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Redundancy and presuppositional exhaustification*

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Abstract Recent work has argued that different inferences, such as homogeneity and implicatures, are in fact presuppositions, based on similarities in their pragmatic status and their projection properties (Fox 2018; Bassi, Del Pinal & Sauerland 2021; Guerrini & Wehbe 2025). Nevertheless, these inferences seem to differ from presuppositions in some ways: (i) as evidenced by the Hey, wait a minute! test, homogeneity and implicatures don't interact with the common ground in the same way as presuppositions (Spector 2013; Bassi et al. 2021) and (ii) homogeneity and implicatures project differently from presuppositions in some environments, like the scope of certain quantifiers (Spector 2013; Križ 2015; Chatain & Schlenker 2025). In this paper, I argue that under the view that homogeneity and implicatures are due to the presuppositional exhaustification operator *pex*, (i) follows from an independently needed redundancy constraint which requires that presuppositions due to *pex* have to be canceled with the A operator. I then show that on a modular theory of presupposition projection, this result can be exploited to account for at least some of the differences in projection.

Keywords: implicatures, homogeneity, presuppositions, redundancy, presupposition projection

1 Introduction

A variety of inferences, such as homogeneity and scalar implicatures (SIs), often project like presuppositions but differ from presuppositions in important ways. First, homogeneity and SIs don't behave pragmatically like presuppositions. Additionally, while these inferences do share certain projection patterns with presuppositions, they appear to project differently from presuppositions from certain environments. Based on these differences, it has been argued that these inferences constitute different kinds of projective meanings (e.g. Križ 2015 for homogeneity; Spector 2024 for

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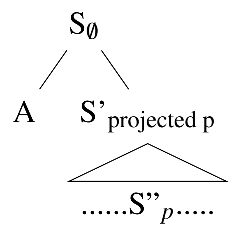
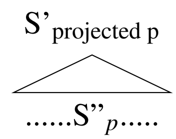
scalar implicatures). The main goal of this paper is to make progress towards a unified analysis of all of these inferences as presuppositions, where the apparent differences between them can be reduced to independently motivated factors.

Starting with the pragmatic differences, I will argue, following Fox (2018) for homogeneity, that homogeneity and scalar implicatures, unlike standard presuppositions, require an A operator which cancels the presupposition at the matrix level, as illustrated in (1). The main challenge for adopting this as a general account of the pragmatic differences is to provide a predictive theory of when matrix A has to be inserted. I assume that homogeneity and SIs are presuppositions that are triggered by the presuppositional exhaustification operator *pex* and argue that an independently motivated redundancy constraint on the insertion of *pex* predicts the desired result in (1), thus providing a novel account of the source of the pragmatic differences.

(1) a. **Homogeneity and SIs:**



b. **Standard presupposition:**



Assuming that this is the only difference between homogeneity/SIs and standard presuppositions, the apparent differences in projection have to follow from whether or not a matrix A is inserted. Different theories of presupposition projection predict a different division of labor between the semantic presupposition that the projection algorithm itself predicts and the pragmatic inference that we get from accommodating a common ground that satisfies the presupposition. Under a modular theory where some of the inferences we get with standard presuppositions are in fact due to the pragmatic process of presupposition accommodation, we predict that certain inferences due to standard presuppositions should not be present with homogeneity and SIs, where the matrix A cancels the presupposition and no accommodation is required. Under the account outlined above, homogeneity and SIs can therefore provide a way to isolate the semantic component of presupposition projection.

In the second part of the paper, I discuss two types of inferences from presupposition projection that on certain theories are predicted to not be the result of the semantic presupposition alone. First, I show in section 3, by extending the argument from Fox (2018) from homogeneity to SIs, that both SIs and homogeneity do not give rise to proviso strengthening, as predicted by a modular theory where proviso inferences are due to the pragmatic process of accommodating a common ground that entails the presupposition. I show that this explains why homogeneity/SIs and standard presuppositions appear to project differently in some environments, such as the scope of certain quantifiers. In section 4, I argue that under certain theories, left-right asymmetries in presupposition projection can also be taken to be part of the pragmatic process of presupposition accommodation. I provide preliminary evidence that homogeneity is not sensitive to left-right asymmetries. If this finding is robust, it provides a novel argument for modular theories which treat these asymmetries as extra-semantic inferences that do not follow from the semantic algorithm for presupposition projection.

2 Deriving the pragmatic differences

Homogeneity and scalar implicatures, like presuppositions, project from under negation and from other environments, like the scope of non-monotonic quantifiers (Križ & Chemla 2015; Bassi et al. 2021; Gotzner & Benz 2022). This is illustrated in the examples below for negation, where we see that all of these phenomena don't give rise to complementary truth-conditions for a sentence and its negated counterpart. Starting with presuppositions, both (2a) and (2b) entail the presupposition that *Mary has two books*. Similarly with homogeneity, both (3a) and its negated counterpart in (3b) entail that Mary didn't read only some of the books. Finally, the *not-and* implicature that disjunctions give rise to similarly survives negation: both (4a) and (4b) entail that Mary didn't read both book A and book B.

(2) **Presupposition:**

a. Mary read both of her books.
$\rightarrow$ Mary has two books.

b. Mary didn't read both of her books.
$\rightarrow$ Mary has two books.

(3) **Homogeneity**:

a. Mary read the books.
$\rightarrow$ Mary didn't read only some of the books.

b. Mary didn't read the books.
$\rightarrow$ Mary didn't read only some of the books.

(4) **Scalar implicature** (*OR*$\rightarrow$ *not-AND*)

a. Mary read book A or book B.
$\rightarrow$ Mary didn't read both book A and book B.

b. Mary didn't read book A or book B.
$\rightarrow$ Mary didn't read both book A and book B.

Despite the projection similarities between these three types of inferences, it has been observed that homogeneity and SIs don't feel like presuppositions pragmatically. As observed by von Fintel (2004), presuppositions can be objected to with *Hey, wait a minute!*. For example, in (5), A's utterance presupposes that *Mary has two books* and B can object that this presupposition is not in the common ground. Homogeneity and scalar implicatures don't license analogous objections (Spector 2013; Bassi et al. 2021), as shown in (6) and (7), thus raising a challenge to a unified analysis of these inferences as presuppositions.

(5) **Standard presupposition:**

a. A: Mary read both of her books.

b. B: Hey, wait a minute! I didn't know Mary had two books.

(6) **Homogeneity:**

a. A: Mary read the books.

b. #B: HWAM! I didn't know that she didn't read only some of the books.

(7) **Scalar Implicature:**

a. A: Mary read book A or book B.

b. # B: HWAM! I didn't know that she didn't read both of the books.

Looking only at homogeneity, Fox (2018) argues that the homogeneity presupposition in (8a) gives rise to a proviso problem which is rescued by inserting a matrix A operator that cancels the presupposition, thus explaining why the inference doesn't behave like a presupposition in (6). More specifically, Fox argues that it is generally odd to accommodate a common ground which entails the disjunction in (8a) without entailing one of the disjuncts. In other words, it is difficult to accommodate an information state where we know that Mary either read all or none of the books, without knowing which. In order to resolve this issue, Fox argues that the presupposition has to be cancelled with matrix A, making it part of the asserted meaning. The main problem with the proviso account for our purposes here is that it does not extend to scalar implicatures in general, since many of them do not give rise to a disjunctive inference like homogeneity. For example, in (7) there is no reason to think that the presupposition that *Mary didn't read both of the books* would be a difficult one to minimally accommodate.

(8) a. **Homogeneity presupposition:** Mary read all or none of the books.

b. ***not-and*** **presupposition:** Mary didn't read both of the books.

The goal of this section is to offer a novel proposal for why these pragmatic differences arise that extends to scalar implicatures. I assume that both SIs and homogeneity are presuppositions that are generated by the presuppositional exhaustification operator *pex* (Bassi et al. 2021; Guerrini & Wehbe 2025). I then argue that whenever *pex* is present in an LF, a matrix A that cancels its presupposition is also obligatorily present, as illustrated in (9). In particular, I will argue that LFs like (9b), where *pex* is present without matrix A are ruled out by an independently needed redundancy condition on the insertion of *pex*. This explains why homogeneity and scalar implicatures can't be objected to with *Hey, wait a minute!*: since matrix A cancels the presupposition, these inferences are predicted to behave like assertions with respect to how they interact with the global common ground.

(9) a. ***pex* with matrix A**: b. * ***pex* without A**:

2.1 Introducing *pex*

Bassi et al. (2021) argue that implicatures are in fact presuppositions, based on how they project from certain environments. They propose to replace the assertive operator *exh*, which conjoins the implicature to the asserted meaning of the prejacent, with a presuppositional exhaustification operator *pex* which adds the implicature as a presupposition.[1] For example, *some* has the truth-conditions in (10) without *pex* and *pex* simply adds the *not-all* implicature as a presupposition (11): (11) is undefined iff Mary read all of the books.

(10) $[\![\text{Mary read some of the books}]\!] = \begin{cases} 1 \text{ iff Mary read at least some of the books} \\ 0 \text{ iff Mary read none of the books} \end{cases}$

(11) $[\![\text{ pex [Mary read some of the books]}]\!] =$
$\begin{cases} 1 \text{ iff Mary read some but not all of the books} \\ 0 \text{ iff Mary read none of the books} \\ \# \text{ otherwise} \end{cases}$

Turning to homogeneity, Guerrini & Wehbe (2025) similarly argue that the inference is due to *pex*, where the basic meaning without *pex* is existential (following

1 The presupposition due to *pex(p)* in general is the material conditional $p \rightarrow exh(p)$ and not just *exh*(p), but this won't make a difference for the cases we look at where the two presuppositions are equivalent.

Bar-Lev 2021). The truth-conditions without *pex* are given in (12) and *pex* simply adds the homogeneity presupposition, resulting in the truth-conditions in (13).

(12) $[\![\text{Mary read the books}]\!] = \begin{cases} 1 \text{ iff Mary read at least some of the books} \\ 0 \text{ iff Mary read none of the books} \end{cases}$

(13) $[\![\text{[pex[Mary read the books]]}]\!] = \begin{cases} 1 \text{ if Mary read all of the books} \\ 0 \text{ if Mary read none of the books} \\ \# \text{ if Mary read only some of the books} \end{cases}$

2.2 Deriving the obligatoriness of A

I show in this section that a redundancy condition on the insertion of *pex*, coupled with Stalnaker's bridge principle in (14), predicts that *pex* gives rise to infelicity unless matrix A is inserted. The redundancy condition is given in (15) and simply rules out LFs where deleting *pex* does not change the overall truth-conditions. In section 2.3, I present evidence from Fox & Spector (2018) that this economy constraint is independently needed to account for certain restrictions on Hurford disjunctions.

(14) **Stalnaker's Bridge:** A sentence can be felicitously uttered only if its presupposition is entailed by the context set. (Stalnaker 1974)

(15) **Non-redundancy**: An occurrence of *pex* in a sentence S is not licensed in a context c if eliminating *pex* results in contextually equivalent truth-conditions.

To see this constraint at play, let's consider the example in (11), repeated below, and compare it to the counterpart without *pex* in (10). The bridge principle predicts that the parse with *pex* in (16) is only felicitous in a context which entails the presupposition that Mary didn't read all of the books. Now, given a context which entails that Mary didn't read all of the books, the parse with *pex* in (16) and the parse without *pex* in (10) become contextually equivalent: both parses are true in worlds where Mary read some but not all of the books and false in worlds where Mary read none of the books. Therefore, there is no context where (16) satisfies both the bridge principle and non-redundancy, thus predicting that (16) is always infelicitous.

(16) a. $[\![\text{ [pex [Mary read some of the books]]}]\!] =$
$\begin{cases} 1 \text{ iff Mary read some but not all of the books} \\ 0 \text{ iff Mary read none of the books} \\ \# \text{ otherwise} \end{cases}$

b. Presupposition: Mary didn't read all of the books.

We can save (16) from infelicity by inserting the A operator (17), which collapses falsity and undefinedness, at the matrix level, resulting in the truth-conditions in (18). Now, in a context which doesn't entail that Mary didn't read all of the books, (18) is not redundant: (18) is false in a world where Mary read all of the books, while the parse without *pex* in (10) is true in such a world. Thus, the parse with matrix A, unlike the counterpart without A, is able to satisfy both non-redundancy and the bridge principle.

(17) $[\![\text{A}]\!](t) = \begin{cases} 1 \text{ iff } t = 1 \\ 0 \text{ iff } t = \# \vee t = 0 \end{cases}$ (Bochvar 1981)

(18) $[\![[\text{A[pex[Mary read some of the books]]]}]\!]$=
$\begin{cases} 1 \text{ iff Mary read some but not all of the books} \\ 0 \text{ iff Mary read none or all of the books} \end{cases}$

This result generalizes to all presuppositions due to *pex*. The general definition for *pex* is given in (19). Since *pex* does not change the falsity conditions of its prejacent, when the presupposition of the parse with *pex* is met, it will always be contextually equivalent to the parse without *pex*. The redundancy constraint therefore successfully predicts that presuppositions due to *pex* have to be cancelled with the A operator. Assuming that both homogeneity and SIs are due to *pex*, we have therefore accounted for why they behave like assertions with respect to the *HWAM!* test.

(19) $[\![\text{pex}]\!]_{IE+II}([\![\phi]\!])= \lambda w. \begin{cases} 1 \text{ iff } [\![\phi]\!](w)\text{=1} \wedge [\![\text{exh}]\!]_{IE+II}(w)\text{=1} \\ 0 \text{ iff } [\![\phi]\!](w)\text{=0} \\ \# \text{ otherwise} \end{cases}$

2.3 Independent motivation for the redundancy condition

One question that this account raises is why other presupposition triggers that appear to be deletable, like *again* and *also*, don't also behave like *pex* in forcing a matrix A. For example, consider (20a): in a context where (20a)'s presupposition that someone else other than Jane read the book is met, (20a) is contextually equivalent to the counterpart where *also* is deleted in (20b). Yet, it is completely felicitous to utter (20a) in such a context. Therefore, it seems that the redundancy condition on the insertion of *pex* does not generalize to other deletable triggers. This raises the question of whether we have any independent evidence that *pex* is in fact sensitive to redundancy. In this section, I show that the redundancy condition on *pex* is independently needed to account for order asymmetries in Hurford disjunctions, following what Fox & Spector (2018) propose for assertive *exh*.

(20) a. Jane also read the book.

b. Jane read the book.

Hurford's constraint states that disjunctions where one disjunct entails the other are infelicitous (Hurford 1974). To see this, consider (21a): here, the first disjunct contextually entails the second and the disjunction is infelicitous.

(21) a. #Mary lives in Paris or France.

b. **Hurford's constraint:** A disjunction p or q is unacceptable when p entails q or q entails p.

Chierchia, Fox & Spector (2012) argue that local implicatures can sometimes rescue violations of Hurford's constraint. For example, in (22a), *Mary read all of the books* entails the first disjunct that *Mary read some of the books*, if we consider the basic meaning of *some* without its implicature. Yet, the sentence is felicitous. Chierchia et al. argue that this is because *exh* applies to the first disjunct in (22b), strengthening *some* to *some but not all* and breaking the entailment between the two disjuncts. Chierchia et al.'s account can be straightforwardly transposed to *pex*, where we can get the same result by having an A operator apply on top of *pex* in the first disjunct, collapsing presupposition and assertion, as shown in (23).

(22) a. Mary read some of the books or she read all of them.

b. exh(Mary read some of the books) or she read all of them.

(23) A(pex(Mary read some of the books)) or she read all of them.

a. First disjunct: Mary read some but not all of the books.

b. Second disjunct: Mary read all of the books.

Interestingly, the order of the two disjuncts is crucial here: when *some* is in the second disjunct in (24), the sentence becomes infelicitous (Singh 2008). Fox & Spector (2018) argue that the infelicity in (24) is due to an incremental redundancy condition on the insertion of *exh*. This constraint, which is also needed when we replace *exh* with *pex*, provides independent motivation for the constraint we assumed in section 2.2. The incremental redundancy condition on *pex* is given in (25).

(24) #Mary read all of the books or she read some of them.

(25) **Incremental Non-redundancy with *pex***: An occurrence of *pex* is not licensed if eliminating *pex* results in contextually equivalent truth-conditions regardless of how the sentence continues after *pex*'s prejacent.

To see how incremental redundancy predicts the order asymmetries in Hurford disjunction, consider first the infelicitous order in (24). Here, the parse with *pex* and A in the second disjunct is equivalent to the parse without *pex*: they're both true iff Mary read at least some of the books. Therefore, this parse is ruled out by the incremental non-redundancy condition and *pex* is unable to rescue the parse from a violation of Hurford's constraint. On the other hand, when *pex* is in the first disjunct, in order for the parse with *pex* to be incrementally equivalent to the parse without *pex*, it has to be the case that deleting *pex* doesn't change the truth-conditions, regardless of what the second disjunct is. It is clear that *pex* is not incrementally redundant in (27): if the second disjunct is *it rained*, the parse with *pex* and without *pex* will not be equivalent. *pex* can therefore be inserted to rescue a Hurford's constraint violation only when *some* is in the first disjunct.

(26) $[\![$Mary read all or A(pex(some)) of the books$]\!]$
$\Leftrightarrow$ $[\![$Mary read all or some of the books$]\!]$

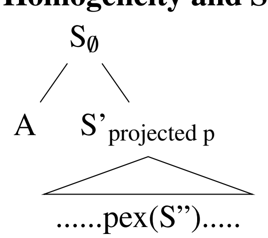
(27) a. A(pex(Mary read some of the books)) or...
b. $[\![$A(pex(Mary read some of the books)) or it rained$]\!]$
$\not\Leftrightarrow$ $[\![$Mary read some of the books or it rained$]\!]$

Note that the incremental non-redundancy condition discussed here for Hurford disjunctions maintains the result from section 2.2 that *pex* is redundant unless the A operator is inserted. We have therefore seen that there is independent evidence for a non-redundancy condition on *pex* and that this condition predicts the pragmatic differences between *pex* and other presupposition triggers, where only the former require a matrix A operator to be inserted, cancelling the presupposition globally.

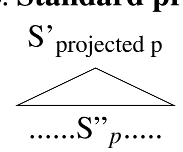
3 Consequences for projection: proviso strengthening

The goal of the rest of the paper is to show that the apparent differences in projection between homogeneity/SIs on one hand and standard presuppositions on the other follow from the fact that the A operator is obligatorily present only with the former. I assume that, all else being equal, inserting the A operator at the matrix level is preferred to inserting it locally, predicting that the presupposition due to an embedded *pex* in general projects and is then accommodated with a matrix A. Finally, I will assume Strong Kleene as the uniform projection algorithm for all of these inferences.

(28) a. **Homogeneity and SIs:**



b. **Standard presupposition:**



The first source of apparent differences in projection that I will discuss is the absence of proviso strengthening with homogeneity and SIs. In particular, Fox (2018) argues that homogeneity lacks proviso strengthening due to the presence of a matrix A operator. The goals of this section are to (i) show how the matrix A result derived in section 2 predicts the absence of proviso strengthening with homogeneity, following Fox (2018) and (ii) extend the same logic to certain cases where scalar implicatures appear to project differently from presuppositions. I show that the differences in projection are predicted by the redundancy constraint proposed in section 2, coupled with a modular theory of presupposition projection where proviso strengthening is not part of the projection algorithm itself.

More specifically, standard presuppositions sometimes give rise to inferences that are stronger than what Strong Kleene alone predicts. Fox (2013) argues that these stronger inferences follow from the pragmatics of accommodating a presupposition that satisfies Stalnaker's bridge principle in (29). To see this with an example, consider the projection of the presupposition trigger *both* from under the possibility modal *might*. In (30a), the presupposition that Mary has two books seems to project from the scope of *might*: we get an inference that Mary in fact has two books. Assuming a standard analysis of *might* as an existential quantifier over worlds, Strong Kleene alone predicts the trivalent truth-conditions in (30b) for the sentence: (30a) is predicted to be true iff there is a world compatible with the speaker's beliefs where Mary has two books and read both of them. Strong Kleene therefore fails to predict the stronger inference in (30a).

(29) **Stalnaker's Bridge:** A sentence S_p is assertable in a context C only if C entails p. (Stalnaker 1974)

(30) a. Mary might have read both of her books. → Mary has two books.

b. $[\![\text{Mary might have read both of her books}]\!]^s =$
$$\begin{cases} 1 \text{ if } \exists w : w \in Dox_s \wedge \text{Mary has two books and read both of them in w} \\ 0 \text{ if } \forall w : w \in Dox_s \rightarrow \text{Mary has two books and didn't read both in w} \\ \# \text{ otherwise} \end{cases}$$

Fox (2013) argues that the stronger inference that we detect in cases like (30a) is due to a pragmatic process where in order to satisfy the bridge principle in (29), the hearer can in certain cases accommodate a common ground that is stronger than what the semantic presupposition minimally demands. For (30b), the hearer has to accommodate a common ground that entails the presupposition in (31a). Since accommodating only (31a) does not result in a plausible information state, the hearer accommodates the stronger presupposition in (31b).[2] If the hearer accepts what the

2 There is a large literature relating to the proviso problem and how we choose among different

speaker believes to be true, then this explains the inference we get in (30a) that Mary in fact has two books.

(31) a. **Semantic Presupposition for (30b)**: Either [it is compatible with the speaker's beliefs that Mary has two books and read both of them] or [the speaker believes that Mary has two books].

b. **Strengthened presupposition:** The speaker believes that Mary has two books.

We therefore see that the stronger inference with *both* is due to the pragmatic process of accommodating a common ground that entails the semantic presupposition. Turning to homogeneity and SIs, since matrix A cancels the presupposition, the bridge principle is trivially satisfied and therefore no common ground accommodation is needed. We therefore predict that both homogeneity and SIs should not give rise to proviso strengthening.

Starting with homogeneity, this prediction is borne out under *might*. Unlike the presupposition of *both*, homogeneity does not seem to project universally from the scope of *might*. In particular, we don't get an inference from (32a) that homogeneity in fact holds in the actual world: that Mary read either all or none of her books. This is exactly what Strong Kleene alone predicts, as shown in (32b). Since (32a) is obligatorily parsed with a matrix A operator, which collapses 0 and #, the final truth-conditions for (32a) with matrix A are given in (32c): (32a) is predicted to be true if there is a world compatible with the speaker's beliefs where Mary read all of her books, and false otherwise. We therefore correctly predict the lack of a universal inference here, since (32c) simply lacks a presupposition.

(32) a. Mary might have read her books. $\not\rightarrow$ Mary read either all or none of the books.

b. $[\![\text{[Mary might have pex [read her books]]}]\!]^s =$
$$\begin{cases} 1 \text{ if } \exists w : w \in Dox_s \wedge \text{Mary read all of her books in w} \\ 0 \text{ if } \forall w : w \in Dox_s \rightarrow \text{Mary read none of her books in w} \\ \# \text{ otherwise} \end{cases}$$

c. $[\![\text{[A[Mary might have pex [read her books]]]}]\!]^s =$
$$\begin{cases} 1 \text{ if } \exists w : w \in Dox_s \wedge \text{Mary read all of her books in w} \\ 0 \text{ if } \neg\exists w : w \in Dox_s \wedge \text{Mary read all of her books in w} \\ \# \text{ never} \end{cases}$$

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accommodation possibilities (e.g. Beaver 2001; von Fintel 2008; Singh 2007). I won't get into this in detail here.

Turning to scalar implicatures, it has similarly been observed that they project differently from presuppositions from certain environments, such as the prejacent of *unlikely* (Chatain & Schlenker 2025). For example, in (33a), the presupposition that Mary has two books seems to project, and we get an inference that Mary has two books in the actual world. On the other hand, (33b) does not give rise to an analogous inference that the implicature that not both of Mary and Bill passed is true in the actual world.

(33) a. It's unlikely that Mary read both of her books.
$\rightarrow$ Mary has two books.

b. It's unlikely that Mary or Bill passed.
$\not\rightarrow$ Not both of them passed. (Adapted from Chatain & Schlenker 2025)

As in the case of *might* above, Strong Kleene alone does not predict the inference in (33a) that Mary in fact has two books. In particular, assuming that the prejacent of unlikely is a downward-entailing environment, Strong Kleene simply predicts that *It's unlikely that p* is true iff *It's unlikely that p=0 or p*=#. While I won't go into the details of the resulting trivalent denotations here, the conditions under which (33a) and (33b) are true are given in (34). We see that this is in fact the correct prediction for (33b) but that the stronger inference in (33a) is not predicted.

(34) **Strong Kleene predictions for (33)**:

a. $[\![$(33a)$]\!]$= 1 iff it's unlikely that (Mary has two books and read both of them or doesn't have two books)

b. $[\![$(33b)$]\!]$=1 iff it's unlikely that at least one of Mary and Bill passed.

Again, the stronger inference in (33a) can be attributed to proviso strengthening, allowing us to maintain Strong Kleene as the algorithm for presupposition projection. Since in (33b), the parse with *pex* and without an A operator is ruled out by redundancy, we again predict that this proviso strengthening will not be present in (33b), just as in the case of homogeneity under *might* above. Note that in downward-entailing environments in general, the parse with *pex* and matrix A will be equivalent to the parse without *pex* at all, so there is a question of what is in fact the correct parse for (33b). This can be illustrated more easily with *pex* under negation, as shown in (35).

(35) a. $[\![$[A[not[pex[Mary read some of the books]]]]$]\!]$=
$\begin{cases} 1 \text{ if Mary read none of the books} \\ 0 \text{ otherwise} \end{cases}$

b. $[\![$[not[Mary read some of the books]]$]\!]$=$\begin{cases} 1 \text{ if Mary read none of the books} \\ 0 \text{ otherwise} \end{cases}$

Since (35a) is equivalent to the parse without *pex* in (35b), the parse in (35) will be ruled out by our redundancy constraint. Note that inserting the A-operator locally in the downward-entailing environment does allow us to avoid the redundancy violation. This can be seen in (36) for negation. While this reading is an available one, it requires focus on *some* (Fox & Spector 2018). Bassi et al. attribute this to presuppositions in general requiring focus in order to be locally accommodated under negation. We can therefore conclude that the parse with embedded A is not in general an available one in downward-entailing environments.

(36) $[\![\text{[not[A[pex[Mary read some of the books]]]]}]\!] = \begin{cases} 1 \text{ if Mary didn't read some but not all of the books} \\ 0 \text{ otherwise} \end{cases}$

(37) Mary didn't read SOME of the books. She read all of them.

Therefore, the only available parse that does not give rise to redundancy is the parse without *pex* at all. I therefore take this to be the default parse when *pex* is in a downward-entailing environment.

To summarize, we have therefore seen that the redundancy condition on the insertion of *pex* predicts certain apparent differences in projection between standard presuppositions on one hand and homogeneity and scalar implicatures on the other. Crucially, in order to predict these differences, we have to assume a modular theory of the inferences that arise from presupposition projection, where certain inferences arise from the pragmatics of presupposition accommodation rather than from the semantic algorithm for projection itself.

4 Left-right asymmetries

We saw in section 3 that we can explain apparent differences in projection between homogeneity/SIs and standard presuppositions on the basis of a single pragmatic difference, repeated in (38). One consequence of this characterization is that we can use the differences between homogeneity/SIs and standard presuppositions as a tool to probe whether other components of presupposition projection are part of the semantic presupposition or come from the pragmatics of accommodation. One area where this has been debated is left-right asymmetries in presupposition projection. The goal of this section is to therefore use the account proposed here to probe the nature of left-right asymmetries.[3]

3 Exploring left-right asymmetries here is inspired by a conversation with Benjamin Spector, who suggested that implicatures lack a left-right asymmetry, based on his observation that implicatures don't project like presuppositions from the antecedents of conditionals. I will not discuss conditional antecedents here for reasons of time and because homogeneity and standard SIs appear to behave differently in that environment. I leave it to future work to explore why this difference arises.

(38) **Pragmatic difference:** The presupposition with Homogeneity/SIs is canceled globally with a matrix A operator, while standard presuppositions require accommodation of a common ground that satisfies the bridge principle.

Presupposition projection has been argued to be sensitive to some notion of order between constituents. To see this, consider a case-study of presupposition projection in conjunction. Given a conjunction of a sentence S, with a presupposition p, and a sentence S' with no presupposition, Strong Kleene alone (and other symmetric theories) predicts the conditional presupposition in (39b), regardless of the two orders of the two conjuncts. While Strong Kleene seems to make the right prediction when the trigger is in the second conjunct, it has been argued that the presupposition in fact projects unconditionally from the first conjunct.

(39) a. S_p and S' (or S' and S_p)

b. Presupposition predicted by Strong Kleene: $[\![\text{S'}]\!] \rightarrow$ p

For example, Mandelkern, Zehr, Romoli & Schwarz (2020) argue with experimental evidence that a conjunction like (40a) has a presupposition that Mary used to smoke, which projects from the first conjunct. On the other hand, the counterpart in (40b) where the presupposition is in the second conjunct has no presupposition (as predicted by Strong Kleene). In order to see the effect of this presupposition, we have to embed the conjunction in an environment where the presupposition projects, like the antecedent of conditionals. Mandelkern et al. show with several experiments that while participants infer from (41a) that Mary in fact used to do yoga, this inference does not arise when the presupposition is in the second conjunct in (41b).

(40) a. Mary **stopped doing yoga** and used to do Jivamukti yoga.
Presupposition: Mary used to do yoga.

b. Mary used to do Jivamukti yoga and **stopped doing yoga**.
No presupposition (since the conditional Mary used to Jivamukti yoga $\rightarrow$ Mary used to do yoga is a tautology).

(41) a. If Mary **stopped doing yoga** and used to do Jivamukti yoga, then Matthew will interview her for the story.
$\rightarrow$ Mary used to do yoga.

b. If Mary used to do Jivamukti yoga and **stopped doing yoga**, then Matthew will interview her for his story.
$\not\rightarrow$ Mary used to do yoga.

Different accounts predict the stronger inference in (41a) by incorporating an incremental component into the theory of presupposition projection (Heim 1983;

Schlenker 2008; Fox 2008; Chemla & Schlenker 2012). There is a question of what the nature of this incremental component is. Certain accounts of projection (e.g. Heim 1983) build the left-right asymmetry into the semantics, thus leading to an expectation that local accommodation should not interfere with the asymmetry. On the other hand, this incremental component can be thought of on other accounts as a distinct component that arises from the pragmatics of presupposition accommodation (e.g. Schlenker 2008; Fox 2008; Chemla & Schlenker 2012). I will argue that on such accounts, we expect that matrix A should remove the incremental component, resulting in the appearance of symmetric projection.

To show this in a concrete way, I will adopt Fox's (2008) implementation of the incremental component as encoded into the bridge principle. In particular, Fox argues that rather than having the bridge principle check whether the presupposition is satisfied globally, we can modify the bridge principle such that it checks at every point in parsing whether the presupposition is satisfied regardless of how the sentence continues. For example, given a sentence like (42a), we have to check at the point where the presupposition is parsed in the first conjunct whether the presupposition is met regardless of what the second conjunct is. While Strong Kleene predicts no presupposition for the continuation *and used to smoke*, an alternative continuation such as *1+1=2* (a tautology) results in a presupposition that Mary used to smoke. In order for the modified version of the bridge principle given in (43) to be satisfied, the context has to therefore entail the presupposition of (42b) that Mary used to smoke. The incremental bridge principle therefore predicts that the presupposition projects unconditionally from the first conjunct.

(42) a. Mary stopped smoking and used to smoke.

b. Mary stopped smoking and 1+1=2.

c. **Strong Kleene prediction:** 1+1=2 $\rightarrow$ Mary used to smoke
$\Leftrightarrow$ Mary used to smoke.

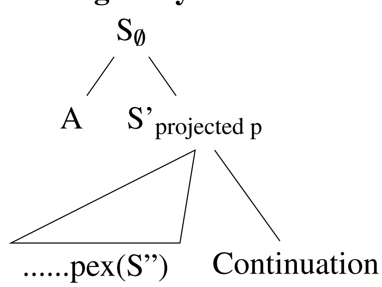
(43) **Incremental Bridge Principle:** A sentence ϕ that has a constituent S_p is only assertable in a context C if
$\forall\psi[\psi$ is a continuation of ϕ at $S_p \rightarrow$ C entails the presupposition of $\psi]$
(adapted from Fox 2008)

Turning to the case where the presupposition is in the second conjunct, we see that the incremental component is trivial here: since the sentence ends with the presuppositional conjunct, there are no other continuations at the point where the presupposition is parsed. The predicted presupposition is therefore simply the conditional one that Strong Kleene gives rise to.

(44) Mary used to smoke and stopped.

We therefore see that the incremental component here is the result of the pragmatic process of presupposition satisfaction, where the bridge principle in (43) demands that the context entails not only the semantic presupposition of the sentence itself, but also the semantic presuppositions of a set of continuations. We can now see what this account predicts with respect to how our matrix A interacts with the left-right asymmetry. Since presuppositions due to *pex* have to be cancelled globally with a matrix A, at the point where *pex* is parsed, all possible continuations will have no presupposition. The bridge principle is therefore trivially satisfied with *pex* and we expect that no incremental component should arise. Rather, presuppositions due to *pex* are predicted to simply project with Strong Kleene, the semantic algorithm for presupposition projection.

(45) **Homogeneity and SIs:**



Focusing on homogeneity, we can test whether the inference is sensitive to the left-right asymmetries in conjunction by embedding a conjunction in an environment where homogeneity has been argued to project from, like the scope of non-monotonic quantifiers (Križ & Chemla 2015). Consider the example in (46). Assuming that homogeneity projects with Strong Kleene, (46a) is predicted to give rise to a universal inference that none of the students hit only some of the red targets. Therefore, (46a) is predicted to not be true in the scenario in (46), since there is a student that hit only one of the two red targets. On the other hand, (46b), where homogeneity is in the second conjunct, is predicted to be true in this scenario. Here, Strong Kleene predicts the conditional inference in (46b), and this conditional inference is met in the context, since the student that hit only one of the red targets didn’t beat the video game.

(46) **Context:** At the fair, my three students are playing different games. In one of the games, you have to throw balls at two red targets and two blue targets, and in another you have to beat a video game. One student hit the two red targets and beat the video game, one student hit only one of the two red targets and didn’t beat the video game, one student hit neither of the red targets and didn’t beat the video game.

a. #Exactly one of my three students hit the red targets.

b. Exactly one of my three students beat the video game and hit the red targets.

c. Exactly one of my three students hit the red targets and beat the video game.

(47) **Strong Kleene predictions:**

a. **Universal inference for (46a):** No one hit only some of the red targets.

b. **Conditional inference for (46b):** No one who beat the video game hit only some of the red targets.

Turning to the crucial example in (46c), where homogeneity is in the first conjunct, the felicity of the sentence in the given context depends on whether homogeneity gives rise to a left-to-right incremental component on top of Strong Kleene. Strong Kleene alone predicts no asymmetry and therefore predicts (46c) to pattern with (46b) and be felicitous. Strong Kleene with an incremental component, on the other hand, predicts that (46c) should give rise to the same presupposition as (46a), where there is no second conjunct, therefore predicting the sentence to be infelicitous in the context. These predictions are outlined in (48).

(48) **Predictions**:

	SK alone	SK + incremental component
a	#	#
b	✓	✓
c	✓	#

Based on preliminary evidence from asking a few speakers, it seems that for speakers who get the expected contrast between (46a) and (46b), (46c) patterns with (46b) rather than (46a). This supports the conclusion that there are no left-right asymmetries in homogeneity projection. I take this to be a very tentative result, as further empirical work needs to be done to systematically compare standard presuppositions and homogeneity with respect to the left-right asymmetry.

In particular, there are several challenges to using the paradigm in (46) to systematically test whether homogeneity is sensitive to the left-right asymmetry. First, while Križ & Chemla (2015) argue with experimental evidence that homogeneity gives rise to a universal inference in the scope of non-monotonic quantifiers, more recent studies have shown that at least in some contexts, participants allow for readings where homogeneity does not appear to project universally under *exactly one* (Marty, Amiraz, Elliott, Del Pinal & Romoli 2024). This lack of projection can be accounted for by assuming that local accommodation of homogeneity is sometimes possible in the scope of *exactly one*, as suggested by Marty et al. (2024), but in any case this confound makes it challenging to use (46) to test the left-right asymmetry.

In addition, abstracting away from the issues specific to homogeneity, left-right asymmetries in general are difficult to test, as evidenced by the ongoing debate regarding whether we see left-right asymmetries with disjunction (e.g. Hirsch & Hackl 2014; Kalomoiros & Schwarz 2021). I hope in future work to systematically use refined versions of paradigms like (46) to test whether homogeneity in fact consistently lacks a left-right asymmetry.

5 Conclusion

I have argued that we can account for the pragmatic differences between homogeneity/SIs and standard presuppositions while maintaining that the former are also presuppositions. In particular, I proposed that the pragmatic differences are due to differences in what triggers the presuppositions: homogeneity and SIs are triggered by *pex*, which is subject to an independently needed redundancy condition that leads to a matrix A requirement, while standard presupposition triggers do not give rise to the same redundancy effect. I then showed, following what Fox (2018) does for homogeneity, that if we assume a modular theory of presupposition projection, where certain inferences arise from the process of accommodating the semantic presupposition rather than the minimal presupposition itself, we can account for certain apparent differences in projection between these triggers. Finally, I showed that the differences in projection can be used under this framework to probe whether other components of presupposition projection, such as left-right asymmetries, are in fact due to the pragmatics of presupposition accommodation.

Several issues and open questions remain, which I did not have space to get into in detail in this paper. I will touch on a few of them here. First, while homogeneity and SIs do not behave pragmatically like presuppositions with respect to certain tests, like the *Hey, wait a minute!* test, they do behave pragmatically like presuppositions in other ways, for example in how the presupposition interacts with constraints on assertability (e.g. Bassi et al. 2021; Wehbe 2022; Wehbe & Doron 2025). At first sight, it seems these results pose a challenge to the present analysis, since matrix A simply cancels the presupposition, but further work needs to be done to investigate how matrix A interacts with different constraints on assertability (see Doron & Wehbe 2022, 2024 for a discussion).

Finally, while homogeneity and SIs seem to pattern together in all of the environments we considered in this paper, there are other environments where their projection patterns appear to diverge. For example, while scalar implicatures seem to project following Strong Kleene from the antecedents of conditionals, homogeneity appears to be obligatorily locally accommodated in that environment (see Križ 2015; Wehbe 2022 a.o. for a discussion). It is not clear within the present account how to explain this divergence.

References

Bar-Lev, Moshe E. 2021. An implicature account of homogeneity and non-maximality. *Linguistics and Philosophy* 44(5). 1045–1097. doi:10.1007/s10988-020-09308-5.

Bassi, Itai, Guillermo Del Pinal & Uli Sauerland. 2021. Presuppositional exhaustification. *Semantics and Pragmatics* 14. 11:1–48. doi:10.3765/sp.14.11.

Beaver, David I. 2001. *Presupposition and assertion in dynamic semantics*, vol. 29. CSLI publications Stanford.

Bochvar, Dmitri. 1981. On a three-valued logical calculus and its application to the analysis of the paradoxes of the classical extended functional calculus. *History and Philosophy of Logic* 2(1-2). 87–112.

Chatain, Keny & Philippe Schlenker. 2025. Janus sentences: a puzzle for theories of local implicatures. *Journal of Semantics* 42(1-2). 75–96. doi:10.1093/jos/ffaf001.

Chemla, Emmanuel & Philippe Schlenker. 2012. Incremental vs. symmetric accounts of presupposition projection: an experimental approach. *Natural Language Semantics* 20. 177–226. doi:10.1007/s11050-012-9080-7.

Chierchia, Gennaro, Danny Fox & Benjamin Spector. 2012. The grammatical view of scalar implicatures and the relationship between semantics and pragmatics. *Semantics: An international handbook of natural language meaning* 3. 2297–2332.

Doron, Omri & Jad Wehbe. 2022. A constraint on presupposition accommodation. In *Amsterdam Colloquium(AC2022)*, 412–418.

Doron, Omri & Jad Wehbe. 2024. On the pragmatic status of locally accommodated presuppositions .

von Fintel, Kai. 2008. What is presupposition accommodation, again? *Philosophical Perspectives* 22. 137–170. doi:10.1111/j.1520-8583.2008.00144.x.

von Fintel, Kai. 2004. Would you believe it? the king of france is back!(presuppositions and truth-value intuitions). *Descriptions and Beyond* 315–341. doi:10.1093/oso/9780199270514.003.009.

Fox, Danny. 2008. Two short notes on schlenker's theory of presupposition projection. *Theoretical Linguistics* 34(3). 237–252. doi:10.1515/THLI.2008.016.

Fox, Danny. 2013. *Presupposition projection from quantificational sentences: trivalence, local accommodation, and presupposition strengthening* 201–232. Cambridge University Press.

Fox, Danny. 2018. Comments on Križ (2015, 2016). Class notes, 24.979 (MIT, Fox/Heim/Schwarzschild). http://lingphil.scripts.mit.edu/papers/fox/Kriz_2015_2016.pdf.

Fox, Danny & Benjamin Spector. 2018. Economy and embedded exhaustification. *Natural Language Semantics* 26(1). 1–50. doi:10.1007/s11050-017-9139-6.

Gotzner, Nicole & Anton Benz. 2022. Implicatures in (non-) monotonic environments. In *Sinn und Bedeutung (SuB 26)*, vol. 26, 340–358.

Guerrini, Janek & Jad Wehbe. 2025. Homogeneity as presuppositional exhaustification. *Journal of Semantics* ffaf007. doi:10.1093/jos/ffaf007.

Heim, Irene. 1983. On the projection problem for presuppositions. *Formal semantics–the essential readings* 249–260. doi:10.1002/9780470758335.ch10.

Hirsch, Aaron & Martin Hackl. 2014. Incremental presupposition evaluation in disjunction. In *North East Linguistic Society (NELS44)*, vol. 1, 177–190.

Hurford, James R. 1974. Exclusive or inclusive disjunction. *Foundations of Language* 11(3). 409–411.

Kalomoiros, Alexandros & Florian Schwarz. 2021. Presupposition projection from disjunction is symmetric. *The Linguistic Society of America (LSA 2021)* 6(1). 556–571.

Križ, Manuel. 2015. *Aspects of homogeneity in the semantics of natural language*: University of Vienna PhD dissertation.

Križ, Manuel & Emmanuel Chemla. 2015. Two methods to find truth-value gaps and their application to the projection problem of homogeneity. *Natural Language Semantics* 23. 205–248. doi:10.1007/s11050-015-9114-z.

Mandelkern, Matthew, Jérémy Zehr, Jacopo Romoli & Florian Schwarz. 2020. We've discovered that projection across conjunction is asymmetric (and it is!). *Linguistics and Philosophy* 43. 473–514. doi:10.1007/s10988-019-09276-5.

Marty, Paul, Omri Amiraz, Patrick D Elliott, Guillermo Del Pinal & Jacopo Romoli. 2024. Homogeneity in (non) monotonic contexts. In *Sinn und Bedeutung (SuB29)*, vol. 29, 968–985.

Schlenker, Philippe. 2008. Be articulate: A pragmatic theory of presupposition projection. *Theoretical Linguistics* 34(3). 157–212. doi:10.1515/THLI.2008.013.

Singh, Raj. 2007. Formal alternatives as a solution to the proviso problem. In *Semantics and Linguistic Theory (SALT 17)*, 264–281. doi:10.3765/salt.v17i0.2960.

Singh, Raj. 2008. On the interpretation of disjunction: Asymmetric, incremental, and eager for inconsistency. *Linguistics and Philosophy* 31(2). 245–260. doi:10.1007/s10988-008-9038-x.

Spector, Benjamin. 2013. Homogeneity and plurals: From the strongest meaning hypothesis to supervaluations. Presented at Sinn und Bedeutung 18.

Spector, Benjamin. 2024. An alternative to presuppositional exhaustification: Supervaluationist RSA. In *Sinn und Bedeutung (SuB29)*, vol. 29, 1501–1517.

Stalnaker, Robert. 1974. Pragmatic presuppositions. In Milton Munitz & Peter Unger (eds.), *Semantics and Philosophy*, New York: New York University Press.

Wehbe, Jad. 2022. Revisiting presuppositional accounts of homogeneity. In *Amsterdam Colloquium (AC2022)*, 320–326.

Wehbe, Jad & Omri Doron. 2025. Diagnosing the presuppositional properties of scalar implicatures. In *Sinn und Bedeutung (SuB29)*, 1681–1697.

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