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Exceptives under negation: strengthening the case for PEX*

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Abstract The sentence *I solved everything but Problem 4* conveys (a) that I solved everything else (the 'universal' inference), and (b) that I didn't solve Problem 4 (the 'exclusion' inference). Recent analyses derive the exclusion inference as a grammatical implicature, due to a covert exhaustivity operator, which obligatorily co-occurs with *but* in the LF. In this paper, we consider intuitions when the clause containing the exceptive is negated. We find that the exclusion inference shows behavior expected of a presupposition (e.g. Vostrikova 2021, Baron 2022, Crnič 2024). As such, our data can be predicted if the covert exhaustivity operator is presuppositional, as proposed in Bassi, Del Pinal & Sauerland 2021 and Del Pinal, Bassi & Sauerland 2024 (see Baron 2022, Crnič 2024).

Keywords: exceptives, exhaustivity, presupposition, prosody

1 Introduction

Our concern in this paper is with expressions of exception and the status of their inferences. As illustrated in (1), an exceptive phrase formed with *but* yields two key inferences, paraphrased in (1a) and (1b) (e.g. von Fintel 1993). We will refer to (1a) as the *universal* inference, and to (1b) as the *exclusion* inference.

(1) I solved everything but Problem 4.

a. I solved everything distinct from Problem 4 ($\phi_{\forall}$)

b. I didn't solve Problem 4 (ϕ_{excl})

Recent analyses take the universal inference to be contributed by *but* itself when it occurs in construction with a universal quantifier. In one line of analysis, the

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exclusion inference is the result of a *grammatical implicature*, introduced by a covert exhaustivity operator in the LF (e.g. Gajewski 2008, 2013, Hirsch 2016, Crnič 2018, 2021, Mayr & Vostrikova 2022). From that perspective, exceptives can offer a window into the analysis of the exhaustivity operator.

We present evidence that the two inferences in (1) have a different status: while the universal inference is asserted, the exclusion inference patterns as expected of a presupposition (e.g. Vostrikova 2021, Baron 2022, Crnič 2024). We will consider data where (1) is *negated*. Our observations will suggest that $\phi_{\forall}$ is introduced in the scope of negation, while ϕ_{excl} projects. Moreover, we will show that there is an effect of prosody, such that intuitions change if the negated exceptive is realized with a stress pattern characteristic of presupposition cancellation. If the exclusion inference is derived by an exhaustivity operator, our full data set will be predicted if EXH presupposes, rather than asserts, the implicature component, as proposed in Bassi et al. 2021 and Del Pinal et al. 2024. In pursuing a presuppositional EXH operator with exceptives, we follow Baron 2022 and Crnič 2024.

The discussion will be organized as follows. Section 2 lays background on the implicature analysis of exceptives, and Section 3 discusses predictions when negation is introduced. In Sections 4-5, we present our central data, and make explicit how our observations are accounted for if the exhaustivity operator is a presupposition trigger. Section 6 considers implications for the alternative set over which the operator quantifies. Finally, Section 7 concludes.

2 The implicature analysis

In Sections 2.1-2.2, we present an analysis of *but*-exceptives based on a covert exhaustivity operator. In Section 2.3, we consider predictions of the analysis if the exhaustivity operator is defined as a presupposition trigger.

2.1 LF with EXH

The LF for (1) in (2) has two ingredients: *but* itself, and the EXH operator, which takes propositional scope.[1] For convenience, we show the subject reconstructed into Spec-*v*P, and the object quantifier in situ, rather than at its scope position.

(2) **LF for (1)**
[EXH [$_{vP}$ I solve [$_{DP}$ every [thing [but Problem 4]]]]]

1 Gajewski (2008) proposed that *but*-exceptives involve a covert operator separate from EXH. EXH was deployed in Gajewski 2013, along with subsequent works. The lexical entry for *but* below is also based on Gajewski 2008, 2013. While Gajewski defined *but* to apply to a *set* of entities (in (2), to the set {Problem 4}), we take *but* to apply to the entity itself. This is not crucial, however.

The role of *but* is to subtract the excepted element from the restrictor of the quantifier. Concretely, *but* can be taken to denote the function in (3a), applied to Problem 4 in (3b). The exceptive phrase *but Problem 4* denotes a predicate of entities distinct from Problem 4. That composes with its sister (*thing*) via Predicate Modification, and *every* quantifies over the resulting predicate. The full *v*P denotes the proposition in (4): that I solved everything that is distinct from Problem 4. (4) corresponds to the universal inference in (1a).

(3) a. $[\![\text{but}]\!] = \lambda x\,.\,\lambda y\,.\,y \neq x$

b. $[\![\text{but Problem 4}]\!] = \lambda y\,.\,y \neq \text{Problem 4}$

(4) $[\![v\text{P}]\!] = \lambda w\,.\,\forall x\,[\,x \neq \text{Problem 4} \rightarrow \text{SOLVE}_w(\text{I}, x)\,] = \phi_{\forall}$

The second key ingredient is the exhaustivity operator. As defined in (5), EXH applies to a proposition, p, and asserts a conjunction: the first conjunct says that p is true, and the second that alternatives to p are false. The latter is referred to as the grammatical implicature, and is asserted on par with the prejacent.

(5) **Defining EXH**
$[\![\text{EXH}]\!]^{\text{ALT}} = \lambda p_{st}\,.\,\lambda w\,.\,p(w) \wedge \forall p' \in \text{ALT}\,[\,p \not\subseteq p' \rightarrow \neg p'(w)\,]$

In (2), the prejacent of EXH is the proposition expressed by the *v*P. Since that is re-asserted, the sentence as a whole asserts that I solved everything distinct from Problem 4, capturing the universal inference. The exclusion inference is sourced to the second conjunct of EXH's entry, where alternatives are negated.

2.2 The role of alternatives

In order to facilitate exposition, we will assume that the alternative set for EXH contains the proposition in (6a), which conveys that I solved Problem 4. If that is an alternative, EXH would negate it to yield the entailment that I did *not* solve Problem 4, as in (6b). With this alternative, then, the exclusion inference is immediately introduced as part of the implicature component. We will return to discuss the alternative set in greater detail later in the paper.

(6) a. **Target alternative**
SOLVE(I, Problem 4)

b. **Entailment**
$\neg$SOLVE(I, Problem 4) = ϕ_{excl}

To summarize so far, the LF for (1) is repeated below. In this LF, we take EXH

to assert that I solved everything distinct from Problem 4 (the prejacent), and that I didn't solve Problem 4 (by negating (6a)). These correspond to $\phi_{\forall}$ and ϕ_{excl}.

(7) [EXH [$_{vP}$ I solve [$_{DP}$ every [thing [but Problem 4]]]]]

$\hookrightarrow$ A: $\phi_{\forall} \wedge \phi_{excl}$

We now consider how the prediction changes if the EXH operator is re-formulated as a presupposition trigger, as proposed in recent work.

2.3 Revising EXH

Bassi et al. (2021) and Del Pinal et al. (2024) propose to revise the denotation of the EXH operator. In their analysis, the implicature component is *presupposed*, rather than *asserted*. For our purposes, the operator, hence referred to as PEX, can be defined as in (8). PEX applies to a proposition, p, presupposes that alternatives to p are false, and if the presupposition is met, re-asserts p.

(8) **Defining PEX**

$[\![\text{PEX}]\!]^{\text{ALT}} = \lambda p_{st} \,.\, \lambda w : \forall p' \in \text{ALT} [\, p \not\subseteq p' \rightarrow \neg p'(w) \,] \,.\, p(w)$

The LF for the exceptive construction is the same as in (2), but with PEX in place of EXH (after Baron 2022, Crnič 2024). As before, it will be asserted that I solved everything distinct from Problem 4, as in (9b). But, it will now be *presupposed* that I didn't solve Problem 4, the exclusion inference, as in (9a).

(9) **LF for (1) (with PEX)**

[PEX [$_{vP}$ I solve [$_{DP}$ every [thing [but Problem 4]]]]]

a. P: ϕ_{excl}

b. A: $\phi_{\forall}$

Compared to the LF in (2) with EXH, the LF in (9) with PEX gives rise to the same meaning components, but they are differently divided between presupposition and assertion. With EXH, the universal and exclusion inferences have the same status, as both are part of the asserted content. By contrast, with PEX, the two inferences have a different status: whereas the universal inference is asserted, the exclusion inference is presupposed. To distinguish the two analyses, we will compare their predictions when the exceptive construction occurs in the scope of negation. Given the well known projection behavior of presuppositions from the scope of negation, if exceptive constructions involve an underlying PEX operator, we expect the presuppositional exclusion inference to project.

3 Predictions with negation

In (10), the exceptive construction is negated. Our aim will be to compare two LFs, one with the original EXH operator, and the other with PEX.

(10) I didn't solve everything but Problem 4.

The parse with EXH is given in (11). In this structure, EXH takes scope under the negation operator.[2] As before, the output of EXH is the conjunction of the universal and exclusion inferences. Negation thus derives (11b). The assertion is equivalent to the disjunction that *either* the negation of the universal inference holds, *or* the negation of the exclusion inference does. That is, either I didn't solve everything distinct from Problem 4, or I did solve Problem 4. It would be equally possible to justify this assertion by affirming either $\neg\phi_{\forall}$ or $\neg\phi_{excl}$.

(11) **LF 1: NEG > EXH**
[not [EXH [$_{vP}$ I solve [$_{DP}$ everything but Problem 4]]]]

a. P: –
b. A: $\neg(\phi_{\forall} \wedge \phi_{excl}) \Leftrightarrow \neg\phi_{\forall} \vee \neg\phi_{excl}$

In the LF in (12) below, EXH is replaced by PEX. Under negation, PEX will assert the universal inference, but presuppose the exclusion inference. Because it is presupposed, the exclusion inference projects over negation, as in (12a), so only the universal inference is negated, as in (12b). It is presupposed that I didn't solve Problem 4, and asserted that I didn't solve everything else. So, with PEX, it would only be possible to justify the claim by affirming $\neg\phi_{\forall}$.

(12) **LF 2: NEG > PEX**
[not [PEX [$_{vP}$ I solve [$_{DP}$ everything but Problem 4]]]]

a. P: ϕ_{excl}
b. A: $\neg\phi_{\forall}$

In sum, when negation is present, LFs with EXH and PEX result in distinct

2 An LF where EXH takes scope over negation should be blocked. With that scope order, *not* would operate directly on the universal inference to derive the proposition that I didn't solve everything distinct from Problem 4. That is equivalent to the existential claim that there is some such problem that I didn't solve, which would be the prejacent of EXH or PEX. As we discuss in Section 6, pathology arises with an exceptive if the prejacent of the exhaustivity operator is existential. So, we only consider LFs where the operator is under negation. As noted by Baron (2022), an LF like (11) with EXH may be suspect, since it has been suggested that EXH cannot in general occur in the scope of negation (e.g. Fox & Spector 2018), while the same restriction is not posited with PEX (Bassi et al. 2021). Regardless, we will give both EXH and PEX full consideration.

readings. In the LF with EXH, the universal and exclusion inferences are treated on par with each other, as their conjunction is input to negation. With PEX, on the other hand, only $\phi_{\forall}$ gets negated, while ϕ_{excl} projects.

4 The default pattern

We will present evidence that the universal and exclusion inferences come apart, in line with the prediction of PEX. The tests we discuss add to findings in Crnič 2024, where the projection behavior of exceptives and *only* is compared. In assessing intuitions, we will consider the sentence in (10) realized with a stress pattern that is readily expected in a provided context, given how stress interacts with information structure. In the next section, we will manipulate prosody.

4.1 Test 1: continuations

We begin with (13). Suppose there were four problems in total. In (13), the set up claims that $\phi_{\forall}$ and ϕ_{excl} both hold, and the target sentence is presented as a denial. In a denial context, the sentence is naturally parsed with verum focus, with main stress on polarity.[3] The continuations in (13a) and (13b) each deny one of the two key inferences. As shown in (14a), $\neg\phi_{\forall}$ says that I didn't solve every problem distinct from Problem 4. (13a), therefore, entails $\neg\phi_{\forall}$. By contrast, $\neg\phi_{excl}$ says that I *did* solve Problem 4, as in (14b), and that is conveyed by (13b).

(13) *(I heard you solved Problems 1-3, but not 4.)*
No, I DIDN'T solve everything but Problem 4.
a. I didn't solve Problem 3 either.
b. ??I solved Problem 4 too.

(14) **Negated inferences**
a. $\neg\phi_{\forall} \Leftrightarrow \neg\forall x$ [x $\neq$ Problem 4 $\rightarrow$ SOLVE(I, x)]
b. $\neg\phi_{excl} \Leftrightarrow \neg\neg$SOLVE(I, Problem 4) $\Leftrightarrow$ SOLVE(I, Problem 4)

3 We set aside F-marking for the LFs in the main text. To be concrete, one possibilitiy is that F-marking is as in (i). In (i), verum focus is taken to involve F-marking of negation, which is the associate of a covert $\sim$ (Rooth 1992). As we will discuss in Section 6, certain analyses have taken *Problem 4* to be focused to yield alternatives for EXH or PEX. *Problem 4* is given, so even if that F-mark is present, stress should naturally fall on the focused negation. F-marked material that is given is usually not prominent (e.g. Schwarzschild 2020 and references therein).

(i) [$\sim_2$ [not_{F_2} [{EXH, PEX}$_1$ [$_{vP}$ you solve everything but [Problem 4]$_{F_1}$]]]]

Crucially, the intuition in (13) is that the two continuations have a different status. Speakers report a contrast where (13a) is completely natural, while (13b) is degraded relative to (13a).[4] With EXH, the meaning of the target sentence would be equally compatible with $\neg\phi_{\forall}$ or $\neg\phi_{excl}$. Therefore, the two continuations should be judged on par with each other (all things equal[5]). On the other hand, with PEX, the asymmetry is directly predicted. Only $\phi_{\forall}$ is negated as asserted content, so (13a) (entailing $\neg\phi_{\forall}$) is appropriate. (13b) (conveying $\neg\phi_{excl}$) does not fit and, in fact, would conflict with ϕ_{excl} as a projected presupposition.

It bears note that, while speakers find (13b) to be degraded, it is not judged as entirely unacceptable. That, too, is naturally accounted for in the PEX analysis. If ϕ_{excl} is a presupposition, the only way to allow for (13b) to be appropriate would be for the presupposition to be locally accommodated. That is, ϕ_{excl} would be canceled as a presupposition, and re-analyzed as asserted content within the scope of negation. Local accommodation is generally thought to be a last resort option (cf. Heim 1983). The prediction, then, is that the continuation in (13b) should be degraded to the extent that local accommodation is resisted here. With local accommodation factored in, the prediction is gradient, rather than categorical. We will discuss local accommodation in more detail in Section 5.

4.2 Test 2: adverbs

A second way to bring out an asymmetry between the two inferences is to assess the felicity of adverbs in the test sentence. We compare (15a) and (15b).

(15) *(I heard you solved Problems 1-3, but not 4.)*

a. Unfortunately, I DIDN'T solve everything but Problem 4.
b. #Fortunately, I DIDN'T solve everything but Problem 4.

Assuming that it is better to solve problems than not, $\neg\phi_{\forall}$ and $\neg\phi_{excl}$ differ in whether they would be perceived as fortunate or unfortunate. $\neg\phi_{\forall}$ says that I didn't solve every problem distinct from Problem 4, i.e. that I didn't solve all of Problems 1-3. So, $\neg\phi_{\forall}$ would be unfortunate. By contrast, $\neg\phi_{excl}$ is fortunate, as it says that I did solve Problem 4. The adverb in (15a) (*unfortunately*) fits with the negation of $\phi_{\forall}$, while the one in (15b) (*fortunately*) fits with the negation of ϕ_{excl}. The key

4 The data in this paper are based on the intuitions of the authors, along with other informants. Since some of the contrasts are gradient, it would be worthwhile to further test the empirical picture, perhaps with quantitative methods. We leave such investigation to the future.

5 If $\phi_{\forall}$ and ϕ_{excl} were on par semantically, the only route route to capture the data would be to draw upon independent factors, such as pragmatic constraints, to explain why (13b) is degraded. Potential pragmatic accounts remain to be considered. Here, we will pursue PEX, whose lexical semantics results in the two inferences interacting differently with negation, as discussed.

observation is, once again, a contrast. Whereas (15a) is natural, (15b) is clearly infelicitous. This suggests that only $\phi_{\forall}$ is negated by default, as in the PEX analysis, where ϕ_{excl} projects over negation as a presupposition.[6]

4.3 A further test

Our target in considering data with negation has been to dissociate $\phi_{\forall}$ and ϕ_{excl} in an environment from which presuppositions typically project. The analysis with PEX can also capture intuitions when the exceptive is embedded in other projection environments. A further case involves questions, as in (16).

(16) Did you solve everything but Problem 4?

A potential LF for (16) with EXH is (17), where EXH occurs within the question nucleus. EXH would introduce both $\phi_{\forall}$ and ϕ_{excl} as asserted content, so the question would ask whether the conjunction of the two inferences holds. As with negation, the two inferences are treated in parallel. By contrast, in the LF with PEX in (18), ϕ_{excl} is presupposed, and so it projects out of the question. The question asks just whether the universal inference, $\phi_{\forall}$, holds.

(17) **LF 1: EXH**
[$_{CP}$ C [$_{TP}$ EXH [$_{vP}$ you solve [$_{DP}$ everything but Problem 4]]]]
a. P: –
b. A: ? [$\phi_{\forall} \wedge \phi_{excl}$]

(18) **LF 2: PEX**
[$_{CP}$ C [$_{TP}$ PEX [$_{vP}$ you solve [$_{DP}$ everything but Problem 4]]]]
a. P: ϕ_{excl}
b. A: ? [$\phi_{\forall}$]

To set up a possible context, suppose that Problems 1-3 were easy, and that Problem 4 was exceptionally hard. After the exam, one student asks their friend the question with the exceptive, as in (19). The question can be produced with a neutral prosody, where stress occurs by default on *Problem 4*, the rightmost element. We consider intuitions when the responder provides a negative answer. In (19a), that answer is justified by affirming that $\phi_{\forall}$ does not hold. In (19b), the justification is

6 The contrast in (15) seems sharper than the one in (13). As noted above, (13b) may be possible if ϕ_{excl} is locally accommodated. Local accommodation may be less likely in the provided context without a continuation. Note that (15b) can, in fact, be improved if a continuation is added and, especially, if stress is also shifted to *but* ('Fortunately, I didn't solve everything BUT Problem 4. I solved Problem 4, too!'). We will discuss effects of stress shift in Section 5.

that ϕ_{excl} does not hold. Similar to the intuitions in Section 4.1, we find that (19a) is entirely natural, while (19b) is relatively degraded.

(19) Did you solve everything but Problem 4?
  a. No, I didn't solve Problem 3.
  b. ??No, I solved Problem 4.

In asking the question in (19), it appears that the speaker is assuming that their friend would not have been able to solve Problem 4. Indeed, the continuation in (19b) seems to be more natural if the response were framed so as to target presupposition, as in (20). This use of *Hey, wait a minute!* to flag an unwarranted presupposition is adapted from Shanon 1976 and von Fintel 2004.

(20) Did you solve everything but Problem 4?
  a. Hey, wait a minute! I solved Problem 4.
  b. Hey, wait a minute! #I didn't solve Problem 3.

The intuitions fit with PEX. As shown above, with PEX, the question would only interrogate $\phi_{\forall}$, so the contrast in (19) is expected. At the same time, the question would still express ϕ_{excl} as a projected presupposition, so it should be possible for the responder to call out that inference, as is facilitated in (20).

5 A marked pattern

The data thus far suggest that, by default, ϕ_{excl} escapes negation, as well as questions. This behavior is expected if ϕ_{excl} is a presupposition, as in the PEX analysis. In this section, we will take a closer look at the negation data, and observe that projection is *not* observed in a denial context when the sentence is realized with main stress on the exceptive morpheme. We will make a case that these data do not challenge PEX. Rather, they are predicted as part of a more general pattern of how prosody and presupposition interact, which is observed with a range of triggers, including in other data where PEX itself has been posited.

5.1 The data

To start, we return to the continuation data from Section 4.1, repeated below from (13). In Section 4.1, we considered a prosodic pattern where primary stress occurs on negation, as a reflex of verum focus. We observed that the continuation in (13a) (supporting $\neg\phi_{\forall}$) is acceptable, while the one in (13b) (supporting $\neg\phi_{excl}$) is relatively degraded. The LF with PEX is reproduced in (21).

(13) *(I heard you solved Problems 1-3, but not 4.)*
No, I DIDN'T solve everything but Problem 4.
a. I didn't solve Problem 3 either.
b. ??I solved Problem 4 too.

(21) **Default LF**
[not [PEX [$_{vP}$ I solve [$_{DP}$ everything but Problem 4]]]]
a. P: ϕ_{excl}
b. A: $\neg\phi_{\forall}$

At this point, we add a new layer to the empirical picture. In (22), the context is kept the same as in (13), but the sentence is produced with stress on the exceptive morpheme. Strikingly, the judgment in (13) flips in (22), and becomes fully sharp. The acceptable continuation is now the one that denies ϕ_{excl}, and conversely, the continuation which denies $\phi_{\forall}$ is entirely unacceptable.

(22) *(I heard you solved Problems 1-3, but not 4.)*
No, I didn't solve everything BUT Problem 4.
a. I solved Problem 4 too.
b. #I didn't solve Problem 3 either.

At first glance, the pattern appears to be the opposite of what would be predicted with PEX. However, we will suggest that when the speaker opts for stress on *but* in (22), they adopt a marked syntactic parse where the presupposition of PEX is locally accommodated in the scope of negation. On that basis, we will be able to predict that the continuation in (22a) is acceptable. Moreover, we will account for why the continuation in (22b) is unacceptable on that same parse.

5.2 A general effect

When certain presupposition triggers occur under negation, it has been observed that the presupposition is readily targeted by negation when the trigger is stressed (cf. Horn 1985, 1989). Consider data with *quit*. In (23), *quit* would trigger the presupposition that I used to smoke, and, by default, that should project. In (24), however, *quit* receives stress, and it is natural to deny the presupposition. The presupposition would be taken to undergo local accommodation in (24).

(23) I didn't quit smoking. I like it too much!
a. P: I used to smoke
b. A: $\neg$ [I no longer smoke] $\Leftrightarrow$ I smoke now

(24) I didn't QUIT smoking. I never smoked!

In the exceptive data, the presupposition trigger would be PEX, which is covert, so cannot itself be stressed, as with *quit*. Nonetheless, Bassi et al. (2021) suggest that local accommodation can be signaled prosodically with PEX. They consider data involving scalar implicatures, and take it that local accommodation is facilitated with stress on the overt scalar item. Consider (25), with disjunction.

(25) Mary didn't have cake or ice cream.

In the LF in (26), PEX occurs under negation. The *v*P in (26) asserts the disjunction that Mary had cake or ice cream. Assuming that an alternative replaces *or* with *and*, PEX would yield the presupposition that Mary didn't have both. That would project, yielding (26a), and negation would yield (26b). Taken together, (26) conveys that Mary had neither one, which is the default reading of (25).

(26) **LF for (25)**

[not [PEX [$_{vP}$ Mary have [cake or ice cream]]]]

a. P: ¬[CAKE ∧ ICE CREAM]
b. A: ¬[CAKE ∨ ICE CREAM]

Yet, a number of works have noted that the 'not both' implicature is computed in the scope of negation when the disjunction morpheme is stressed, as in (27) (for recent discussion, see Fox & Spector 2018). Bassi et al. (2021) propose that stress on *or* signals local accommodation of the presupposition that PEX triggers. That way, *not* negates the proposition that Mary had cake or ice cream, and not both, as in (27b). The continuation is, then, compatible with the assertion.

(27) Mary didn't have cake OR ice cream. She had both!

a. P: –
b. A: ¬ [[CAKE ∨ ICE CREAM] ∧ ¬[CAKE ∧ ICE CREAM]]

Just as stress on *or* facilitates local accommodation of PEX's presupposition in (27), we will take it that stress on *but* facilitates local accommodation of PEX's presupposition in (22). We spell out the analysis next.

5.3 Analyzing the exceptive

Our data of central concern are repeated below. For concreteness, we assume with Bassi et al. 2021 that local accommodation is due to a covert operator, $\mathscr{A}$ (as in Beaver & Krahmer 2001). We suggest that stress on *but* in (22) occurs with the LF

in (28) for the target sentence. PEX is present, as before, but now the $\mathscr{A}$ operator occurs, as well. $\mathscr{A}$ attaches just above PEX, still under negation.

(22) *(I heard you solved Problems 1-3, but not 4.)*
No, I didn't solve everything BUT Problem 4.
a. I solved Problem 4 too.
b. #I didn't solve Problem 3 either.

(28) **LF for (22)**
[not [$\boxed{\mathscr{A}}$ [PEX [$_{vP}$ I solve [$_{DP}$ everything BUT Problem 4]]]]]

The $\mathscr{A}$ operator is defined in (29). This entry assumes that presupposition failure yields a stigmatized truth-value, #. In that case, $\mathscr{A}$ takes a trivalent proposition and maps it to a bivalent one. The result is like the input, p, except that it returns false, rather than #, when the presupposition fails. In effect, the presupposition is re-analyzed on a par with the asserted content.

(29) **Defining $\mathscr{A}$**
$[\![\mathscr{A}]\!] = \lambda p_{st} \,.\, \lambda w \,.\, 1$ if p(w) = 1, 0 if p(w) = 0 or #

As a result, the LF in (28) expresses the meaning components in (30a) and (30b). There is no projected presupposition, as in (30a). Because the $\mathscr{A}$ operator takes scope under negation, ϕ_{excl} is part of the assertion beneath negation. The overall assertion, shown in (30b), is thus the disjunction that either I didn't solve every other problem (i.e. $\neg\phi_{\forall}$) or I did solve Problem 4 (i.e. $\neg\phi_{excl}$).

(30) **Predicted meaning**
a. P: –
b. A: $\neg(\phi_{\forall} \wedge \phi_{excl}) \Leftrightarrow \neg\phi_{\forall} \vee \neg\phi_{excl}$

It immediately follows that the continuation in (22a) is acceptable. That supports $\neg\phi_{excl}$ and, with local accommodation, it entails the assertion. Still, more needs to be said to explain why the continuation in (22b) is not acceptable, too. (22b) supports $\neg\phi_{\forall}$, and so would also entail the assertion in (30).

We suggest that the continuation in (22b) is ruled out due to a competition between structures. Consider parses with and without the $\mathscr{A}$ operator side by side, along with their assertions. The assertion without $\mathscr{A}$ is $\neg\phi_{\forall}$ itself. With $\mathscr{A}$, the assertion is equivalent to a disjunction with $\neg\phi_{\forall}$ as one disjunct. As a result, *both* parses are compatible with $\neg\phi_{\forall}$. Yet, we take it that the parse in (21) blocks that in (28) when the universal inference is to be denied.

(21) **LF 1: default**

[not [PEX [$_{vP}$ I solve [$_{DP}$ everything but Problem 4]]]]

$\hookrightarrow$ A: $\neg\phi_{\forall}$

(28) **LF 2: with $\mathscr{A}$**

[not [$\mathscr{A}$ [PEX [$_{vP}$ I solve [$_{DP}$ everything BUT Problem 4]]]]]

$\hookrightarrow$ A: $\neg\phi_{\forall} \vee \neg\phi_{excl}$

The competition could take place in either of two ways. One possibility is that it is based on informativity, as the assertion is stronger in (21) than (28). Another possibility is that the structures compete based on syntactic complexity: (21) is syntactically less complex than (28), due to the absence of the $\mathscr{A}$ operator. By either metric, the parse in (21) should be preferred when possible. If the universal inference is to be denied, (21) can be deployed, and will block (28).

Hence, the data can be accounted for with PEX. A basic parse without $\mathscr{A}$ is adopted as the default in (13), but with stress on *but* in (22), the $\mathscr{A}$ operator occurs under negation. That parse allows for denial of ϕ_{excl}, due to local accommodation, but not for denial of $\phi_{\forall}$, due to competition with the basic parse.[7,8]

5.4 Taking stock

Over the past two sections, we have presented a series of observations, which taken all together, show that ϕ_{excl} seems to escape negation and questions by default, but still can be targeted by negation, especially when *but* receives stress. The full data set can be accounted for if ϕ_{excl} is triggered as a presupposition, but can be locally accommodated as a marked option. In that case, if ϕ_{excl} is a grammatical implicature, its source should be the presuppositional operator, PEX.

7 To clarify, our aim has not been to argue that the data in (22) by themselves necessarily require PEX. To account for (22) with EXH, it would be necessary to formulate an analysis where stress on *but* in this case does not involve local accommodation. One possibility to explore might be that *but* itself is focused in (22), and has *including* as an implicit alternative. As we see it, a strength of the PEX analysis lies in its ability to predict (13) and (22) together.

8 One might wonder whether shifting stress to *but* could also facilitate local accommodation in a question, allowing it to readily interrogate ϕ_{excl}. In general, stress shift does not seem to aid local accommodation in questions, at least not by itself. In (i-a), PEX would yield the presupposition that you did not have *both* cake or ice cream. Yet, the question is infelicitous to interrogate that inference, even with *or* stressed. (ii-a) seems to be unnatural as a means to interrogate ϕ_{excl}, as well. It remains to be more fully explored whether (ii) can be improved in context.

(i) a. #Did you have cake OR ice cream?
b. No, I had both.

(ii) a. #Did you solve everything BUT Problem 4?
b. No, I solved Problem 4.

6 A note on alternatives

Since the outset of the paper, we have made an assumption about the alternative set for PEX. Consider again (1), with the LF in (9). We took it that the alternative set (ALT) contains (31). By negating (31), PEX immediately introduces the exclusion inference in its presupposition, as in (32). We will refer to (31) as the 'deletion' alternative, since it amounts to the proposition that would result from deleting all material in the object DP except for *Problem 4*.

(1) I solved everything but Problem 4.

(9) **LF for (1)**
[PEX [$_{vP}$ I solve [$_{DP}$ every [thing [but Problem 4]]]]]

(31) **Deletion alternative**
SOLVE(I, Problem 4)

(32) **Target inference**
$\neg$SOLVE(I, Problem 4) = ϕ_{excl}

However, the deletion alternative cannot account for a key property of *but*-exceptives: that *but* is unacceptable when the quantifier is not universal, such as in (33). von Fintel (1993) proposed that (33) is ungrammatical because it expresses a pathological meaning, in particular a contradiction. Yet, with just the deletion alternative, no contradiction arises with PEX (or EXH). Consider (34).

(33) *I solved something but Problem 4.

(34) **LF for (33)**
[PEX [$_{vP}$ I solve [$_{DP}$ some [thing [but Problem 4]]]]]

The prejacent of PEX says that I solved something distinct from Problem 4, as in (35b). The deletion alternative would again be (31), and excluding it yields (35a). So, (34) would presuppose that I didn't solve Problem 4, and assert that I solved a different problem. These are mutually consistent. In order to derive a contradiction, a stronger presupposition should be predicted, one which does contradict the assertion. To that end, PEX must negate additional alternatives.

(35) **Predicted meaning**

a. P: $\neg$SOLVE(I, Problem 4)

b. A: $\exists$x [x $\neq$ Problem 4 $\wedge$ SOLVE(I, x)]

In this section, we will take a closer look at the make up of ALT. While ALT must contain further alternatives, we suggest that the deletion alternative is motivated as well, in line with our initial assumption.

6.1 Step 1: substitution alternatives

In order to capture the distribution of *but*, we adopt *substitution* alternatives. We start with the alternative set in Hirsch 2016 (adapted from Gajewski 2008). In that analysis, the complement of *but* is focused (Gajewski 2008), and alternatives are formed by substituting the focused element with any constituent of *equal or lesser* structural complexity (Fox & Katzir 2011). With the LF in (34), the alternatives distinct from the prejacent are taken to be as in (36).

(36) **Alternatives (substitution)**

a. $\exists x [\ x \neq \underline{\text{Problem 1}} \wedge \text{SOLVE}(I, x)\ ]$

b. $\exists x [\ x \neq \underline{\text{Problem 2}} \wedge \text{SOLVE}(I, x)\ ]$

c. $\exists x [\ x \neq \underline{\text{Problem 3}} \wedge \text{SOLVE}(I, x)\ ]$

Negating (36a) says that I didn't solve any problem distinct from Problem 1, i.e. Problems 2, 3, or 4. Negating (36b) says that I didn't solve any problem distinct from Problem 2, i.e. Problems 1, 3, or 4. It is thus presupposed that I solved *no* problem. That is stronger than (35a), and does conflict with the asserted prejacent (that I solved some problem distinct from Problem 4). The deviance of (33) can thus be accounted for based on substitution alternatives.[9,10] Still, with PEX as the exhaustivity operator, the deletion alternative has a role to play, as well.

6.2 Step 2: deletion alternative

We return to data with a universal quantifier. The LF for (1) is repeated below. Our concern is how the exclusion inference (that I didn't solve Problem 4) is derived. Suppose that just the substitution alternatives in (37) are in ALT.

9 The alternative set assumed here may not be sufficient to fully predict the deviance of *but* with an existential once a broader range of contexts are considered (see Gajewski 2013, and a possible response in Hirsch 2016). We will set aside these complications here.

10 The analysis with PEX has implications for negative existential sentences, which are acceptable (e.g. *I didn't solve anything but Problem 4*). A contradiction could be avoided, first, if negation took high scope, as in (i). PEX would negate (36a)-(36c) to say that I solved none of Problems 1-4. That would be presupposed, and project. Negation would yield the assertion that I did *not* solve any problem distinct from Problem 4 (i.e. Problems 1-3). The presupposition and assertion are consistent. Still, (i) must be illicit, since the sentence cannot say that I solved nothing. We suggest that this LF is ruled out on pragmatic grounds: the presupposition entails the assertion, trivializing the assertion. In the licit LF, negation would take scope under PEX instead (see Gajewski 2008).

(i) [NEG [PEX [$_{vP}$ I solved [$_{DP}$ any [thing [but Problem 4]]]]]]

(9) **LF for (1)**

[PEX [$_{vP}$ I solve [$_{DP}$ every [thing [but Problem 4]]]]]

(37) **Alternatives (substitution)**

a. $\forall$x [x $\neq$ Problem 1 $\rightarrow$ SOLVE(I, x)]

b. $\forall$x [x $\neq$ Problem 2 $\rightarrow$ SOLVE(I, x)]

c. $\forall$x [x $\neq$ Problem 3 $\rightarrow$ SOLVE(I, x)]

Due to PEX, the negation of (37a)-(37c) would be presupposed. That is, it would be presupposed that I did not solve everything distinct from Problems 1, 2, and 3, respectively, which does not, on its own, entail ϕ_{excl}. Rather, ϕ_{excl} is captured only by combining the presupposition with the asserted prejacent. Consider the negation of the first alternative: that I didn't solve everything distinct from Problem 1. The prejacent says that I did solve everything distinct from Problem 4. Taken together, it must be that I didn't solve Problem 4, as in (38).

(38) **Deriving exclusion**

$\neg$(37a) $\wedge$ ... $\wedge$ $\phi_{\forall}$ $\Rightarrow$ ϕ_{excl}

While ϕ_{excl} could be captured in this way in the positive universal case, the prediction changes substantially in our core case with *negation*. Throughout the paper, we have assumed that ϕ_{excl} projects over negation in (10). Yet, with just the alternatives in (37), ϕ_{excl} would not be derived from (12).

(10) I didn't solve everything but Problem 4.

(12) **LF for (10)**

[not [PEX [$_{vP}$ I solve [$_{DP}$ every [thing [but Problem 4]]]]]]

Again, the presupposition would be that I didn't solve everything distinct from Problems 1, 2, and 3, respectively. So, ϕ_{excl} would not be presupposed. However, since the assertion is changed, ϕ_{excl} would not be derived at all. (12) asserts that I did *not* solve everything distinct from Problem 4, either. Suppose that I did solve Problem 4, but didn't solve two other problems, say 1 and 2. In that scenario, the presupposition and assertion would both be verified. The issue is in (39).

(39) **No exclusion**

$\neg$(37a) $\wedge$ ... $\wedge$ $\neg\phi_{\forall}$ $\not\Rightarrow$ ϕ_{excl}

Hence, if ϕ_{excl} projects in (10), the deletion alternative must be in ALT, in line with

our initial assumption.[11] As shown above, negating (31) directly yields ϕ_{excl} as part of the presupposition, so ϕ_{excl} would project.[12]

6.3 Deriving ALT

Substitution alternatives can help regulate the distribution of *but*. However, the deletion alternative still seems to be needed to introduce ϕ_{excl} in the negation data. We take it that the algorithm to form alternatives should yield both together. One possibility, then, is that alternatives are formed by making substitutions or deletions within the larger DP containing the exceptive phrase. In the universal LFs in (9) or (12), that DP is *everything but Problem 4*. Substitution alternatives would come from replacing *Problem 4* with equally complex DPs, and the deletion alternative would come from deleting *everything but* from the structure.

Another route is to form alternatives by substitution alone, but to replace the complement of *but* with *any* entity (see Gajewski 2008). To derive what amounts to the deletion alternative, Problem 4 in the prejacent must be substituted with the plurality of Problems 1, 2, and 3 (Crnič 2024). To illustrate, *but* could be re-defined as in (40) to allow for a plural argument (cf. Thomas 2011). *But* would apply to an atomic or plural entity, x, and return the set of entities having no part in common with x. The crucial alternative is (41a), equivalent to (31), as in (41b).

(40) $[\![\text{but}]\!] = \lambda x\,.\,\lambda y\,.\,\neg\text{Overlap}(y, x)$

(41) **Potential alternative**

a. $\forall x\,[\,\neg\text{Overlap}(x, \text{Problems 1, 2, and 3}) \rightarrow \textsc{solve}(I, x)\,]$

b. $\Leftrightarrow \textsc{solve}(I, \text{Problem 4})$

11 Direct support that the projected presupposition is ϕ_{excl} (and not weaker) is in (i). The right conjunct is (10), and the left is ϕ_{excl} in (ia), but $\neg\phi_{excl}$ in (ib). With PEX, infelicity in (ib) follows if ϕ_{excl} projects. Note that *but* is stressed in (i). These sequences set up a contrast between Problem 4 and the other three problems, so the DP *everything but Problem 4* is focused. Since *Problem 4* is given, focal stress falls on *but*. As such, stress on *but* is not indicative of local accommodation here. Indeed, the right conjunct is taken to assert $\neg\phi_{\forall}$ in (i), as it would by default with PEX.

(i) a. I didn't solve Problem 4, and I didn't solve everything BUT Problem 4 either.
b. #I solved Problem 4, but I didn't solve everything BUT Problem 4.

12 In ongoing work, Yunhui Bai and Jingyi Chen (p.c.) draw upon alternatives formed by deletion to develop a novel derivation for sufficiency readings with *only*, which they take to be decomposed into PEX and an exceptive (building on Crnič 2024, 2025). They initially motivate a deletion alternative in part by observing a problem parallel to (39). Crnič (2024) also posits an alternative analogous to (31) (illustrated in (41) for our case). Crnič deploys the alternative with a range of projection data. Derivations with and without that alternative are compared in Crnič 2025.

Further consideration of potential alternatives and the algorithm to compute them should be offered, but for now, we leave it open.[13]

7 Conclusion

In this paper, our main aim has been to assess how the inferences of a *but*-exceptive pattern under negation, both by default, and when the exceptive morpheme is realized with marked stress. Taken together, our full data set is expected if the universal inference is asserted, while the exclusion inference is presupposed. If the exclusion inference is a grammatical implicature, our results thus support the proposal that exhaustification is due to a presuppositional operator, PEX.

One issue for future work regards differences between scalar items and *but*-exceptives. Bassi et al. (2021) note that, in (42) (Russell 2012), the presupposition of PEX patterns as not-at-issue. While (42b) asserts that not all students passed, (42a) would presuppose that, due to PEX. If the interjection must target asserted content, the deviance of (42a) is expected. By contrast, in (43), the exceptive is quite natural. Since the speaker is upset because they did not solve Problem 4, it seems that the exclusion inference can be asserted here.

(42) (I want all my students to pass.)
   a. Crap! #Some of my students passed.
   b. Crap! Only some of my students passed.

(43) (I want to get a perfect score.)
Crap! I solved everything but Problem 4.

It may be that local accommodation is more readily available with exceptives than scalar implicatures in certain contexts.[14] It remains to be further investigated when local accommodation can occur without marked stress and, in particular, why scalar items and exceptives come apart, if both involve PEX.

13 With the full alternative set adopted here, note that it is crucial to assume an exhaustivity operator that negates all non-weaker alternatives (as in Chierchia 2013) rather than one that negates only those alternatives that are innocently excludable (as in Fox 2007). For the existential case in (34), the former operator would yield a contradiction, as discussed above. With innocent exclusion, the LF in (34) could, in principle, be ruled out if the PEX operator were to apply vacuously (cf. Fox & Spector 2018). None of the substitution alternatives in (36) would be innocently excludable. However, the presence of the deletion alternative in ALT makes it such that the application of PEX would not be vacuous, since that alternative can itself be excluded, as noted with (35).

14 See also Section 3.2 of Crnič 2024 on accommodation. Crnič discusses a range of cases where the presupposition of exceptives is amenable to local accommodation.

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