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Predicting contrast in sentences with and without focus marking

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Abstract

How do we know when a contrast is coming? This study explores the prediction of parallel contrastive phrases, especially NPs, in sentences with and without overt focus marking. A written sentence-completion questionnaire with clauses followed by the conjunction “but” compared unmarked initial clauses to ones with the focus marker “only” on the subject or object. Both conditions with “only” elicited more contrasts overall than the condition without focus marking, and many of the contrasts were with the focus-marked NP. While the baseline (no-only) condition had full clauses for half of the completions, subject focus increased clausal completions and object focus increased negative ellipsis completions (“not”+NP structures), both changes in syntax which make a contrast with the marked NP easy. The production of negative ellipsis sentences primarily in the object-focus condition suggests that the object bias of these sentences in comprehension could relate to their being used more frequently with this meaning. Finally, the overall pattern of results shows that overt marking of contrastive focus increases continuations with contrasts, and the conjunction “but” does not reliably predict explicitly-stated contrasts within a sentence without overt focus marking.

Keywords

contrast; focus; ellipsis; conjunctions; information structure

1. Introduction

This study explores how often explicit contrastive alternatives are produced after a clause and a contrastive conjunction (*but*), through a written completion study of sentences like (1). To see how overtly marked focus affects the production of contrasts, the conditions varied the presence and placement of the focus marker *only* on the first-clause subject or object.

(1) On Monday (only) the smuggler followed (only) the gangster through the city,
but...

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This study follows up research on the comprehension of related ellipsis structures by exploring when contrast is expected and how overt focus changes these expectations. Specifically, Carlson (2013) studied the processing of bare argument ellipsis versions of these sentences (i.e., *On Monday (only) the smuggler followed (only) the gangster through the city, not the thief*), and found both an object bias and effects of the position of focus markers. This study also explores whether the use of *but* in the contrast discourse relation is preferred over other discourse uses, and whether its use is influenced by focus marking.

1.1 The particle *only*, *but*, and contrast

Focus shows how information in a sentence relates to the surrounding linguistic and real world context, and can be indicated in English by means of prosody (accents), focus particles like *only*, and syntactic structures (e.g., clefting, preposing). Any sentence, with or without a focus marker, has a focus. This governs where the sentence would generally be accented (Cinque, 1991; Selkirk, 1984). For a simple sentence like (2a), focus would likely be on the object, leading to accenting of *pork*. *Only* is a focus particle that indicates contrastive focus on a constituent, as well as indicating exhaustivity (Kadmon, 2001; Kiss, 1998; Rooth, 1992). For example, a sentence like (2b) indicates that of some contextually relevant group of eaters, the only one that ate the pork was the dog.

(2)

- a. The dog ate the pork.
- b. Only the dog ate the pork.

As this example shows, *only* divides entities into two groups: the single stated item that fits the criteria of the rest of the sentence, and the remaining items which do not.

According to some theories, contrastive focus (as marked by *only*) is distinct from informational focus, which occurs on the new information in a sentence, because contrastive focus can appear on both given and new information (Kiss, 1998). Additionally, all sentences are required to have at least one informational focus, but contrastive focus is optional. Other theorists believe that contrastive focus is just a particular use of focus, relating to its context, but not a distinct semantic category (Rooth, 1992; Schwarzschild, 1999). Semantic interpretation of focus involves the generation of alternative propositions with the focused item replaced by alternatives: i.e., for (2b), (x ate the pork) for all contextually relevant values of x (Kadmon, 2001; Rooth, 1992). In this study, *only* is always placed on an NP and does not involve the type of positional ambiguity that appears in ‘association with focus’ situations (Rooth, 1992).

Turning to the conjunction *but*, we follow several theorists in positing that it has several identifiable uses. Izutsu (2008)’s discussion of opposition relations distinguishes three uses of this conjunction: contrast, concessive, and corrective (though since correctives have a syntactic structure inconsistent with those in this study, they will not be considered further). In Izutsu’s contrast relation, the clauses joined by *but* must be comparable in structure, and also have distinct compared items or phrases which can contrast with each other because they are mutually exclusive but within the same cognitive/semantic domain. For example, *a drink* and *a martini* cannot contrast because martinis are a sub-type of drinks; on the other

hand, *a drink* and *a carburetor* do not contrast easily because they share so few features and are unlikely to relate to any particular predicate in similar ways. Kehler (2001), in his inventory of discourse relationships, similarly labels this use of *but* as illustrating a Contrast relationship between clauses. Kehler considers Contrast to be a subtype of the general category of Parallel discourse relations, which are identified by finding specific parallel arguments or predicates in the conjoined clauses. Toosarvandani (to appear) also identifies this use of *but*, calling it semantic opposition.

Izutsu's concessive use, which corresponds to the Violated Expectation discourse relationship for Kehler, involves clauses where an assumption or expectation set up by the first clause is not realized by the second clause. Winter & Rimon (1994), in their analysis of contrastive conjunctions like *but*, *yet*, and *although*, claim that these conjunctions are felicitous when there is some statement which the first clause implies and the second clause denies. They then concentrate their analysis on uses of *but* that fit in the general category of Izutsu's concessives, since they involve no explicit parallelism between elements within the clauses. As Toosarvandani (to appear) notes, Winter & Rimon (1994) appear to take this use of *but* as central to its meaning, while other theorists, like Umbach (2004, 2005), concentrate primarily on the semantic opposition or contrast use.

Umbach (2004, 2005) states that *but* is used between two clauses to present two alternative propositions, one confirmed and one denied. Her analysis then concentrates most on sentences with explicit parallelism, fitting Kehler's Contrast classification, and considers their focus structure. Consider the examples in (3) from Umbach (2005: 216):

(3)

- a. John cleaned up his ROOM but he didn't wash the DISHES.
- b. John only cleaned up his ROOM.

The sentence in (3a) shows a contrast use of *but*, where there are two things presented which John could have done and he only did one of them. Interestingly, Umbach emphasizes how similar this conjunction is to *only* in its sensitivity to focus position and its relationship to alternatives. Note that in (3b), although alternative things which John could have done are not presented, *only* does effectively claim that the one mentioned is what he did and alternative actions did not take place (e.g., cleaning up something else, vacuuming the hall). This is very similar to how *but* functions in (3a), except that a single explicit alternative in the second conjunct is denied. Indeed, the uses seem so similar that Umbach (2005) questions whether a focus marker would have any effect in the first clause of a sentence like (3a), if *but* is present between clauses instead.

This project will follow Kehler (2001) and Izutsu (2008) in considering *but* to be used in at least two different discourse patterns. It is outside the purview of this work whether or not these need distinct semantic treatments (see Toosarvandani (to appear), though). This study will concentrate on tracking instances of the Contrast discourse pattern.

1.2 Processing and *only*

In the sentence processing literature, *only* has been studied in a number of papers on the main clause/reduced relative ambiguity, as in (4). Initially, one presumes that the first verb, *loaned*, is the main verb of the sentence, and only at *were* does one realize that it was instead a participle in a reduced relative clause.

(4) (Only) the businessmen loaned money at low interest were told....

Sedivy (2002) followed the lead of Ni, Crain, & Shankweiler (1996) in researching this structure. Ni et al. claimed that the presence of *only* made a modifying relative clause following the head noun *businessmen* more likely, because it made a contrast between subsets of this group more likely. This in turn weakened the usual preference to take the first verb *loaned* as the main verb of the sentence. Indeed, Sedivy found that the region disambiguating toward the reduced relative analysis (the second verb, *were told*) was read quicker with *only* present, and this speeding up disappeared again if a preceding context provided a different contrast for *only*. Paterson, Liversedge, & Underwood (1999), Liversedge, Paterson, & Clayes (2002), and Clifton, Bock, & Rado (2000) likewise explored *only*'s effects on the main clause/reduced relative ambiguity, though Clifton et al. differed in not finding the expected effects, and the others found that the transitivity of the first verb mattered. Filik, Paterson, & Liversedge (2005) then placed reduced relative sentences in question contexts, finding that a question presenting a contrast between subsets of the head noun worked with *only* to ease the reduced relative analysis. In these studies, then, the presence of *only* before a plural head noun affected the interpretation of a temporarily ambiguous sentence structure because it led people to expect a contrast, and this made a relative clause instantiating a contrast more likely. As Sedivy (2002) notes, though, it is somewhat unclear why a contrast with the head noun itself (e.g., *businessmen* vs. *housewives*) is not as likely as a contrast between subsets of the head noun (some businessmen vs. others). It may be that the different levels of structure at which a contrast could be realized explains some of the issues in replicating the effect of *only* on reduced relative clause sentences.

Another line of research on *only* has looked at how it affects expectations about focus position within a sentence. Stolterfoht et al. (2007) used event-related potentials (ERPs) to study focus expectations in German. In their sentences (5), a first clause was followed by a contrastive ellipsis phrase (e.g., *not the teacher*) which contrasted with either the subject or object.

(5) Am Dienstag hat der Direktor den Schüler getadelt,
on Tuesday has the_{NOM} principal the_{ACC} student criticized,
'On Tuesday, the principal criticized the student,
und nicht der/den Lehrer
and not the_{NOM/ACC} teacher
and not the teacher.'

The syntactic case of the ellipsis phrase disambiguated the contrast, and the first clause appeared as shown or with *nur* ‘only’ on either the subject or the object. The ERP effects showed first that processing was easier when the focus particle marked the argument corresponding to the upcoming contrast, as the position and scope of focus did not need to be revised. They also suggested that in the absence of focus marking, an object contrast was expected instead of a subject one, as there were additional effects of revision of focus position with a subject contrast.

This German work harmonizes with the results of a range of English ellipsis comprehension research (such as Carlson, 2001, 2002, 2013; Carlson et al., 2009; Frazier & Clifton, 1998; Hoeks, Redeker, & Hendriks, 2009), all showing a bias towards object resolution of ambiguous ellipsis sentences. For example, sluicing sentences (Frazier & Clifton, 1998) as in (6a), comparatives as in (6b) and negative bare argument ellipses as in (6c) (Carlson, 2002), and gapping sentences (Carlson, 2001) as in (6d) showed an object bias in comprehension.

(6)

- a. Some tourist suspected that the hotelkeeper was hiding someone. Guess who?
- b. Tasha called Bella more often than Sonya.
- c. Dolores met a doctor after the party, not a lawyer/Madeline.
- d. Jane asked my dad about careers, and Sharon about politics.

Since focus in English is generally placed on the object or the last argument in a predicate (Cinque, 1991; Selkirk, 1984), these results in focus-sensitive ellipsis sentences are explained as showing processors’ expectations about focus position (Frazier & Clifton, 1998; Carlson et al., 2009). Whether or not focus is overtly marked in a sentence, it has to be assigned somewhere; the default expectation that focus will appear on the object or last argument guides processing and results in the favoring of object interpretations of ellipsis sentences.

Slightly different results were found by Paterson et al. (2007), who studied *only* in English ellipsis sentences such as (7).

(7)

- a. ...Jane passed (only) the salt to (only) her mother but not {the pepper/her father}...
- b. ...Jane passed (only) her mother (only) the salt but not {the pepper/her father}...

Negative phrases (*but not the pepper/her father*) contrasted with the direct or indirect object in double-object (7b) and prepositional dative (7a) sentences. When the appropriate object in the previous clause was marked with *only*, processing was faster and easier than when the non-contrasting argument was so marked. However, there was no general bias towards contrast with the later argument in the first clause.

1.3 Questions and Predictions

One of the questions behind this experiment was how often a contrast would occur in sentences like (1) after *but*, given that the conjunction has at least two uses in different discourse patterns: contrast vs. concessive (or violated expectation). A related question was how much the presence of *only* would raise the production of overt contrasts within the sentence. We know that *only* indicates contrastive focus on a phrase, and that an explicit contrast to that phrase may appear within a sentence, within a discourse, or within a visible (but unspoken) context. In a sentence completion study, then, participants might not present an overt contrast within the completion, being used to accommodating *only* within non-contrastive sentences. On the other hand, participants might feel that the sentence would be most felicitous if a contrast were provided to ground the use of the focus particle. The answer to this question would provide some gauge of how necessary it is to flesh out the contrastive meaning of *only* within a sentence as opposed to within a larger discourse. The comparison between conditions with and without *only* would show whether the conjunction *but* alone was sufficient to induce contrast, or whether an overt focus marker would have additional effects. Further, conditions with *only* in different positions would show whether this shift in the focus structure of the first clause would affect what any contrastive phrases contrasted with.

This experiment also explored whether the presence and position of *only* would influence the syntactic structures used in completions. It would be easy to imagine that it would not. There might be a general bias to follow a particular conjunction with a certain syntactic structure (like an entire clause), a bias which might not be affected by *only*. Instead, the particle would influence the semantic content of the structure and the discourse relationship between clauses. Alternatively, *only* might affect what structure was provided if the semantic and focus structure also influences the syntactic structure. For example, if people want to provide a contrast with the first-clause subject, they might need to produce a full second clause instead of just a VP. Similarly, on the grounds of economy of structure and effort, people intending a contrast with the object might be less likely to provide full clauses and more likely to use VPs and negative NPs. Further, because negative bare argument ellipsis constructions seem to have a object bias in comprehension (Carlson, 2002; Carlson et al., 2009; though see also Paterson et al., 2007), people might be less likely to produce these ellipsis structures in subject-only contexts and more likely in object-only contexts.

2. Experiment

2.1 Method

2.1.1 Participants—Thirty-six people from the Morehead State University community, mostly students, were recruited through posters offering \$5 for participation in a language study. All were native speakers of American English over the age of 18, and most were from Kentucky.

2.1.2 Materials—The 24 sentences in this experiment were complete transitive clauses followed by the conjunction *but*, as in (8). Each clause began with an adverbial Prepositional Phrase (PP) or adverb and ended with another adverbial PP. The subjects and objects in each

clause were human definite descriptions, usually occupations. The sentences were partly modeled on items in Stolterfoht et al.'s (2007) German ERP studies, and completed bare argument ellipsis versions of these sentences were studied in Carlson (2002, 2013, in press).

The sentences came in three conditions: a baseline condition without *only* (8a), a condition with *only* on the subject (8b), and a condition with *only* on the object (8c). (The focus marker is shown in bold here, but always appeared in normal type in the questionnaires.) For a complete list of the items in the experiment, see Appendix A.

(8)

- a. On Monday the smuggler followed the gangster through the city, but —
- b. On Monday **only** the smuggler followed the gangster through the city, but —
- c. On Monday the smuggler followed **only** the gangster through the city, but —

The focus particle *only* was selected for use so that the position of focus within the first clause could be marked and manipulated. The conjunction *but* was chosen for this study for a number of reasons. It is a flexible conjunction, allowing continuations with a full clause, a verb phrase (VP), or a negative noun phrase (*not*+NP). The last continuation type, if produced, would allow comparison with research on the comprehension of such ellipsis sentences. The examples in (9) show actual continuations of each syntactic type which were given for the specific item in (8):

(9)

- a. ...he was caught by the police. (clause, after 8a)
- b. ...not the police. (not NP, after 8b)
- c. ...didn't catch up with him. (VP, after 8c)

Further, the adversative or contrastive meaning of *but* (discussed above) was predicted to interact interestingly with focus, given the focus-sensitivity attributed to it by Umbach (2004, 2005).

2.1.3 Procedure—The sentence-completion questionnaires contained the 24 experimental items in the 3 conditions illustrated in (8): no-only, subject-only, and object-only. The conditions were rotated in a counterbalanced design such that no subject saw multiple conditions of a single item, and each subject saw equal numbers of items in each condition. These items were combined with filler sentences from unrelated experiments (sentences exploring ambiguous pronouns, NP definiteness, subordinate clause transitivity, and double objects) for a total of 125 sentences. The order of items was pseudo-randomized so that no consecutive items were from the same condition in this experiment or the same set of fillers.

Once the item order had been decided, sentences were numbered in order and printed in 12-point font. The pages of the questionnaires were printed in landscape orientation (pages were wider than they were tall) so that line breaks would not occur in the middle of any

items. An underscored line followed the end of each partial sentence, giving at least three inches of room for subjects to continue the sentences. The underscores continued on a second line if needed to allow this space.

Participants were asked to continue each sentence so that it was complete and grammatical. They were told that they could write in the first continuation that occurred to them. Most participants took between 30 minutes and an hour to complete the questionnaire.

2.2 Results

The given completions varied between 1 and 22 words, averaging close to 4 words for structures smaller than a VP, 5-6 for VPs, and about 6 for full clauses. The results will first show analyses of semantic contrasts and negation, then syntactic structures, and end with reference issues. All analyses that follow exclude the small number of ungrammatical completions (1.6% of the total) that were produced.

The information structure of the completions was of primary interest, especially whether they contained an overt contrast with a constituent in the first clause. In order to get a count of the contrasts present in the sentences, four raters were used: the author and three undergraduate researchers. The raters evaluated all clause and VP completions (722 examples) for whether there were contrasts, and if so, with what constituents. The students were not informed about the intent of the experiment or the hypotheses and had one or two introductory linguistics courses as background. They were trained to find contrasts on a small subset of the completions (around 25 items), using syntactic techniques based on Izutsu (2008) and Kehler (2001) plus semantic judgment. Specifically, each student was asked to decide whether the sentence did have at least one pair of contrasting words or phrases on either side of the conjunction, in which case it should sound fine with *in contrast* after *but*. If the sentence did not have a clear contrast, then either the conjunction *but* should be replaceable with *although* or *nevertheless*, or *surprisingly* should be able to be added at the end of the completion. Mere differences between a constituent in the completion and a corresponding constituent in the first clause were not sufficient to get a contrastive rating. Instead, there had to be some parallelism and similarity between the clauses and between the pairs of contrasted items, including related syntactic structures and semantic domains, rather than a narrative or causal discourse relationship. Further, in cases with a contrast, the students were asked to write out all pairs of contrasting phrases (each pair including one word or phrase from the first clause and one from the completion following the conjunction *but*). This allowed the tabulation of the number of contrasts with the first-clause subject, object, and other constituents. After discussion of the training set with the author, each student completed ratings for all clause and VP completions. Negative NP completions (*not* NP or NP *else*) were taken to transparently indicate contrast and were rated only by the author. Most of these did not provide any evidence of which NP was intended to contrast with the ellipsis remnant, and thus were coded as ambiguous contrast.

The four sets of ratings were collated, and a completion was considered to be contrastive if at least three out of the four raters marked a contrast for it. Further, specific contrasts were only included in later analysis if three out of four raters agreed that the same specific constituent participated in a contrast. There were items including contrasts with each

constituent, from the initial adverbial to the final PP. Table 1 shows examples of completions for a single item which were rated as having contrasts or not. The condition they appeared in is listed in parentheses.

The total percentage of items coded as having at least one contrast with any constituent is shown in Figure 1.

The data were analyzed in a logistic mixed-effects model using the `lmer` function in R (Jaeger, 2008). There were significantly more contrasts in the subject-only condition than the no-only condition ($z = 4.12$, $p < .001$), and significantly more contrasts in the object-only condition than the no-only condition ($z = 5.52$, $p < .001$). The subject-only and object-only conditions did not differ significantly in their percentage of contrasts ($z = -1.65$, $p = .10$). Compared to the baseline, then, both conditions with *only* had significantly more items with contrastive phrases in the completions.

In addition, there was variation in which specific contrasts occurred in each condition, as shown in Table 2 for the non-NP constituents and Figure 2 for the NP constituents. Note that the percentages of contrasts with individual phrases add up to more than the total percentage of items with contrasts (in Figure 1), because some completions contained contrasts between multiple pairs of words or phrases. Completions with the negative NP structure were usually coded as ambiguous (subject or object) contrast, because although it was clear that they contrasted with some first-clause NP, the bare syntactic structure and lack of case-marking did not indicate which one. A small number of these completions were semantically disambiguated by their content. Contrasts with constituents other than the subject or object (Adverbial, Verb, or PP contrasts) were fairly steady across conditions when added together.

As shown in Figure 2, contrasts with either first-clause NP were rare in the baseline condition without *only*. In the subject-only condition, NP contrasts rose overall, especially subject contrasts. In the object-only condition, object contrasts and ambiguous contrasts were high. The data were analyzed in a logistic mixed-effects model using the `lmer` function in R (Jaeger, 2008), and the relevant statistics are summarized in Table 3.

The percentage of subject contrasts was significantly higher in the subject-only condition than the other two conditions, and did not differ significantly between the object-only and no-only conditions. The percentage of object contrasts was significantly higher in the object-only condition than both other conditions; the difference between the subject-only and no-only conditions was only marginally significant. The percentage of ambiguous contrasts, finally, was significantly higher in the object-only condition than both other conditions, and did not differ significantly between the no-only and subject-only conditions. Overall, then, the focus marker on the subject led to a large rise in subject contrasts, and *only* on the object led to a rise in both object and ambiguous contrasts.

The completions fell into three main groups by what syntactic structure was formed. The most common structures were complete second clauses, followed by VPs, then negative NPs (*not*+NP or NP+*else*). These three structures accounted for over 90% of the completions in all conditions. The remaining items included some instances of *not* plus a PP or adverbial phrase, as well as ungrammatical, incomplete, or missing answers (only grammatical

completions were included in any analyses). The distribution of the three main syntactic types across conditions is shown in Figure 3.

Full clause completions were the most common in all three conditions. But they appeared to be a greater majority in the subject-only condition, compared to the baseline without *only* and the object-only condition. Negative NP (*not* NP) completions were a small minority overall, but rose to 20% of responses in the object-only condition. The data were analyzed in a logistic mixed-effects model in R to see if answer type was affected by the different conditions, and the results are shown in Table 4. There were significantly more full-clause completions in the subject-only condition than the other two conditions. VP completions were significantly more frequent in the no-only condition than in the other two conditions. And NP completions were significantly more frequent in the object-only condition than the other two. Thus the increased number of clausal completions in the subject-only condition and the increased number of negative NP completions in the object-only condition were statistically different from the baseline proportions.

Another feature of the completions relevant to their semantic interpretation was the presence of overt negation. Many of the second clauses or phrases contained *not*, either in full or contracted with an auxiliary verb, including the negative NP completions which used *not*. Other negative completions contained the determiner *no*, as in *no one* or *no interest*; negative adverbs like *never*; or words with negative morphemes, as in *disbelief* or *incorrect*. Items with any of these markers were categorized as having negation. In the condition without *only*, items with such negation made up 53% of the total, vs. 38% in the subject-only condition and 41% in the object-only condition. The difference between these conditions was significant by both subjects and items in a three-level ANOVA ($F(2,70) = 6.61, p < .01$; $F(2,46) = 7.04, p < .01$). Relatively frequent negation is likely a consequence of the conjunction *but*, as Umbach (2004) notes it is always accompanied by explicit or implicit negation. The lower frequency of negation in the conditions with *only*, however, suggests that the numerous completions of these sentences including contrastive phrases satisfied this feature another way or led participants to concentrate on other aspects of the sentences.

Within the completions which were complete clauses, there was interesting variety in the reference of the second clause subjects. Sometimes the second clause subject referred to the same entity as the first clause subject, usually using a pronoun (e.g., *In the confusion the guard punched the detective in the head, but he got punched back*). Other times the first clause object was used as the second clause subject (*In the confusion the guard punched the detective in the head, but the detective was not hurt*). Then there were a range of other possibilities, including expletive subjects, inclusive or exclusive general pronouns (e.g., *everyone, everyone else, they all*), or NPs referring to entirely new entities. Table 5 shows how often the subject of the second clause referred back to the first-clause subject, the first-clause object, or any other referent (for the subset of responses which provided a complete second clause and thus had a subject NP).

The proportions of references were analyzed in separate three-level ANOVAs, which showed that the variation in references to objects and other NPs was significant (object:

$F(1(2,70) = 7.49, p < .005; F(2(2,46) = 5.17, p < .05; \text{other: } F(1(2,70) = 4.96, p < .05; F(2(2,46) = 6.65, p < .005)$, while the variation in references to the subject was only significant by items ($F(1(2,70) = 2.82, p = 0.07; F(2(2,46) = 6.99, p < .005)$). In the subject-only condition, second-clause subjects were more likely to have some other referent than to refer back to one of the first-clause NPs. In the object-only condition, second-clause subjects were more likely to refer back to the first-clause subject than another referent. Both of these results harmonize with the contrast results. When *only* focused the subject, completions were likely to contrast with that subject: doing so would naturally involve using a new referent for the subject of the second clause. So it is not surprising that second clause subjects often referred to other entities in this condition. When *only* focused the object, completions were likely to contrast with the object. Repeating the first clause subject as the second clause subject allows for continuity between the sentences, and a new referent then could appear in the object position. (A more detailed count of subject referents and the NP types that expressed them is shown in Appendix B, Table B.1.)

Turning to the objects in the second clauses, there was again variety in their referents. For this analysis, objects were defined very inclusively, including the objects of particle verbs and verb+preposition combinations (e.g., *the drummer grew on him, spoke kindly to all the other staff*) as well as the objects of embedded clauses (e.g., *the salesman tried to keep up with the cashier, many wished to fight him*). Table 6 shows how often the object of the second clause referred back to the first-clause subject, the first-clause object, or any other referent (for the responses which contained an object NP).

The proportions of references were included in three-level ANOVAs, which showed that the variation in references to the object or other NPs was marginally significant (object: $F(1(2,70) = 2.85, p = 0.07; F(2(2,46) = 5.59, p < .01; \text{other: } F(1(2,70) = 6.01, p < .005; F(2(2,46) = 2.75, p = .08)$, while the variation in references to the subject was non-significant (p 's $> .10$). In the subject-only condition, second-clause objects tended to refer back to the first-clause object more than in the other conditions. In the object-only condition, second-clause objects less often referred back to either first-clause NP. Both of these results also harmonize with the contrast results. When *only* focused the subject, completions tended to contrast with that subject, but objects could refer back to the first-clause object to increase parallelism between the clauses. When *only* focused the object, completions were likely to contrast with the object, and new referents therefore appeared in the object position. (A more detailed view of the object referents and the NP types that expressed them is shown in Appendix B, Table B.2.)

2.3 Discussion

The contrast, syntax, and reference patterns seen in the completions give a detailed picture of the continuations triggered by the conjunction in these sentences. Without an overt focus marker (the no-only condition), completions tended to fit a non-Contrast discourse pattern (Kehler, 2001). The completions had some contrast in them 39% of the time, but in this condition, few contrasts with first-clause NPs. Instead, the sentences more often showed some other discourse pattern which *but* also allows, such as the concessive or violated

expectation pattern. The syntactic structures of the completions were just over half clausal completions and almost a third VPs. Overt negation was also often present.

In the subject-only condition, the overt focus marker on the subject made more participants produce a contrast within the sentence, especially with the focus-marked NP, and they produced syntactic structures which allowed this. Contrasts rose to a majority of completions, and 30% of the sentences had clear contrasts with some first-clause NP. Further, most completions were now full clauses, the only structure which allows an unambiguous subject contrast. The second-clause subjects were likely to have referents different from the first-clause subject or object, also consistent with contrast between subjects; second-clause objects referred back to first-clause objects for some continuity between the clauses or had new referents as well.

In the object-only condition, overall contrasts were again high, and both the unambiguous object contrasts and the ambiguous contrasts were higher than in the other conditions. Syntactically, clausal completions fell again to the same level as in the baseline condition, and negative NPs rose to 20% of completions. Comprehension research on negative NP structures suggests that the negative NPs coded as ambiguous were likely intended to contrast with the object, as that is the preferred interpretation of such structures (Carlson, 2002, 2013). This is supported by their increased production here in the object-only condition. Second-clause subjects often referred back to first-clause subjects, and second-clause objects had new referents, both choices consistent with object contrast. Again, the overt focus marker led to more contrasts overall, especially with the NP it indicated, and the shift in syntactic structures made this possible. The syntactic type of the completions appears to vary, therefore, in a way that would match the expected contrasts.

Certainly there are other focus markers besides *only*. Since this was a written study, prosodic markers were not available, though an auditory completion study could have used accents for the same purpose. It is likely that syntactic clefting would have a similar effect to *only*, since comprehension research on related ellipsis sentences with clefts (Carlson, in press) shows that they are effective in drawing the ellipsis remnant to contrast with the clefted item. It is also true that even in sentences with no contrastive focus marker, the first clause still has a focus (like any sentence in the language). Most likely, participants read the sentences as having informational focus on the VP, with the nuclear accent on the last argument in the VP (Cinque, 1991; Fodor, 1998; Selkirk, 1984). That is the default assumption for a sentence without a biasing context, and people generally do seem to assume some prosody in their heads as they read. With this presumed implicit prosody in the no-only condition, it seems that people present few contrasts with NPs, but some with other elements of the sentences (verbs, adverbials, PPs); and they present just over half clausal completions and 30% VPs. The high level of clausal completions in all three conditions suggests that this could be considered the default syntactic structure to follow *but*. VPs, though, may be more common in the no-only condition than the other two conditions as a consequence of the default focus structure.

3. Conclusions

The presence of *only* on an NP in a first clause increased completions with NP contrasts compared to the baseline. This shows that the contrastive focus indicated by *only*, when placed on an early argument, made people more likely to expect or consider a contrast, and thus they tended to provide a contrast to a first-clause NP following the conjunction. Further, placing *only* on a particular first-clause NP increased contrasts with that NP, and also increased syntactic structures which made such contrasts available. People gave more complete clause completions in the condition favoring contrast with the subject; in the condition favoring contrast with an object, people presented more negative NP completions.

In the object-only condition, there were increased contrasts with the object and with either the subject or object (ambiguous contrasts), along with increased negative NP ellipsis structures. Although a conservative coding listed most of the negative NP completions as ambiguous, the fact that these structures increased just in the condition with object focus makes it likely that most negative NPs were intended to contrast with the object NP. This harmonizes with comprehension research on complete ellipsis sentences based on these clauses (Carlson, 2013), which has shown a general bias in processing towards the object interpretation. The frequent production of negative NP structures in this condition also shows the acceptability of this particular ellipsis structure (sometimes called stripping; Drubig, 1994; Paterson et al., 2007). Participants in the study did not see any ellipsis, since they did not see any complete sentences, but they spontaneously chose to provide this economical structure primarily in the object-*only* condition.

The fact that the information structure of completions differed according to the position of *only* is consistent with the eye-tracking results of Paterson et al. (2007), Carlson (2013), and Stolterfoht et al. (2007), who found that a given contrastive ellipsis phrase was read more easily when its first-clause counterpart had been marked with *only*. However, it is also true that the focus marker did not guarantee contrasts with the marked NP. Focus-marked NPs in the first clause were followed by clauses instantiating a non-contrastive discourse pattern, indicating the optionality of within-sentence contrasts.

Numerically, the object-only condition had the highest level of contrasts. Including even a portion of the ambiguous contrasts with the object contrasts would make them significantly more common in the object-only condition than subject contrasts were in the subject-only condition. This is consistent with both theoretical and processing research suggesting that object position in English is the most likely position for focus (Carlson, 2002; Carlson et al., 2009; Frazier & Clifton, 1998; Gussenhoven, 1994; Selkirk, 1984, 1995; Stolterfoht et al., 2007, among others). Contrasts with the object are not more common in general than any other discourse structure, since there were few contrasts with any NP in the condition without *only*. But when an overt focus marker made a contrast likely, participants were more likely to flesh out the contrast with the object position.

On the other hand, even with *only* in the sentence and the conjunction *but*, many sentences did not provide an explicit contrast. Almost 40% of sentences even in the object-only condition presented no contrasting phrases. That makes it clear that people are comfortable

accommodating *only* within a non-contrastive sentence, even when they provide its final content. Clearly *only*, like other focus particles, can easily take a larger discourse as its domain, and people can find a sentence with *only* meaningful even when no surrounding context actually exists to instantiate a contrast. Perhaps people take the focus marker to address some implicit question under discussion (Roberts, 1996).

The level of contrasts and of overt negation in the baseline sentences without *only* tell us about preferred uses of the conjunction *but* in English. As noted earlier, *but* usually participates in two patterns of discourse when joining clauses: contrast or concessive. At least in these single-clause contexts, the non-contrast pattern appears more common, with contrasts in the completions occurring about 40% of the time after first clauses without focus markers. The presence of a contrastive focus marker raised the percentage of contrast uses to a majority, though, indicating how closely the contrast discourse pattern and contrastive focus are linked together. Further, overt negation in the completions occurred half of the time. This supports the observation of Umbach (2004, 2005) that *but* needs one conjunct clause to be denied, but this need not be done through direct negation. Negative verbs (*John went to the party but Bill skipped it*) are one way to deny action which was not tabulated here, along with other strategies.

When people encounter a simple clause with no overt focus markers, followed by a potentially contrastive conjunction, they predict or expect a contrast some of the time (at least insofar as completion data can tell us what people expect). Highlighting an early argument with an overt focus marker, though, makes it more likely that people provide a contrast with that argument. They make various syntactic and semantic choices to instantiate that contrast. Turning this around to comprehension, if post-conjunction material turns out to include phrases contrasting with first-clause elements, then that affects where contrastive focus would be placed in the first clause. But processing a first clause followed by *but* does not guarantee that there will be a second clause containing contrasts, even when overt focus is marked in that first clause, and thus contrastive focus within the first clause does not completely predict upcoming contrasts.

It would be natural to follow up this research by looking at related sentences in contexts. These sentences were isolated and out of the blue, giving participants no surrounding discourse context to work with, and thus they were forced to accommodate sentences with complicated focus structures. Even without overt focus marking, similar sentences might be swayed toward contrastive or concessive uses by a surrounding context, illustrating the flexibility (or not) of the conjunction *but*. It would be interesting also to examine the use of sentences with negative replacive or stripping ellipsis in corpora to see whether the object bias seen here in completions and in ellipsis comprehension research (e.g., Carlson, 2013, in press) would be evident in natural language use. Similarly, corpus research on the frequency of use of *but* in sentences with different discourse patterns could help decide whether the preference for non-contrast uses seen here holds more generally.

As this study shows, the concept of contrastive focus interfaces with the syntactic structures people use, the semantic contribution of sentences and their information structure, and even the phonology of how the sentences might be pronounced (or heard, in the case of implicit

prosody: Fodor, 1998). We see here that altering the focus structure of a given clause affects the syntactic structures which follow it as well as the contrast patterns of upcoming phrases. It is hard to know whether the intended contrast leads to the production of a particular syntactic structure, or a chosen syntactic structure allows or prohibits the production of a particular contrast, or whether the two choices are too intertwined to say that one precedes the other. This study does not disentangle the question of the priority of the processes, but does raise this question for future work.

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Appendix A

Experimental items

1. On Monday (only) the curator embarrassed (only) the gallery owner in public, but...
2. At the international party (only) the Brazilian kissed (only) the German on the lips, but...
3. Apparently (only) the guitarist respected (only) the bassist from the start, but...
4. On Friday (only) the clown jostled (only) the lion tamer during the opening parade, but...
5. Last weekend (only) the rifleman beat (only) the foot soldier at chess, but...
6. After Thursday (only) the cashier avoided (only) the salesman at work, but...
7. On Tuesday (only) the psychiatrist convinced (only) the neurologist of a diagnosis, but...
8. During lunch (only) the roofer contacted (only) the builder for instructions, but...
9. At the reception (only) the geographer noticed (only) the economist by the drinks, but...
10. On Sunday (only) the butcher greeted (only) the baker with warmth, but...
11. After the opening (only) the make-up artist praised (only) the set designer for originality, but...
12. At the games (only) the wrestler teased (only) the gymnast after competition, but...
13. After dinner (only) the judge joined (only) the diplomat for coffee, but...
14. On Wednesday (only) the banker spotted (only) the politician near City Hall, but...

15. In September (only) the skier warned (only) the snowboarder about the weather, but...
16. On Friday (only) the sculptor informed (only) the photographer about the art show, but...
17. In the novel (only) the baron challenged (only) the count to a duel, but...
18. On Monday (only) the smuggler followed (only) the gangster through the city, but...
19. In the confusion (only) the guard punched (only) the detective in the head, but...
20. At the convention (only) the minister recognized (only) the priest from across the room, but...
21. In the epic tale (only) the elf rescued (only) the dwarf in a dramatic fashion, but...
22. On Tuesday (only) the farmer supported (only) the rancher at the council meeting, but...
23. At the trial (only) the bodyguard supported (only) the butler in his testimony, but...
24. After the storm (only) the hunter heard (only) the fisherman in the woods, but...

Appendix B

Table B.1

Number of second-clause subjects with particular referents and NP types across conditions

First-clause or other reference	NP type	Conditions		
		No only	Subject only	Object only
Subject	pronoun	39	25	63
	full NP	2	5	5
	possessive	2	2	5
Object	pronoun	17	12	8
	full NP	44	33	21
	possessive	2	1	3
Inclusive (subject and object)	pronoun	11	35	5
Exclusive	pronoun	2	18	12
Referent from adverbial or PP	any	4	8	5
New referent	any	28	60	28
Expletive (no referent)	pronoun	11	17	8
Wh-subject	wh-phrase	0	1	1
Total of full-clause completions per condition		162	217	164

Table B.2

Number of second-clause objects with particular referents and NP types per condition

First-clause or other reference	NP type	Conditions		
		No only	Subject only	Object only
Subject	pronoun	11	3	9
	full NP	11	13	8
	possessive	9	2	4
Object	pronoun	29	31	13
	full NP	2	15	7
	possessive	0	3	3
Inclusive (subject and object)	pronoun	3	7	21
Exclusive	pronoun	2	11	35
Referent from adverbial or PP	any	4	4	4
New referent	any	41	37	44
Total of completions with objects per condition		112	126	148

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Highlights

- “Only” increases the probability of contrasts with focus-marked arguments.
- To produce contrasts, subjects adjust the syntax and semantics of completions.
- Object focus increases the probability of negative ellipsis structures.

Figure 1.
Percentage of completions that included a contrast of any kind across conditions

Figure 2.
Percentage of completions containing contrasts with first-clause NPs (subject, object, or ambiguous between the two) across conditions

Figure 3.

Percentage of completions with different syntactic structures across conditions (Clause = a complete sentence completion including subject; VP = a verb phrase completion; not NP = a noun phrase preceded by not or followed by else)

Table 1

Completion examples with and without contrasts

Contrastive completions	Notes
Apparently the guitarist respected the bassist from the start, but ...	
(Subject-only) now everyone does.	subject contrast with VP ellipsis
(Subject-only) the bassist didn't respect the guitarist.	subject and object contrast (reversed NPs)
(Subject-only) afterward he respected the whole band.	object contrast
(No-only) didn't like him.	verb contrast
(Object-only) after the first song he respected everyone.	adverbial and object contrast
Non-contrastive completions	Notes
Apparently the guitarist respected the bassist from the	start, but ...
(No-only) the band didn't know that at first.	new subject (inclusive), non-parallel syntax, narrative
(No-only) the bassist was self-conscious.	object as subject, non-parallel syntax
(No-only) still enjoyed the sound of his instrument better.	different verb and structure
(No-only) I don't think the initial respect was mutual.	refers to reversed situation, but not syntactically parallel
(Object-only) he kept the band together for the money.	repeated subject, narrative rather than contrastive

Table 2

Percentage of completions containing contrasts with non-NP constituents

Condition	Adverbial ^a	Verb	PP
No-only	8%	10%	7%
Subject-only	14%	5%	1%
Object-only	15%	4%	3%

^a Adverbial = the initial adverbial phrase, which was either an AdvP or a PP; PP = the final phrase after the object

Table 3

Statistical comparison of contrast positions between conditions

Contrast Position	Subject contrasts	Object contrasts	Ambiguous contrasts
No-only vs. subject-only	$z = -6.28, p < .001$	$z = -1.88, p = .06$	$z = -1.67, p < .095$
No-only vs. object-only	$z = 0.08, p = .94$	$z = -7.27, p < .001$	$z = -4.59, p < .001$
Subject-only vs. object-only	$z = 6.16, p < .001$	$z = -6.17, p < .001$	$z = -3.52, p < .001$

Table 4

Statistical comparison of syntactic completion types between conditions

Syntactic Type	Clauses	VPs	Negative NPs
No-only vs. subject-only	$z = -5.85, p < .001$	$z = 6.86, p < .001$	$z = -1.42, p = .16$
No-only vs. object-only	$z = 0.08, p = .94$	$z = 5.08, p < .001$	$z = 5.52, p < .001$
Subject-only vs. object-only	$z = 6.12, p < .001$	$z = -2.01, p = .047$	$z = -4.95, p < .001$

Table 5

Within full-clause completions, number of second-clause subjects referring to first-clause arguments per condition

Condition	Referring to First-clause Subject	Referring to First-clause Object	Any Other Reference	# of Clause Completions
No-only	54 ^a	74	45	162
Subject-only	64	76	107	217
Object-only	78	37	54	164

^a numbers add up to more than the total relevant completions in each condition because inclusive pronouns included both subjects and objects as referents

Table 6

Within completions with objects, number of second-clause objects referring to first-clause arguments per condition

Condition	Referring to First-clause Subject	Referring to First-clause Object	Any Other Reference	# of Completions with Objects
No-only	34 ^a	34	47	112
Subject-only	25	56	52	126
Object-only	42	44	83	148

^a numbers add up to more than the total relevant completions in each condition because inclusive pronouns included both subjects and objects as referents