Not all scalar inferences are alike: The effect of existential presuppositions*

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Abstract

This paper investigates a novel puzzle regarding the indirect scalar inference (SI) 'not all' ⇝ 'some'. When 'not all' is embedded in a Strawson-Downward-Entailing context, some constructions give rise to more robust SIs than others even though they express the same proposition with the same lexical items. I argue that this contrast is related to whether or not the quantifier phrase occurs in a conventionalized focus construction. If it does, the SI is not derived by implicature calculation but arises from an existential presupposition triggered by the focus construction. Hence, it is not sensitive to contextual considerations.

1 Introduction

In this paper, I observe a puzzling pattern in the context of the indirect scalar inference (SI) 'not all' ⇝ 'some'. Consider the contrast between (1a) and (1b), where 'not all' is embedded under the factive Strawson-Downward-Entailing (SDE) predicate *surprised* [19]. (1b) strongly implies that some of the students failed even though this SI conflicts with the common ground (CG) that none failed. (1a), by contrast, does not have a 'not all but some' interpretation in this context, which makes it felicitous.

(1) *Context: Mary teaches Intro to Statistics. She accidentally gave the students the exam of Advanced Statistics. She expected they would all fail, but surprisingly, they all passed.*
Mary: You should all be proud of yourselves for passing the exam. Frankly, ...
a. I was surprised that you didn't all fail!
b. #I was surprised that not all of you failed!

Another example is in (2), where 'not all' occurs in an antecedent of a counterfactual conditional, which is a non-factive SDE context [19]. In both sentences, we consider counterfactual situations in which it is not the case that everyone died in the plane crash. However, only in (2a) are there also relevant situations where in fact nobody died, possibly because the plane never crashed (i.e., there is no 'not all but some' SI in (2a)). In contrast, (2b) only considers situations where some team members did die in the crash, which is incongruent with the consequent (because it is unlikely that the survival of some (non-specific) team members would suffice to guarantee winning the title). Thus, (2b) has a surprisingly robust SI, just like (1b).

(2) a. This team would have won the title if they hadn't all died in that plane crash.
b. #This team would have won the title if not all of them had died in that plane crash.

Note that the absence of an SI in (1a) and (2a) is what one would expect based on the behavior of other scalar expressions in this environment. For instance, 'or' sometimes triggers an SI (i.e.,

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'A or B' $\rightsquigarrow$ 'not both A and B') in factive SDE contexts (aka "negative factives") such as the complement of *surprised* or *unaware* [9, 16], e.g., (3). However, this SI is not generated if it conflicts with the CG, e.g., (4). Hence, the goal of this paper is to explain why sentences like (1b) and (2b) trigger an SI that is not sensitive to contextual considerations.

(3) John is unaware that his son used his credit card or payment app to buy video games.
$\rightsquigarrow$ John's son used his father's credit card or payment app, but not both.

(4) Nintendo is completely unaware that I or my stories exist.
$\not\rightsquigarrow$ I or my stories exist, but not both.

I argue that the contrast in (1) and (2) is related to whether or not the universal quantifier phrase (QP) occurs in a conventionalized negative focus construction (NFC). When 'all' occurs under negation in a construction which is not an NFC—e.g., in (1a) and (2a)—the 'not all but some' SI is derived by implicature calculation. Hence, it patterns with the SI of 'or' (3)-(4) and other scalar expressions (see Section 4 for additional examples). However, when 'all' occurs under negation in an NFC—e.g., in (1b) and (2b)—the SI is not derived by implicature calculation but rather arises from an existential presupposition triggered by the NFC (i.e., NFCs are presupposition triggers just like clefts). Given that the SI arises from a presupposition, it is present even when it contradicts the CG (1b) and in non-factive SDE contexts (2b).

This analysis suggests that some indirect SIs constitute a phenomenon in their own right. Additionally, previous studies have shown that some scalar items trigger SIs more frequently than others [17]. This paper observes that there is variation not only across lexical scales (e.g., ⟨some, all⟩ vs. ⟨warm, hot⟩, see e.g., [17]) but also between grammatical constructions expressing the same proposition and containing the same set of lexical items, as in (1) and (2).

This paper is structured as follows. Section 2 discusses the distinction between clausal negation constructions and NFCs and provides cross-linguistic evidence for its relevance to SIs. Section 3 proposes an information-theoretic analysis. Section 4 briefly discusses the behavior of other scalar expressions in factive SDE contexts. In contrast to previous claims in the literature, in particular in [16], I demonstrate that SIs are merely optional in this environment and argue that this fact poses a challenge for certain previous accounts of SIs.

2 Clausal negation vs. negative focus constructions

According to [3, 4], focus-sensitive expressions can be divided into (at least) two separate classes: (i) those that exhibit non-conventionalized focus sensitivity (e.g., *always* and counterfactual conditionals); and (ii) those whose focus sensitivity is conventionalized and lexically encoded (e.g., *only* and *even*). Clausal negation constructions such as those in (5) belong to the former category. They are focus sensitive in that minimal pairs differing in focus marking produce different inferences. For instance, *I didn't invite* JOHN *for dinner* may suggest that the speaker invited someone else for dinner, while *I didn't invite John for* DINNER may suggest that the speaker invited John to another event. However, these inferences are cancelable implicatures rather than entailments (see [8] for a recent review). For example, a sentence like *I obviously can't afford a* MERCEDES may imply that the speaker can afford a cheaper car, but it can just as well be coherently followed by the claim *In fact, I can't afford any car!*

(5) a. The cookies did not all burn. (floating quantifier construction)
b. I didn't burn all of the cookies. (QP in object position)

Conventionalized focus-sensitive expressions, by contrast, must associate with focus, and they

encode a dependency on focus marking [3, 4]. I argue that NFCs such as those in (6) belong to this category. This is fairly uncontroversial as far as negated clefts (6b) are concerned (see e.g., [18]). I assume that negated quantifier phrase constructions such as (6a) are NFCs too, and their semantics is the same as negated clefts. This assumption is motivated in Section 3.

(6) a. Not all of the cookies burned. (negated quantifier phrase construction)
b. It's not every student who has access to their teacher 24/7.[1] (negated cleft)

Further evidence for the contrast between clausal negation and NFCs comes from Hebrew and Korean. In Hebrew, negated quantifier phrase constructions, as in (7b), contrast with various clausal negation constructions. For instance, (7a) involves clausal negation with VS word order and lacks an SI in this scenario. The NFC in (7b), on the other hand, triggers a 'not all but some' SI even though it contradicts the CG given that the cookies weren't even baked.

(7) *Context: John was baking cookies. He put the cookies in the oven, forgetting to set up an alarm. Two hours later, he realized that he forgot about the cookies. He rushed to the kitchen and opened the oven only to learn that he also forgot to turn on the oven.*
a. rak be-mazal lo nisrefu l-i kol ha-ugiyot.
only in-luck NEG burned to-me all the-cookies
'It was only through luck that the cookies did not all burn (possibly none did).'
b. #rak be-mazal lo kol ha-ugiyot nisrefu l-i.
only in-luck NEG all the-cookies burned to-me
'It was only through luck that not all of the cookies burned (but some did).'

Korean presents an interesting example because it usually employs another type of NFC to express the meaning of 'not all' (Korean lacks negated quantifier phrase constructions). In (8), the contrastive marker *nun* is attached to the lexical verb, and the QP is focused (the particle *nun* requires a focused constituent in its scope). In accordance with the generalization, (8) triggers an SI even in the context of (1), where the SI contradicts the CG (Eunsun Jou, p.c.).

(8) Nehuy motwu-ka nakceyha-ci-nun anh-un sasil-i nollap-ta.
you all-NOM fail-NMLZ-CNTR NEG-ADN fact-NOM surprising-DECL
'(lit.) The fact that not all of you failed is surprising.'

3 Analysis

I argue that the contrast between clausal negation constructions and NFCs is due to the fact that their SIs come from different sources. This difference cannot be detected in sentences where 'not all' is unembedded, as in (5) and (6), because the sentences in (5) give rise to robust SIs too. However, if 'not all' is embedded in a (factive or non-factive) SDE context, the difference between the two types of constructions comes to the surface. In clausal negation constructions such as (5), the SI 'not all but some' is a cancelable implicature, which is derived by general principles of implicature calculation (whether one assumes a pragmatic or grammatical approach to scalar implicatures). Therefore, these 'not all' constructions pattern with other scalar expressions such as 'or' in that the presence of an SI is affected by the monotonicity of the environment in which the scalar expression is embedded.

On the other hand, I propose that implicature calculation is not responsible for the SIs in NFCs such as (6). Of course, these SIs could be derived by implicature calculation, but there

[1] For some reason, *every* is much more frequent than *all* in negated clefts, which is why I use it here.

is also another way to derive them—namely, from the existential presupposition triggered by the NFC. For ease of presentation, I will start with negated clefts (6b). I follow the analysis of clefts in [18], who propose that the existential presupposition comes from the question under discussion (QUD) that the cleft addresses. In (6b), the QP (or just the quantifier) is focused. The QUD is (9a), and it contains the alternatives in (9b). Accepting a QUD introduces a presupposition that one of the propositions in the alternative set is true [14]. Therefore, the cleft presupposes that the disjunction of (9b) is true, which gives rise to the existential presupposition in (9c). If we combine the assertion (9d) with the existential presupposition (9c), we get a 'not all but some' SI. Importantly, this SI is derived independently of whatever general mechanism one assumes for implicature calculation. Given that an SI triggered by an NFC does not exhibit the characteristic context dependence of implicatures, I propose that the existential presupposition is indeed the source of the SI. Due to projection, the SI is present even in non-factive SDE contexts, as in (2b), and when it contradicts the CG, as in (1b) and (7b).[2]

(9) a. QUD: How many students have access to their teacher 24/7?
b. Focus alternatives: {Some/Most/All students have access to their teacher 24/7.}
c. Presupposition: Some students have access to their teacher 24/7.
d. Assertion: The alternative with *all* is rejected (which is a partial answer to the QUD) ≈ 'It is not the case that every student has access to their teacher 24/7.'

I argue that negated quantifier phrase constructions such as (6a) are NFCs too, and their semantics is the same as negated clefts (although they have a different distribution in English). This relates to a recent debate about the syntactic structure of these constructions. [5] suggests that negation modifies the entire QP, and the resulting constituent fills the subject position, as in (10a). On the other hand, [7] argue that negation is in a high position in the left periphery, and the QP is adjacent to it because it is fronted to a focus position, as in (10b). The main evidence for the latter structure comes from clauses in which the QP functions as the complement of a preposition. In Spanish, the preferred word order is one in which negation precedes the PP (i.e., Neg + Prep + QP), while the alternative order in which the preposition precedes the negated quantifier phrase (i.e., Prep + Neg + QP) is rejected by some speakers and is not available at all for certain quantifiers [7]. This preference is not particular to Spanish but found across a wide variety of languages [1], e.g., in Hebrew (11), where the alternative word order is not possible. This suggests that negation does not form a constituent with the QP. Instead, the QP (or PP containing it) is fronted. If this analysis is correct, one expects (10b) to be a conventionalized NFC because it necessarily associates with focus, like a negated cleft.

(10) a. $[_{CP}\ [_{IP}\ [_{NegP}$ **Not** $[_{QP}$ **all** of the students]] came]].
b. $[_{CP}\ [_{NegP}$ **Not** $[_{FocP}\ [_{QP}$ **all** of the students$]_1$ Foc^o] $[_{IP}\ t_1$ came]]].

(11) lo al kol mucar mecuyan ha-mexir.
NEG on every product is.marked the-price
'Not every product has a price tag on it.'

The presuppositional status of the SIs triggered by NFCs is evidenced by projection facts. In (12a), the SI projects from the scope of a probability adverb, which is characteristic of presuppositions. In contrast, regular implicatures typically do not arise in this context (12b). Another example is given in (13), where 'not all' occurs in the complement of the modal predicate *hope*. SIs are usually not generated under *hope* (e.g., *Mary hopes to get into Harvard or Yale* $\not\rightsquigarrow$ *Mary doesn't wish to get into both Harvard and Yale*). This is indeed what we find

[2] Regarding (2b), see [15] for other cases where presuppositions interact with the semantics of counterfactuals.

in (13a)—i.e., we infer that the speaker probably hopes that no audience member will throw tomatoes at him and his fellow actors. In contrast, (13b) conveys that the speaker accepts his fate of being pelted with tomatoes by some audience members but hopes that others will not take part in the tossing. Thus, the SI projects from the modal context in (13b).

(12) a. It's very likely that not all of the cookies burned. ⇝ Some of the cookies burned.
b. It's very likely that some of the cookies burned. ⇝̸ Not all of the cookies burned.

(13) *Context: After a terrible theatrical performance, the actors are about to take their bows. One of the actors says to his friends:*
a. I hope they don't all start throwing tomatoes at us!
b. I hope not all of them start throwing tomatoes at us!

4 Other scalar expressions in factive SDE contexts

In this section, I briefly discuss the behavior of other scalar expressions in factive SDE contexts. First, I demonstrate that in contrast to previous claims in the literature, SIs are merely optional in this environment, while noting that the scalar item 'some' is somewhat exceptional in this respect. Second, I maintain that despite appearances, the SI triggered by 'some' is not of the same nature as the one triggered by 'not all' in NFCs. Finally, I argue that these observations pose a challenge for several previous accounts.

It has been argued that a sentence like (14a), where 'some' occurs in a factive SDE context, is infelicitous in the context of (1) due to competition with the alternative with 'all' (14b) which has a stronger presupposition entailed by the CG [9, 16]. Thus, (14a) can be said to trigger an obligatory SI in this context since it presupposes that not all of the students passed.

(14) a. #Frankly, I was surprised that SOME of you passed! (uttered in the context of (1))
b. Frankly, I was surprised that all of you passed!

However, I observe that this pattern is idiosyncratic to the scalar item 'some'. We have already seen that 'not all' (with clausal negation) and 'or' do not always give rise to SIs in factive SDE contexts, e.g., (1a) and (4), respectively. Another example is that if we replace *some* with *any* in (14a), the resulting sentence is felicitous and lacks an SI (15). According to common assumptions (see e.g., [10]), *any* is an existential like *some*, and indeed, outside the context of (1), (15) would probably give rise to a 'some but not all' SI just like (14a). Yet, (15) shows that this SI is not obligatory in any way. A final example is with *allow*, which sometimes gives rise to an SI in factive SDE contexts (16a), but not always (16b). I conclude from these examples that the obligatory SI of 'some' in cases like (14a) is in fact the exception rather than the rule.

(15) Frankly, I was surprised that ANY of you passed! (uttered in the context of (1))

(16) a. John is unaware that the students are allowed to take a bowling class for credit.
⇝ The students are allowed, but not required, to take a bowling class for credit.
b. A: As part of your studies, you are required to take a bowling class for credit.
B: Required?! I'm surprised I am ALLOWED to!

The question of why 'some' differs from other scalar expressions is beyond the scope of this paper. However, I will make a few relevant observations in order to clarify the difference between the infelicity of (14a) and (1b). While these examples appear to be parallel, the parallelism breaks down if the matrix clause is negated: (17a) becomes felicitous (i.e., 'some' does not trigger an SI), whereas (17b) is still bad due to a 'not all but some' SI. I speculate that (14a)

is infelicitous because 'some' is not a proper scalar endpoint. That is, the intended meaning of (14a) is that Mary would have been surprised even if only one student had passed. This is conveyed by (15) with *any*, while (14a) with *some* strongly implies that more than one student passed. Hence, the oddness of (14a) appears to be related to the fact that speakers consider *some* unnatural for reference to a single entity [6]. The CG in (17), by contrast, favors a 'more than one' interpretation, so (17a) is felicitous (whereas a variant with *any* would not be). This suggests that the SIs of (14a) and (1b) come from different sources (see Section 3).

(17) *Context: Mary expected that 40-70% of the students would pass. Surprisingly, all failed.*
   a. I wasn't surprised that SOME of you failed, but I certainly did not expect that ALL of you would!
   b. #I wasn't surprised that not ALL of you passed, but I certainly did not expect that NONE of you would!

The fact that SIs are typically optional in SDE contexts poses a challenge for several previous studies. [16] propose that a sentence is infelicitous if there is a relevant alternative with a stronger presupposition which is entailed by the CG. This principle predicts the infelicity of 'some' in (14a), but it seems to make incorrect predictions regarding the other scalar expressions discussed above, namely 'not all' (1a), 'or' (4), 'any' (15), and 'allow' (16b).

Another approach suggests that (14a) is infelicitous because of obligatory exhaustification [13, 2]. According to [11, 12], a silent EXH operator is obligatorily adjoined to any clause. Additionally, if an alternative is contextually equivalent to the prejacent of EXH, it is necessarily relevant and must be excluded by EXH. In (18) (from [12]), the logically weak alternative (18a) is contextually equivalent to the strong alternative (18b) given that all of the students get the same grade. According to this analysis, (18a) is odd because EXH must exclude the strong alternative, and the resulting SI contradicts the CG.

(18) *Context: Prof. Smith always assigns the same grade to all of the students in his class.*
   a. #This year, Prof. Smith assigned an A to some of his students.
   b. This year, Prof. Smith assigned an A to all of his students.

The example with 'some' (14a) and the alternative with 'all' (14b) are not contextually equivalent in the context of (1) because (14a) makes a stronger assertion than (14b) [16]. However, the presupposition of (14b) is trivially relevant because it is entailed by the CG [13]. Therefore, this alternative is excluded by EXH, which results in a SI that contradicts the CG [13, 2]. Notice that this account, too, appears to wrongly predict (1a) to be infelicitous by the same reasoning that was applied to (14a): the prejacent of EXH with 'not all' has a relevant alternative with 'not some' (i.e., 'none'), and excluding the latter would lead to conflict with the CG. A final example is given in (19), which is modeled after (18). Assume an LF with embedded EXH (19a), as in [2]. The presupposition of the alternative with 'not any' (19b) is relevant because it is entailed by the CG (and contextually equivalent to the presupposition of (19a)), and hence must be excluded by EXH. Yet, (19a) is fine and does not presuppose that some of the students got an F. This shows that the alternative with 'not any' is in fact not excluded.

(19) *Context: This year, all of Prof. Smith's students did very poorly except for Jane, whose work well deserved an A. He reasons that it is better that ten bad students pass than that one good student fail, and decides to give all the students a C. He then tells them:*
   a. It is only because of Jane that [EXH [I didn't give all of you an F]].
   b. Relevant alternative: It is only because of Jane that I didn't give any of you an F.

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