakers) that influences the set of alternatives remains still an open, and untested, question. The experiments in this paper will look only at how the linguistic context influences the formation of the set of alternatives, but it is entirely possible that the extra-linguistic context also influences how speakers/hearers build the set of alternatives.
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, he/she 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 an episodically related word pair being tested. This indicates that episodic priming is automatic under the definition provided by Posner and Snyder 1975a,b. If episodically related words can be primed as well as semantically associated words, then it seems highly likely that words related to a focused constituent only by the episodic circumstances of an utterance can also be included in the focus set of alternatives.

4. **Experiment 1**

The focus set of alternatives, as has been shown, is ubiquitous in semantic theories for the meaning of focus. It is therefore extremely important for theories of focus that the set of
alternatives exists. If it were to be found that language users were interpreting focus via some other mechanism, a great deal about our current understanding would need to be amended.

Three previous studies have provided evidence that the focus set of alternatives exists in the minds of language users, but this is still a very limited body of research to support such an important mechanism. As such, the first goal of Experiment 1 is to replicate the results of previous studies and provide additional evidence that the set of alternatives for a focused constituent exists as predicted.

The second goal of Experiment 1 is to test whether the set of alternatives can be built dynamically from the linguistic context of the utterance, instead of relying on previously learned 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. The veracity of an utterance with a focused constituent is evaluated according to the set of alternatives. It is therefore important to know what information a language user is relying upon when building the set of alternatives in order know when a language user would judge an utterance to be true or false.

4.1 Method and Materials

4.1.1 Participants

Data from forty-two native speakers of English was included in the final analysis. They were naïve to the purpose of the study.

4.1.2 Materials and Design
Thirty sets of four sentences and a target word were composed as the experimental materials. All stimuli were written, not spoken. Together, the four sentences told a short narrative, as illustrated in ex. (25).

25) (a) Little Martin pretends to be a sergeant, a scientist, and a lieutenant.
(b) He wants to have these careers when he grows up.
(c) Last Christmas, he got a new costume as a present.
(d) For the next two weeks, he pretended to be <Prime Word here>.

Target Word: sergeant

Sentence (a) introduced a set of three common household items. The first item was the target word (e.g. sergeant), the second item (e.g. scientist) 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 (e.g. lieutenant). Association was defined using the South Florida Free Association Norms (Nelson, McEvoy & Schreiber 1998). Associated words had a forward cue-to-target strength of .08-.25\(^4\). 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, lieutenant-sergeant has a forward cue-to-target strength of .08, meaning that when given the word lieutenant, 8% of the people in a group responded sergeant. 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.

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\(^4\) 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.
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. The prime word was bare or focused with *only*. We also manipulated the association between the prime word and the target word: (i) **Associated**: The prime was an associate of the target word (e.g. *bolt* if the target is *lock*). (ii) **Unassociated**: The prime was not associated with the target word but included in the set from the first sentence (e.g. *scientist*). (iii) **Unmentioned**: The prime is not associated with the target word and not in the set from the first sentence (e.g. *policeman*). Thus, by manipulating **Focus** (presence vs. absence of ‘*only*’) and **Relatedness** (associated, unassociated, unmentioned), we created six conditions, shown below:

26) For the next two weeks, he pretended to be…

   (i) Focused, associated: *only a lieutenant*
   
   (ii) Unfocused, associated: *a lieutenant*
   
   (iii) Focused, unassociated: *only a scientist*
   
   (iv) Unfocused, unassociated: *a scientist*
   
   (v) Focused, unmentioned: *only a policeman*
   
   (vi) Unfocused unmentioned: *a policeman*

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. 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.

4.1.3 Procedure

We used a lexical decision task. All stimuli were presented in writing on a computer screen. 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 with the article and only, if in the focused condition, all at once (e.g. only a scientist).

The participant pressed the spacebar when he/she 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. 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 the onset of the target word to when the participant pressed ‘f.’
There were also four comprehension questions evenly spaced throughout the experiment. All participants included in the final analysis answered at least three of the four questions correctly.

4.2 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 Figure 2. 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 3. This corroborates prior work which found that focus increases the priming effect. 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) = $

![Fig. 2 Reaction time for all experimental conditions.](image)
3.06, p₂ = .063). Thus, participants’ RTs were influenced by the nature of the relation between the prime and the target. There was no significant interaction between focusing and the relationship between the prime and the target (F₁(2, 40) = .933, p₁ = .402; F₂(2,28) = .606, p₁ = .553).

To investigate which differences in the relatedness factor were driving the main effect, t-tests were run comparing the associated and the unassociated condition to the unmentioned condition, both when focused and when not focused (e.g. a scientist vs. a policeman; only a scientist vs. only a policeman, see Figure 1). T-tests comparing the focused version of each prime to its unfocused version were also run (e.g. a scientist to only a scientist). The overall RTs, collapsing the focused and unfocused conditions, are shown in Figure 4. Three significant or marginal effects were found:
The focused, unassociated condition (e.g. *only a scientist*) was significantly faster than the focused, unmentioned condition (*only a policeman*) \((t_1(41) = -3.2, p_1 < .05; t_2(29) = -2.2, p_2 < .05)\). This indicates a priming effect for items associated to the target only by the context (nails had been mentioned in the context set). This is evidence that context, not just previously learned semantic associations, is used when building the set of alternatives for a focused constituent.

The unfocused, associated condition (*a lieutenant*) was significantly faster than the unfocused, unmentioned condition (*a policeman*) by subject but not by item \((t_1(41) = -2.1, p_1 < .05; t_2(29) = -1.35, p_2 = .187)\). 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, the focused, unassociated condition (*only a scientist*) was significantly faster than the unfocused, unassociated condition (*a scientist*) by item \((t_2(29) = -2.29, p_2 < .05)\) and marginally faster by subject \((t_1(41) = -1.8, p_1 = .076)\). 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 given. 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. This is consistent with other work on priming newly learned associations (McKoon & Ratcliff 1979).
There was no effect found for unfocused unassociated (*nails*) vs. unfocused unmentioned (*lamp*) (\(t_1(41)=-1.41, p_1=.17; t_2(41)=-1.09, p_2=.28\)) or, interestingly, for focused associated (*only a bolt*) vs. focused unmentioned (*only a lamp*) (\(t_1(41)=-.543, p_1=.59; t_2(41)=-.17, p_2=.87\)) or unfocused associated (*a lieutenant*) vs. focused associated (*only a lieutenant*) (\(t_1(41)=-.139, p_1=.89; t_2(41)=.04, p_2=.97\)). Unfocused unmentioned (*a policeman*) vs. focused unmentioned (*only a policeman*) was marginal by subjects but not by items (\(t_1(41)=-1.78, p_1=.082; t_2(41)=-1.19, p_2=.24\)).

4.3 Discussion

Our lexical decision experiment confirmed prior findings that the presence of focus speeds up word recognition (Kim et al. 2010, Braun and Tagliapietra 2009, Norris et al. 2006). Importantly, we also found that unassociated primes (e.g. *only a scientist*) primed the target at least as well as related primes (e.g. *only a lieutenant*) in the focused condition. In other words, focused primes related to the targets only by context (rather than long-term, learned 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 the context of the utterance, are used in the set of alternatives.

Thus, our study provides evidence from an English lexical decision task for the cognitive reality of the set of alternatives being constructed dynamically from the context.

Finally, this study has methodological significance because the results were achieved with written materials. Prior work (Fodor 2002) has shown that readers often impose ‘silent prosody’ when they are reading. Thus, our materials may have received such silent prosody from the comprehenders, but, crucially, the participants created this prosody themselves based on the
contrastiveness of the sentence and were not given any explicit prosodic cues. Other results showing a set of alternatives for focused constituents (Braun and Tagliapietra 2009, Norris et al 2006) have been obtained with cross-modal studies where the participant hears the focused constituent, usually spoken with a contrastive accent. In contrast, our study relied on the word *only* in written materials. This helps to show that the focus effect, whereby related contrastive words are more activated/salient, is not just the result of a prominent accent, but of contrastiveness itself.

Experiment 1, though, only looked at one type of focus, that which associates with the focus particle *only*. Beaver and Clark (2008) referred to this as strong focus because alternatives to the focused constituent are required in order to interpret the definition of *only*. It still remains an open question whether other types of focus also make use of a set of alternatives. Experiment 2 will look at whether constituents focused by a contrastive accent, lexical newness, and referential newness also invoke a set of alternatives.

5. Types of Focus

There is a great deal of debate in the literature as to whether there are multiple types of focus or just one type of focus. Many researchers have argued that focus needs to be split into at least two different types. They include Cowles (2003), É Kiss (1998), Féry and Ishihara (2010), Hayes and Lahiri (1991), Katz and Selkirk (2009), Koch (2008), Selkirk (2008), Steedman (2000), Zerbian (2006), and Zubizarreta (1998). These authors all minimally distinguish between a type of focus associated with contrast or identification, called here contrastive focus, and a type of focus associated with new information being introduced into a discourse, called here new-information focus. Katz and Selkirk (2009) found that, in English, contrastively
focused items were prosodically distinguishable from new-information focused items. É Kiss (1998) argues that Hungarian has a syntactic position at the beginning of an utterance for contrastive focus, but not for new-information focus. Zubizarreta (1998) shows that many languages, including Spanish, German, and English, use deaccenting or the movement of non-focused material in order to align contrastively focused constituents, but not new-information focused constituents, to the nuclear stress, and Cowles (2003) presents ERP evidence that participants process contrastive focus differently than new-information focus.

However, this view is by no means agreed upon. Proponents of focus being a single phenomenon include Brunetti (2003), Büring (1997, 2006), Gussenhoven (1984), Karttunen and Peters (1979), Roberts (1996), Rooth (1985, 1992), Selkirk (1984), and Schwarzschild (1999). Selkirk (1984) failed to find any prosodic differences between contrastive focus and new-information focus in English. Roberts (1996) presents a way of interpreting focus that works neatly for both contrastive focus and new-information focus. Schwarzschild (1999) argues that the placement of pitch accents can be best explained by appealing to only the given-new distinction, and Brunetti (2003) shows that Italian does not seem to have any syntactic position for contrastive versus new-information focus nor does it seem to distinguish prosodically between different types of focus.

It remains then still very much an open question whether focus can be said to be a single, unified phenomenon or several different phenomena. Experiment 2 will build on the results of Experiment 1 and look at whether four different phenomena that have been referred to as focus, make use of a set of alternatives. Most of these authors listed use slightly different definitions for contrastive focus versus new-information focus when they reference the possible distinction; however, all of their definitions agree that contrastive focus uses a set of alternatives, but
information focus does not. It would therefore be important to establish whether different types of focus do or do not make use of a set of alternatives in order to establish whether these different types are interpreted the same. If they all do seem to be using a set of alternatives, then it is possible that these different types of focus are all manifestations of the same phenomenon. However, if only contrastive focus seems to be making use of a set of alternatives, then it can be said that contrastive focus and new-information focus are fundamentally different. It is, therefore, important to establish whether the set of alternatives is present for all types of focus.

6. Experiment 2

Experiment 1 showed that the focus set of alternatives is cognitively real, but only focused on one type of focus: contrastive focus associated with *only*. Experiment 2 expanded the results of Experiment 1 by investigating whether other types of focus also evoke a set of alternatives.

6.1 Design and Procedure

6.1.1 Participants

Data from forty native speakers of English was included in the final analysis. They were naïve to the purpose of the study. Data from three participants was replaced because they had six or more data points that were more than three standard deviations from the overall mean reaction time. These participants were excluded, unlike in the first experiment, because these six data points were unevenly distributed to favor a particular condition so that the data for one condition was completely missing.
6.1.2 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 Experiment 1, but, unlike Experiment 1, the last sentence containing the prime word was spoken. The context sentences, that didn’t contain the prime, were written because they were easier to control in a written form. 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 and two types of new-information focus were compared to a given condition that was neither contrastively focused nor new-information focused. This made for five conditions. In the contrastive focus conditions, the prime word was either focused with a contrastive pitch accent or by association with *only* as in Experiment 1. Example (27a) below is an example of a contrastive pitch accent condition, and example (27b) is an example of an association with *only* condition. The words in both of these items were almost identical\(^5\) to the given condition (27e). The only difference was whether the prime word was contrastively focused. This was done for two reasons. Firstly, it was done so that the contrastive conditions could be said to be entirely given and wouldn’t be confused at all with the new-information conditions. Secondly, it 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*.

\(^5\)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. 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.* For the other items, see Appendix C. With the exception of the negation, the contrastive conditions and the given conditions had the same words.
In the new-information focus conditions, the prime word was either lexically new or referentially new. In the lexically new condition (27c below), the first sentence introduces that an object exists, but does not specify what that object is, so that, while the object exists throughout the entirety of the item, the object is not named until the prime word at the end of the third sentence. Furthermore, the prime word does not appear in this item referring to any other object so that when the prime word is introduced, the lexical word is entirely new. In the referentially new condition (27d below), the first sentence introduces the lexical item that will be the prime word in the third sentence, but the lexical word refers to a different object than what the prime word will refer to. For instance, in (27d), *bolt* refers to an object on a fixture that Christina’s roommate bought while *bolt* when it is used for the prime word refers to an object that Christina bought to fix her front entrance. In this way, the lexical item is introduced, but not the object so that when the prime word is introduced, the reference of the prime word is entirely new.

(27) Five Conditions

a) contrastive accent:

Christina bought a bolt. Christina fixed her front entrance. So she bought a *bolt.*

b) contrastive with only:

Christina bought a bolt. Christina fixed her front entrance. So she bought *only* a bolt.

c) lexically new:

Christina bought something. Christina fixed her front entrance. So she bought a *bolt.*

d) referentially new:
Christina’s roommate bought a fixture with a strange bolt. Later, Christina fixed her front entrance. So she bought a bolt.

e) given:

Christina bought a bolt. Christina fixed her front entrance. So she bought a bolt.

Many authors going back to Pierrehumbert (1980) and Jackendoff (1972) have claimed that a L+H* pitch contour is associated with contrastive focus\(^6\), and 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. Katz and Selkirk (2009) found additionally 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, items contrastively focused with a contrastive accent had a very prominent L+H* pitch contour on the prime word, according to the author’s intuitions. (Further acoustic analysis will be necessary to confirm these intuitions.) Items contrastively focused by association with only had a very prominent L+H* pitch contour on the word only. It was 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.

Items that were new-information focused had a less prominent H* pitch accent on the prime word, again: according to the author’s intuitions. Additionally, as there is evidence that accenting may or may not indicate a new item, but deaccenting robustly indicates a given item (see for example Schwarzschild 1999), the sentence containing the new-information focus was

\(^6\) Although there have also been claims that other accents are also associated with contrastive focus. See, for example, Watson et al 2008 where it is claimed 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.
deaccented until the prime word. The same sound file was used for both lexically new information focus and referentially new information focus because there are no prosodic studies yet looking at the difference between lexical newness and referential newness. (see Appendix 1 for the pitch track of an example item)

The given condition was neither contrastively focused nor new-information focused so it was entirely deaccented, with a low pitch through the entire sentence. It should be noted that there are many definitions of givenness. For instance, Schwarzschild (1999) defines givenness according to existential closure as explained in Section 2. 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 as in Clark and Haviland (1977). In the given condition used here, the third sentence directly repeats the first sentence after the connective so that should indicate a relationship between the third sentence and the previous two. In this way, the prime word should be given by any of these definitions. It is inferable, previously evoked, predictable, already present to the hearer, and its existential closure has an antecedent.

6.1.3 Procedure

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. 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. After a 250 ms pause, the target word 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. Participants had to answer at least six of them correctly to be included in the experiment.

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 on the given condition and any condition that the participants are interpreting using a focus set of alternatives. Specifically, based on the results of Experiment 1, Braun and Tagliapietra (2009) and Norris et al. (2006), 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; participants should be including the target word in their set of alternatives for the focused constituent so that it is already activated when they have to access its lexical form in order to declare that it is a real word of English. It is anticipated that the two contrastive focus conditions will pattern together as will the two new-information focus conditions. If contrastive focus is interpreted with respect to a focus set of alternatives, but new-information focus is not, then the contrastive only condition and the contrastive accent condition should be significantly faster than the given condition, the lexically new condition, and the referentially new condition, but the lexically new and referentially new conditions should not differ significantly from the given condition. If, though, new-information focus is also interpreted with respect to a focus set of alternatives, then the lexically new condition and the referentially new condition in addition to
the contrastive only condition and the contrastive accent condition should be significantly faster than the given condition, but they should not differ significantly from each other.

It should also be noted that there is a possibility in Experiment 2 that conditions that used a set of alternatives will be slower than conditions which did not, unlike in Experiment 1 where conditions that used a set of alternatives were faster. This is because the target word and the alternatives to the target word were provided in Experiment 1, but not in Experiment 2. In Experiment 1, the target word was presented in the linguistic context in a list with two other objects (ex: lock was presented in a list with bolt and nails in the first sentence Christina wants to buy a lock, nails, and a bolt). When the participant generated a set of alternatives, the participant minimally included in their set these other objects. Also, it can be known that these other objects were appropriate to the context because they were already part of the linguistic context. However, Experiment 2 doesn’t have any previously mentioned items that could be part of the set of alternatives for the prime word. It is, therefore, less predictable what objects the participant will be including in the set of alternatives. If the participant generates a set of alternatives that doesn’t include the target word, then suddenly encountering the target word could cause a conflict between the target and the participant’s expectations. This could result in a slowdown for conditions with a set of alternatives.

6.2 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 for Experiment 2 are in figure (5) below.
The given condition was used as a baseline for the lexical decision task. 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 Experiment 1, the contrastive only condition caused participants to respond to the target word significantly slower than they did to the given condition ($t_1(39) = 2.69, p_1 < .05; t_2(29) = 2.31, p_2 < .05$). Additionally, 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 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 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 ($t_1(39) = .47, p_1 = .64; t_2(29) = .35, p_2 = .72$). Neither of the new-information focus conditions were significantly
different from the given condition (lexically new: \( t_1(39) = -0.08, p_1 = .94; t_2(29) = -0.10, p_2 = .92 \)) (referentially new: \( t_1(39) = 0.72, p_1 = .48; t_2(29) = 0.69, p_2 = .50 \)).

6.3 Discussion

The most interesting thing about the results of Experiment 2 is that the contrastive only condition, which caused participants to be significantly faster than in the non-contrastive conditions in Experiment 1, caused the participants to be significantly slower than the non-contrastive conditions in Experiment 2. This slowdown though can still be interpreted as evidence for the contrastive set of alternatives for two reasons.

The first reason is that compiling a set of alternatives likely does involve additional processing. Cowles (2003) ran an ERP study investigating the difference between contrastive focus and information focus. Participants read either a contrastive focus context, as in (28a) below or an information focus context, as in (28b).

28a) Contrastive Focus Context for Cowles 2003

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 (8a) was capable of generating a set of alternatives for just the word *butcher*. This is because the context in (8a) saliently introduces a set of alternatives to *butcher*, and the alternative set in (8b) 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 (8a), 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.

The second reason for the slowdown in Experiment 2 is that the target word may not have been included in the participant’s set of alternatives for the focused word, and so the slowdown may be the result of a conflict between the participant’s set of alternatives and the target word.
This would explain why presence of *only* resulted in faster reaction times in Experiment 1, but slower reaction times in Experiment 2. In Experiment 1, the objects that the participants included in the set of alternatives were given in the item. For instance, if the participants read, in Experiment 1, *only a bolt*, they would include *nails* and *lock* in their set of alternatives because these were previously mentioned as part of the same set as *bolt*. Kim et al (2010) showed that items previously mentioned in the linguistic context of a focused constituent are included in the set of alternatives. However, because Experiment 2 manipulated newness, it could not provide the alternatives for the participant, and instead had to rely on participants using semantic associates to build the set of alternatives. Unfortunately, though, this meant that not all of the targets were the most likely continuations of the context. For instance, in the example item provided in (7), if Christina is fixing her front entrance, it is more likely that she bought a door or a doorframe or a new rug than it is that she bought a lock. Participants’ set of alternatives might have been {door, doorframe, rug}, and so they were unprepared for *lock*. Other examples demonstrate this even better. In one of the items, the final sentence is *Little Martin pretended to be a lieutenant* and the target word is *sergeant*. A sergeant is an odd thing for a young boy to pretend to be. It is more likely that the participants’ set of alternatives for the focused word *lieutenant* included words like *firefighter, policeman, teacher*. Particularly in light of the results from Experiment 1 showing that the set of alternatives is built from context, this should be investigated further.

For these reasons, a significant slowdown in Experiment 2 can be interpreted as evidence that the participants were using a set of alternatives to interpret the focused constituent. In this case, Experiment 2 confirmed the results of Experiment 1 showing again that participants do seem to generate sets of alternatives for constituents focused by *only*. It also showed a difference in
types of focus. Participants were slower to recognize target words when the prime word was contrastively focused with *only* than they were when the prime word was new-information focused. This indicates that participants were generating a set of alternatives for the contrastively focused constituent, but not for the new-information focused condition. This supports theories that differentiate between contrastive focus and new-information focus.

Interestingly, the condition where the prime word was contrastively focused with a contrastive pitch accent was not significantly faster or slower than any of the other conditions, even though this is the condition that directly replicates the Braun and Tagliapietra (2009) results. There are three possibilities for why this is so.

The first possibility, as always when the null hypothesis is the result, is that this is simply the result of a flaw in the experiment itself. The pitch accent may not have been extreme enough (see Appendix A); there weren’t enough participants run; etc.

The second possibility is that the type of focus that associates with *only* is not the same as the type of focus indicated by a contrastive pitch accent. Clark and Beaver (2008) suggest that focus indicated by a contrastive pitch accent is weak focus while the focus that associates with *only* is strong focus, by virtue of the set of alternatives being a part of the definition of *only*. In this case, it might then be that weak focus does still generate sets of alternatives, but the set of alternatives of a weak focus is more easily amended to include unexpected items, like the target word, than the set of alternatives of a strong focus. It could also be that weak focus does not generate sets of alternatives, but this doesn’t seem likely in light of the results of Braun and Tagliapietra (2009), Kim et al (2010), and Norris et al (2006).

The third possibility is that the contrastive accent condition was less sensitive to the target word not being in the participants’ initially generated set of alternatives for some other, and
possibly unsystematic, reason. It should be observed that the contrastive accent condition was
trending in the same direction as the *only* condition. In this case, it would be important to run
this study again with target words that were more appropriate to the context.

The important thing to observe for Experiment 2 is that it did support that contrastive focus,
at least as used by the focus particle *only*, causes participants to generate sets of alternatives, but
that new-information focus does not appear to.

### 7. Conclusion

This paper set out to answer three questions:

1) Is the focus set of alternatives cognitively real? (aka: Do hearers actually build a set
   of alternatives when they encounter a focused constituent?)

2) How is the set of alternatives built?

3) If the set of alternatives is cognitively real, do hearers build it for all types of focus or
   only some types?

Experiment 1 and Experiment 2 both provide evidence that the focus set of alternatives is
cognitively real. Participants in Experiment 1 were faster to respond to a target word when the
prime word was focused than when the prime word was unfocused. Participants in Experiment 2
experienced a greater processing load, causing slower responses, when the prime word was
focused by *only* than when the prime word was unfocused (in the given condition). Both of these
results indicate that participants are building sets of alternatives for focused constituents that
associate with *only*. In Experiment 1, the faster speed would be because the target word was
included in the set of alternatives the participants built when they heard the focused prime word.
In Experiment 2, the slower speed would be because of the higher processing demands of the
focused prime, most likely as a result of the target word conflicting with the set of alternatives the participant had already built.

As for the second question, how is the set of alternatives built, Experiment 1 provided a partial answer. In Experiment 1, primes that were only related to the target word by virtue of being included in the same list as the target in the linguistic context were able to induce faster reaction times to the target word. Additionally, these context associated prime-target pairs were sensitive to the focus manipulation. Participants were faster to respond to the target when the context associated prime was focused than when it was not. More research though into how the set of alternatives is built is definitely needed. For instance, is the set of alternatives a closed set or can new material be accommodated into it? Is it a fixed set of specific items or a general category title? Is it built automatically or as a result of higher level processing? These questions and many more remain to be answered.

Experiment 2 began to answer the third question: do participants built a set of alternatives for all types of focus? In Experiment 2, participants were significantly slower to respond to targets when the prime was contrastively focused with only than when the prime was new-information focused. This shows that speakers build a set of alternatives for focused constituents that associate with only, but that they do not build a set of alternatives for new-information focused constituents. Additional work, though, needs to be done to determine if speakers build a set of alternatives for constituents that are contrastively focused by pitch accent. Also, while this study is significant evidence that strong contrastive focus is different from new-information focus, it is by no means conclusive. Much work still remains to be done showing that new-information focus and contrastive focus differ in other respects.
References


**Appendix A: Discussion of pitch accents for the third sentence of Experiment 2**

In Experiment 2, the pitch accents in different conditions were reliably different from one another in a way consistent with the literature. Four measurements were made on each item: **maximum pitch, pitch rise, duration, and preceding pitch range.**

**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*. It was measured for the period beginning with the onset of the stressed syllable to either the onset of the following syllable or the beginning of silence if the prime word was one syllable long. The purpose of this 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) or the new conditions (t(29)=12.35, p<.001). Also, the maximum pitch in the *only* condition was significantly higher than in the given condition (t(29)=8.27, p<.001) and in the new conditions (t(29)=6.20, p<.001). There was no significant difference between the contrastive accent condition and the *only* condition (t(29)= -.39, p=.701). This shows that the contrastive conditions did have a higher pitch than the given
condition, as would be consistent with it having an H* accent. The contrastive conditions also had a higher pitch than the new conditions, as is consistent with Katz and Selkirk’s observations. The maximum pitch in the new conditions was significantly higher than in the given condition ($t(29)=-5.56, p<.001$), as would be consistent with an H* accent on the new conditions. The maximum pitch on the items can be said to conform with the expectations from the literature.

<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>new</td>
<td>192.7423333</td>
</tr>
<tr>
<td>only</td>
<td>208.564</td>
</tr>
</tbody>
</table>

**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 ($\text{max pitch} - \text{beginning pitch} = \text{pitch rise}$). The maximum pitch was the same measurement as was reported in the previous section. The beginning pitch was measured at the onset of the stressed syllable, or, if the stressed syllable began with an unvoiced consonant, at the end of the syllable preceding the stressed syllable. In the rare case that both the onset of the stressed syllable and the coda of the preceding syllable were unvoiced, it was measured from 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 pitch rise was significantly different for every condition. The contrastive accent condition had the greatest pitch rise. It was significantly greater than the given condition ($t(29)=8.14, p<.001$), the new conditions ($t(29)=11.09, p<.001$), and also the *only* condition ($t(29)=-4.24, p<.001$). As the *only* condition also had a lexical cue to its contrastiveness, less stress might have been necessary. The *only* condition, though, still had a significantly greater pitch rise than the new conditions ($t(29)=2.74, p<.05$) and the given condition ($t(29)=3.67, p<.01$). The new conditions had a greater pitch rise than the given condition ($t(29)=-2.39, p<.05$). Both Katz and Selkirk and Watson et al described the contrastive condition has having a greater pitch rise than the new condition. Additionally, the
new condition, by virtue of having an L+H* or H* pitch, should have a greater pitch rise than the neutral given condition. We see that all of these characterizations were present in the items that the participants heard.

<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>new</td>
<td>13.019</td>
</tr>
<tr>
<td>only</td>
<td>21.95066667</td>
</tr>
</tbody>
</table>

**Duration:** The duration of the stressed syllable was also measured. For every condition, 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, like in the other measurements, 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.

We found, again, significant differences between the conditions. The prime in the contrastive accent condition was significantly longer than in the new condition (t(29)=4.49, p<.001), the given condition (t(29)=6.44, p<.001), and the only condition (t(29)=4.42, p<.001). The prime in the new condition was significantly longer than in the given condition (t(29)=2.43, p<.05), and the prime in the only condition was also significantly longer than in the given condition (t(29)=2.73, p<.05). The prime in the new condition and in the only condition were not different (t(29)=.419, p=.679). As would be predicted by Katz and Selkirk, it was found that the prime in the contrastive accent condition was longer than in the new conditions. The primes in the new conditions were longer than in the given condition, as would be expected if the primes in the new conditions were emphasized more than the primes in the given condition. The prime in the only condition might be less emphasized than in the contrastive accent condition because, even though the prime in the only condition does appear to be emphasized, being longer than in the given condition, the prime was the only logical choice to associate with only. The prime was the
only contentful word after the word *only*. It would therefore not be necessary to differentiate the prime from the other words in the sentence with a contrastive accent.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Duration (Seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>con accent</td>
<td>0.441563333</td>
</tr>
<tr>
<td>given</td>
<td>0.362966667</td>
</tr>
<tr>
<td>new</td>
<td>0.39015</td>
</tr>
<tr>
<td>only</td>
<td>0.395876667</td>
</tr>
</tbody>
</table>

**Preceding Pitch Range:** The preceding pitch range was measured from the beginning of the utterance to the beginning of the onset of the stressed syllable in the prime. For the *only* condition, the preceding pitch range was measured from the beginning of the utterance to the beginning of the word *only*. It has been claimed, most notably by Schwarzschild (1999), that newness is not marked by accenting, but by all given material being de-accented. Unfortunately, the experiment was not designed that we can compare the preceding pitch range of the new conditions to another condition that we know shouldn’t have deaccenting, but we can note that the preceding pitch range was significantly smaller in the new conditions than in the contrastive accent condition (t(29)=2.29, p<.05), but only marginally, not significantly, larger than the preceding pitch range in the given condition (t(29)= -1.958, p=.06). As the preceding pitch range of the contrastive accent condition was also significantly larger than the given condition (t(29)=4.86, p<.001), this suggests that there was no pitch compression in the contrastive accent condition before the prime word in the contrastive accent condition, but there was some pitch compression in the new conditions, as would be expected for given material.

The preceding pitch range for the *only* condition did not differ significantly from any of the other conditions (given: t(29)=1.93, p=.064; new: t(29)=.83, p=.413; contrastive accent: t(29)= - .40, p=.693). This is not exactly as the literature would lead us to expect, as the new conditions did still have a larger preceding pitch range than the given condition, but it is close.
Discussion

We see from the acoustic analysis that the items the participants heard did indeed differ from each other significantly, and in the direction that we would expect, given studies such as Katz and Selkirk (2009) and Watson et al (2008). The contrastive accent condition had the highest maximum pitch, the greatest pitch rise, the longest duration, and no pitch compression preceding the prime word. The *only* condition has almost the exact same maximum pitch as the contrastive accent condition, the second greatest pitch rise, and a longer duration than the given condition. The new conditions had a greater maximum pitch, pitch rise, and duration than the given condition but not as great as the contrastive accent condition, and some pitch compression preceding the prime word. Finally, the given condition had the lowest maximum pitch, the smallest pitch rise, the shortest duration, and the most pitch compression preceding the prime word. From this, we can say that the items participants were presented with accurately represented the pitch contours the literature would expect for the different conditions.
Example pitch accents
Contrastive Accent

So               she        bought    a   bolt.

Given

So  she  bought  a  bolt.
New (referential and lexical)

Contrastive with ‘Only’

Appendix B: Items for experiment 1

(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)
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 conductor.
For the next two weeks he pretended to be only a conductor.
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 C: Items for Experiment 2

(last sentence presented auditorily)

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

3) 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.

4) 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.

5) 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.

6) 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.

7) 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.

8) Mouse

9) 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.

10) 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.

11) 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.

12) 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.

13) 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.

14) 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.
Pауla 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.

15) 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 gum.
Carmen gave away gum. Carmen needed raffle prizes. So she gave away gum.
Carmen gave away gum. Carmen needed raffle prizes. So she gave away gum.

16) 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 a tag.
Tina used a tag. Tina was organizing her desk. So Tina used a tag.

17) 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 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.

18) 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.

19) 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 a zipper.
Emily sewed a zipper. Emily designed a simple skirt. So she sewed a zipper.

20) Singer
Jackie’s father worked as a coach before becoming a dancer. Later, Jackie went to New York. So she worked as a dancer.
Jackie worked as something. Jackie went to New York. So she worked as a dancer.
Jackie worked as a dancer. Jackie went to New York. So she worked as a dancer.
Jackie worked as a dancer. Jackie went to New York. So she worked as only a dancer.
Jackie worked as a dancer. Jackie went to New York. So she worked as a dancer.
21) 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 a violin.
Ted lost a violin. Ted wasn't moving. So he lost only a violin.
Ted lost a violin. Ted wasn't moving. So he lost a violin.

22) 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 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.

23) 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.

24) 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.

25) 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 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.

26) 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 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.

27) Angel
Mandy's priest said he believes in the intercession of saints. Later, Mandy read a book on religion. So she believes in saints.
Mandy believes in something. Mandy read a book on religion. So she believes in saints.
Mandy believes in saints. Mandy read a book on religion. So she believes in saints.
Mandy believes in saints. Mandy read a book on one religion. So she believes in only saints.
Mandy believes in saints. Mandy read a book on one religion. So she believes in saints.

28) 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*.

29) 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*.

30) 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*.

31) 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 only a walnut.

Mitch used a walnut. Mitch was decorating cupcakes. So he used a *walnut*.

32) 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*. 