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Keeping it simple

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Abstract Breheny et al. (Nat Lang Semant, 2017) argue against the structural approach to alternatives. The empirical force of their argument comes mostly from challenges raised against Trinh and Haida (Nat Lang Semant 23:249–270, 2015). This paper aims to respond to these challenges, showing how they can be met by a natural refinement of Trinh and Haida's proposal which turns out to capture additional facts previously not accounted for. Another aim of this paper is to recount the debate with enough precision and explicitness in order to enhance understanding and facilitate future discussions.

Keywords Implicatures · Alternatives · Symmetry · Atomicity

1 Introduction

I will presuppose some theses of a particular approach to scalar implicatures which has been discussed and defended elsewhere (cf. Krifka 1995; Fox 2007a, b; Chierchia et al. 2012, among others). According to this view, a sentence φ licenses $\neg\psi$ as a "scalar implicature" (SI) for every ψ which is "innocently excludable" given φ and a set A of scalar alternatives of φ, where

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(1) ψ is innocently excludable given φ and A iff $\psi \in \bigcap \{S' \mid A'$ is a maximal subset of A such that $\{\varphi\} \bigcup \{\neg\varphi' \mid \varphi' \in A'\}$ is consistent$\}$.[1]

Following many works, I call φ the "prejacent" (PREJ) and the conjunction of φ with all of its SIs the "exhaustive meaning" (EM) of φ. I will write "ONLY(A)(φ)" for the EM of φ with A being the set of its scalar alternatives. The choice of this notation is motivated by the observation that ONLY(A)(φ) can sometimes be made more explicit by using the word **only** (cf. Fox and Hackl 2006).

Both PREJ and its scalar alternatives, by assumption, are possible answers to one and the same question Q: the alternatives must be "relevant," so to speak (cf. Grice 1967). Q is identified with the set of all of its possible answers, which is assumed to be closed under Boolean operations (cf. Groenendijk and Stokhof 1984; Lewis 1988; von Fintel and Heim 1997). Thus, Q is to be the Boolean closure of a set which has PREJ as member. I will write "BC(S)" for the Boolean closure of the set S.

A consequence of (1) is that ψ and χ cannot both be innocently excludable given φ and A if $\varphi \wedge \neg\psi$ is inconsistent with $\varphi \wedge \neg\chi$, i.e. if $(\varphi \wedge \neg\psi) \wedge (\varphi \wedge \neg\chi) \equiv \bot$. Such ψ and χ are "symmetric alternatives" of φ (Kroch 1972; von Fintel and Heim 1997). It then follows that no ψ is innocently excludable given φ and Q, since for each $\psi \in$ Q there will be $\neg\psi \in$ Q, $\varphi \wedge \neg\psi \in$ Q, etc., which are symmetric to ψ. Thus, for any φ which has an EM = ONLY(A)(φ), it holds that

(2) $A = Q \cap F$,

where F is a property which "breaks symmetry," being true of ψ but none of its symmetric counterparts in Q, for each $\neg\psi$ which is an SI of φ.

This paper is about F. Specifically, it seeks a definition of F which guarantees that for any EM which is attested for φ, there is a Q such that ONLY(Q$\cap$F)(φ) = EM, and for any EM$'$ which is not attested for φ there is no Q such that ONLY(Q$\cap$F)(φ) = EM$'$.

The discussion in which the paper engages starts out from the characterization of F proposed in Katzir (2007), and later, in Fox and Katzir (2011). According to this theory, alternatives must meet not only the criterion of contextual relevance, but also that of contextual simplicity. Thus, F is to be the set of sentences which are no more complex than PREJ, where the context determines, to some extent, what counts as "complex." The formal definition is given in (3), where "$\psi \precsim_c^{K_0} \varphi$" stands for "$\psi$ is no more complex than φ in discourse context c."[2]

[1] More informally, ψ is innocently excludable given φ and A iff every way of negating as many sentences in A as possible without contradicting φ includes the negation of ψ. Another way to formulate the definition in (1) is that ψ is innocently excludable given φ and A iff ψ is an element of A and $\varphi \wedge \neg\psi$ does not entail any disjunction of elements of S which is not entailed by φ. I thank Andreas Haida for suggesting this formulation.

[2] The superscript "K_0" is mnemonic for "Katzir," where "0" stands for "original," anticipating the revisions which will be made later and which will be called "K_1" and "K_2." Note that (3) is not a verbatim reproduction of the definition in Katzir (2007), Fox and Katzir (2011). It is a reformulation which, as far as I can see, is equivalent to the original in all the relevant respects, and better suited for the present discussion.

(3) $F = \{\psi \mid \psi \precsim_c^{K_0} \text{PREJ}\}$, where

a. $\psi \precsim_c^{K_0} \varphi$ iff ψ can be derived from φ by replacing at most one syntactic constituent of φ with an element of SUB(c) of the same semantic type, and

b. if $\psi \precsim_c^{K_0} \varphi$ and $\chi \precsim_c^{K_0} \psi$, then $\chi \precsim_c^{K_0} \varphi$

The substitution source of context c, SUB(c), is a set containing all lexical items plus syntactic constituents that are uttered in, or more generally made salient by, the context. The definition of SUB(c) is (4), where x ranges over syntactic objects.

(4) $\text{SUB(c)} = \{x \mid x \text{ is a word}\} \cup \{x \mid x \text{ is salient in c}\}$

The adverb "at most" in (3a) guarantees that the relation "no more complex than" is reflexive: no structure is more complex than itself. The clause (3b), which guarantees that the relation is transitive, means that an alternative may be derived from PREJ in more than one step, as exemplified by the derivation of a binary conjunction from a ternary disjunction.[3]

(5) $[_\alpha\ \varphi\ [_\beta \text{ or } [_\gamma\ \psi\ [_\delta \text{ or } \chi]]]] \overset{\gamma/\chi}{\rightarrow} [_{\alpha'}\ \varphi\ [_\delta \text{ or } \chi]] \overset{\text{or/and}}{\rightarrow} [_{\alpha''}\ \varphi\ [_{\delta'} \text{ and } \chi]]$

In what follows, I will write "[x/y](z)" for the result of replacing x in z with y, i.e. the result of applying the replacement of x with y to z. I will call z the "input," x the "target," and y the "substitute." In (5), we have $[\text{or/and}]([\gamma/\chi](\alpha)) = [\text{or/and}](\alpha') = \alpha''$. Note that both substitutes, χ and **and**, are predicted to be in SUB(c), the first by having been uttered, thus made salient, the second by being a lexical item.

That the relation "no more complex than" is reflexive and transitive should be intuitive. Also intuitive is the idea that SUB(c) contains lexical items: a structure, naturally, will not become more complex when one of its subparts is replaced with something which is syntactically atomic.[4] Katzir's real innovation lies in the hypothesis that SUB(c), in addition to lexical items, also contains phrases which have been uttered in the context. The intuition behind this hypothesis is that phrases which have been used by the discourse participants can be considered as simple as lexical items. This is how the context sets the standard for simplicity.

Another way of presenting this hypothesis, then, is to say that in addition to the set AT_g of syntactic atoms provided by the grammar, there is another set AT_c of "pretended" syntactic atoms which are provided by the context of utterance. A natural assumption would be that AT_g is the lexicon, containing all and only the words of the language, and AT_c contains all and only the phrases made salient in the context.[5] Katzir's hypothesis amounts to the following definition of SUB(c).

[3] I write "x/y" to mean 'x is replaced by y,' 'x becomes y.' For arguments that the scalar implicature of a multiple disjunction require binary conjunctions of the individual disjuncts as alternatives, see Sauerland (2004), Spector (2007), among others.

[4] This, of course, harks back to the theory of Horn scales (cf. Horn 1972, 1989), which to my knowledge is the first attempt to break symmetry.

[5] There is a use of "phrase" in which this term is equivalent to "constituent," hence includes words. My use of "phrase" excludes words.

(6) $\mathrm{SUB(c)} = \mathrm{AT_g} \cup \mathrm{AT_c}$
(i) $\mathrm{AT_g} = \{x \mid x \text{ is a word}\}$
(ii) $\mathrm{AT_c} = \{x \mid x \text{ is a phrase}\} \cap \{x \mid x \text{ is salient in c}\}$

I will call this theory "K_0," and say "ψ is K_0-derivable from φ" if it holds that $\psi \precsim_c^{K_0} \varphi$. I will not recite arguments supporting K_0 here. For these, the reader is invited to consult Katzir (2007), as well as Fox and Katzir (2011).

2 From K_0 to K_1

Having contextually salient phrases in the substitution source makes it possible to analyze "particularized implicatures" as scalar implicatures. Consider the discourse in (7).[6]

(7) A: Today it is [$_\alpha$ warm and sunny with gusts of wind].
B: What about yesterday?
A: Yesterday it was (only) [$_\beta$ warm].

A's response has an EM = (8a)$\wedge\neg$(8b) which entails it was not sunny with gusts of wind yesterday. K_0 predicts this EM to be available. Referencing (7), (8b) = [β/α](8a) is K_0-derivable from (8a), but such symmetric counterparts of (8b) as (8c) are not. Thus, F contains (8a) and (8b) but not (8c), or more concisely, $\{(8a), (8b)\} \subseteq F \not\supseteq \{(8c)\}$.

(8) a. Yesterday it was warm
b. Yesterday it was warm and sunny with gusts of wind
c. Yesterday it was not warm and sunny with gusts of wind

Suppose we simplify $\{(8a), (8b)\} \subseteq F \not\supseteq \{(8c)\}$ to $F = \{(8a), (8b)\}$. Now let $Q = \mathrm{BC}(\{(8a), (8b)\})$. We then have $\mathrm{ONLY}(Q \cap F)(8a) = \mathrm{ONLY}(\{(8a), (8b)\})(8a) =$ (8a) $\wedge \neg$(8b), which is the attested EM.

Excursus At this point, I need to address a question that arises from from the last paragraph: what makes it possible to simplify $\{(8a), (8b)\} \subseteq F \not\supseteq \{(8c)\}$ to $F = \{(8a), (8b)\}$? It is the assumption that $\mathrm{AT_g}$, the set of syntactic atoms provided by the grammar, does not contain a lexical item α such that [warm/α](8a) is equivalent to (8c) or any other symmetric counterpart of (8b). Such assumptions about the lexicon are in the background of Katzir's theory, supporting the various claims it makes about the non-existence of certain symmetric alternatives of certain sentences in certain contexts. In what follows, I will write $F = A$ when it is the case that $A \subseteq F$ and the lexicon is assumed to be such that $\mathrm{ONLY}(F \cap Q)(\varphi) \equiv \mathrm{ONLY}(A \cap Q)(\varphi)$.[7] *End of excursus.*

However, having $\mathrm{AT_c}$ as subset of SUB(c) opens a back door for symmetric alternatives to come into F: all it takes to derive them is for the necessary replacement

[6] This example is modelled after one presented in Katzir (2007). See also Matsumoto (1995) for other similar examples.

[7] See Swanson (2010), Katzir and Singh (2013) for some discussion related to this issue.

materials, e.g. the word **not**, to be uttered in the context as part of some expression. This leads to the undergeneration of EMs. To illustrate, consider (9), which was pointed out by Romoli (2013) as a problem for K_0.

(9) John did not do all of the homework

This sentence has an EM = (10a) $\wedge$ $\neg$(10b) which entails that John did some of the homework. However, K_0 predicts this EM to be unavailable. Referencing (10a), both (10b) = [all/any](10a) and (10c) = [all/some]([α/β](10a)), which are symmetric alternatives of (10a), are K_0-derivable from (10a).[8]

(10) a. $[_{TP}$ John $[\ \lambda_x\ [_{\overline{T}}$ past $[_{NegP_\alpha}$ not $[_{VP_\beta}\ [_{QP}$ all of the homework$]\ [\ \lambda_y\ [_{VP}\ t_x$ do $t_y]]]]]]]$

b. John did not do any of the homework

c. John did some of the homework

This means F = {(10a), (10b), (10c)}. Since any Q which contains (10b) will also contain its symmetric counterpart (10c), there is no Q such that ONLY(F $\cap$ Q)(10a) = ONLY({(10a), (10b)})(10a) = (10a) $\wedge$ $\neg$(10b). Thus, K_0 predicts (10a) not to have the attested EM.

As a solution to such problems as this, Trinh and Haida (2015) propose an amendment to K_0. The amendment sharpens the sense in which elements of AT_c are to be treated in the same way as lexical items. It is the following constraint.

(11) *Atomicity*
[u/v]([x/y](z)) is undefined if u is a subconstituent of y.

The constraint says that no target may be a subconstituent of a substitute. As substitutes are, by definition, elements of SUB(c), the constraint amounts to the requirement that all elements of SUB(c), words as well as phrases, be treated as syntactically atomic, in that their internal structure is inaccessible to the replacement operation. The constraint rules out such derivational paths as (12), where C is replaced by D, and then E, a subconstituent of D, is replaced by G. In other words, [E/G]([C/D](A)) is undefined because the target E is a subconstituent of the substitute D.

(12) $[_A\ B\ C\ ] \overset{C/D}{\rightarrow} [_{A'}\ B\ [_D\ E\ F\ ]] \overset{E/G}{\rightarrow} [_{A''}\ B\ [_{D'}\ G\ F\ ]]$

Atomicity prevents the derivation of (10c) from (10a). This derivation involves two steps: (i) replacing α with β, and (ii) replacing **all**, a subconstituent of β, with **some**.[9] The second step is ruled out: [all/some]([α/β](TP)) is undefined, because **all** is a subconstituent of β. With Atomicity, then, we have F = {(10a), (10b)}. Let Q = BC({(10a), (10b)}); we have ONLY(F$\cap$Q)(10a) = ONLY({(10a), (10b)})(10a) = (10a)$\wedge\neg$(10b), which is the attested reading.

[8] For various arguments supporting the constituency in (10a), see Heim and Kratzer (1998), Fox (2010), Fox (2003), among others.

[9] Note that (10c) cannot be derived by first replacing **all** with **some** and then replacing α with the modified QP, since this modified QP, by definition, is not a substitute, i.e. not an element of SUB(c).

I will write "K_1" for the theory which results from adding Atomicity to K_0, and say "ψ is K_1-derivable from φ," or equivalently, "$\psi \precsim_c^{K_1} \varphi$," if ψ is K_0-derivable from φ with Atomicity being obeyed. The reader is invited to consult Trinh and Haida (2015) for more arguments supporting K_1.

3 From K_1 to K_2

I will now turn to a discussion of K_1 which ends in an amendment to it.[10] I start by noting that the capacity of K_1 to break symmetry more adequately than K_0 extends beyond the data point in (10a). Consider the following conversation.

(13) A: Bill went for a run and didn't smoke.
B: What about John?
A: John (only) went for a run.

A's response has an EM = (14a) $\wedge \neg$(14b) which entails that John is different from Bill, i.e. that he smoked. K_0 does not account for this EM. Every sentence in (14) is K_0-derivable from (14a), which means F = {(14a), (14b), (14c), (14d), (14e)}, which in turn means there is no Q such that ONLY(F $\cap$ Q)(14a) = (14a) $\wedge \neg$(14b).

(14) a. John went for a run
b. John went for a run and didn't smoke
c. John went for a run and smoked
d. John didn't smoke
e. John smoked

K_1, on the other hand, does account for the availability of the attested EM. The account has two ingredients. The first is the fact that (14a), (14b), (14d), and (14e) are K_1-derivable from (14a) but (14c) is not.[11] Thus, F = {(14a), (14b), (14d), (14e)}. The second ingredient is the fact that (14d) and (14e) are not in BC({(14a), (14b), (14c)}). This means there exists a Q = BC({(14a), (14b), (14c)}) such that ONLY(F$\cap$Q)(14a) = ONLY({(14a), (14b)})(14a) = (14a) $\wedge \neg$(14b), the attested EM.

Note that the two ingredients of K_1's account are of different natures: one logical, the other syntactic. That (14d) and (14e) are not in BC({(14a), (14b), (14c)}) is a logical fact, but that (14c) is not K_1-derivable from (14a) is a syntactic fact. The data point in (13), therefore, constitutes evidence for the "structural approach to scalar implicatures," which claims that the SI of a sentence is a function of both its logical and its syntactic properties. One way to test this approach, therefore, is to design variations on (13) by selectively tinkering with each kind of ingredients. If different EMs show up as expected, we have evidence for the approach; if not, we have evidence against it.

[10] In the arguments made in this section, and in those that follow, several logical steps will be skipped. Spelling out every premise will increase the length of this exposition way beyond what is warranted by its substance. The reader is invited to verify the validity of my arguments for herself.

[11] See Trinh and Haida (2015) as well as Breheny et al. (2017) for an elucidation of this fact.

Trinh and Haida (2015) discuss a variation of (13) which has its syntactic, but not its logical, profile. Consider the following exchange.

(15) A: Bill passed some but not all of the tests.
B: What about John?
A: John (only) passed some of the tests.

In this conversation, unlike in (13), A's response does not have the EM = (16a)∧¬(16b) which entails that John is different from Bill, i.e. that he passed all of the tests. K_1 accounts for the unavailability of this EM in just the way we expect. The syntactic situation is parallel to that of (13): (16a), (16b), (16d), and (16e) are K_1-derivable from (16a), but not (16c). Thus, F = {(16a), (16b), (16d), (16e)}.

(16) a. John passed some of the tests
b. John passed some but not all of the tests
c. John passed some and all of the tests
d. John did not pass all of the tests
e. John passed all of the tests

However, the logical situation is different: any Q which contains (16a) and at least one more sentence in (16) will contain all the other sentences. This means there is no Q such that ONLY(F ∩ Q)(16a) = (16a) ∧ ¬(16b), which is the EM that is not attested.

Trinh and Haida (2015) do not discuss cases that differ minimally from (13) with respect to syntactic profile. Such an example is provided in Breheny et al. (2017). It is the conversation in (17).

(17) A: Bill went for a run. He did not smoke.
B: What about John?
A: John (only) went for a run.

In this discourse context, the sentences which are K_1-derivable from (14a), the prejacent, are (14a), (14d), and (14e). Crucially, neither (14b) nor (14c) is K_1-derivable from (14a).

(14) a. John went for a run
b. John went for a run and didn't smoke
c. John went for a run and smoked
d. John didn't smoke
e. John smoked

Thus, F = {(14a), (14d), (14e)}. Given this F, it turns out there is no Q such that ONLY(F ∩ Q)(14a) = (14a) ∧ ¬(14d). The prediction, then, is that A's response in (17) does not have an EM = (14a) ∧ ¬(14d) which entails that John is different from Bill, i.e. that he smoked. This prediction, however, is false: A's reponse has this EM in (17) just as easily, and naturally, as it does in (13). This observation, therefore, constitutes evidence against the structural approach to implicatures, since it shows that an SI exists without the structural conditions postulated to be necessary for it.

To solve the problem posed by (17), I will now propose an amendment to K_1. Recall that Atomicity sharpens Katzir's idea that contextually salient phrases, i.e. elements of AT_c, are to be be treated as lexical items. The amendment I am proposing will sharpen it even more. In fact, it can be considered an additional clause to Atomicity. I will call this new constraint *Atomicity*$^+$.

(18) *Atomicity*$^+$
(i) [u/v]([x/y](z)) is undefined if u is a subconstituent of y.
(ii) x, y $\in AT_c$ only if x is not a subconstituent of y.

The second clause of Atomicity$^+$ prevents elements of AT_c from having each other as subparts. Thus, it imposes on these phrases the structural relation which holds definitionally between syntactic atoms. I will call the resulting theory "K_2," and say that "ψ is K_2-derivable from φ," or equivalently, "$\psi \precsim_c^{K_2} \varphi$," if φ is K_0-derivable from φ with Atomicity$^+$ being obeyed.

Let us see how K_2 circumvents the problem posed by (17) for K_1. Here is the conversation again.

(17) A: Bill went for a run. $[_{TP}$ He $[\ \lambda_x\ [_{\overline{T}}$ did $[_{NegP_\alpha}$ not $[_{VP_\beta}\ t_x$ smoke]]]]].
B: What about John?
A: John (only) went for a run.

Let $\alpha \in AT_c$. It follows from Atomicity$^+$ that $\beta \notin AT_c$, as β is a subconstitutent of α. Since β is not a lexical item, $\beta \notin SUB(c)$. Thus, (19b) = $[\gamma/\alpha]$(19a) is K_2-derivable from (19a), but (19c) is not, since $[\gamma/\beta]$(19a) is not defined.

(19) a. $[_{TP}$ John $[\ \lambda_x\ [_{\overline{T}}$ past $[_{VP_\gamma}\ t_x$ go for a run]]]]
b. John did not smoke
c. John smoked

We then have F = {(19a), (19b)}. Now let Q = BC(F). Then ONLY(F $\cap$ Q)(19a) = ONLY({(19a), (19b)})(19a) = (19a) $\wedge \neg$(19b), which entails John smoked. This is the attested EM.

Note that K_2 also allows the possibility, referencing (17), that $\beta \in SUB(c)$, hence that F = {(19a), (19c)}. This means K_2 predicts ONLY(F $\cap$ BC(F))(19a) = (19a) $\wedge \neg$(19c) to be an available EM of A's response in (17). This prediction is correct. Consider (20).

(20) A: Bill went for a run. $[_{TP}$ He $[\ \lambda_x\ [_{\overline{T}}$ did $[_{NegP_\alpha}$ not $[_{VP_\beta}\ t_x$ smoke]]]]].
B: What about John?
A: John (only) went for run also.

A's response in (20) clearly implies that John did not smoke. Inserting the word **also** makes the response more natural, as it maximizes its presuppositional content, i.e. it gives the sentence the presupposition that John is the same as Bill (cf. Heim 1991). However, this should not be a confounding factor. Note, importantly, that K_1 cannot account for (20), since it lets either both (19b) and (19c), or none of these, be alternatives of (19a).

4 Some consequences of K_2

In addition to solving the problem for K_1 posed by (17), K_2 has some theoretical and empirical consequences which I will now discuss.

4.1 The complexity of verbs

I start with a fact which could, but in the end does not, undermine K_2's account for (17). Recall that this account rests on K_2's ability to break the symmetry in (19) by providing the possibility for F to contain (19b) but not (19c), i.e. the possibility for SUB(c) to contain α but not its daughter VP_β. But note that $AT_g \subseteq SUB(c)$ and AT_g, by assumption, contains the verb **smoke**. The question, then, is whether (19c) is K_2-derivable from (19a) by replacing γ with **smoke**, i.e. whether [γ/smoke](19a) = (19c).

The answer is negative. Replacement is by definition type preserving: [x/y](z) is defined only if x and y are of the same semantic type. As γ is of type t, while **smoke** arguably is not, [γ/smoke](19a) is undefined. A narrow escape for K_2.

But this escape, of course, is made possible by luck, not principle: it is an accident that the target is a VP and not a single verb, and we can easily construct a variant of (13) for which this condition fails to obtain. Consider the discourse in (21).

(21) A: Bill ran. $[_{TP}$ He $[\ \lambda_x\ [_{\overline{T}}$ did $[_{NegP_\alpha}$ not $[_{VP_\beta}\ t_x$ smoke]]]]].
B: What about John?
A: John (only) ran.

A's response in (21), clearly, can imply that John smoked, which means it has the EM = (22a) ∧ ¬(22b). K_2 predicts this attested EM to be unavailable, since this time, there is no way for K_2 to break the symmetry in (22): referencing (21), both (22b) = [γ/α](22a) and (22c) = [run/smoke](22a) are K_2-derivable from (22a). In both cases, the target and the substitute are arguably of the same semantic type.

(22) a. $[_{TP}$ John $[\ \lambda_x\ [_{\overline{T}}$ past $[_{VP_\gamma}\ t_x$ run]]]]
b. John did not smoke
c. John smoked

The problem is that Atomicity$^+$ only prevents phrases in the SUB(c) from containing each other, and since **smoke** is not a phrase, Atomicity$^+$ does not rule out the possibility of SUB(c) containing both **smoke** and **did not smoke**. This means that the problem will dissolve if **smoke** is a phrase, not a lexical item. I believe that a case for such a claim can be made. Let us take standard syntactic analysis more seriously, and assume the following structure for the sentence **John ran** (cf. Hale and Keyser 1993, 2002; Chomsky 1995; Kratzer 1996; Wurmbrand 1998; Radford 2004; Carnie 2006; Wurmbrand 2006, among many others).

(23) $[_{TP}$ John $[\ \lambda_x\ [_{\overline{T}}$ past $[_{vP}\ t_x\ [_{\overline{v}}\ [_v$ run v] $[_{VP}\ t_{run}\ \emptyset\ ]]]]]]$

The head-chain (**run**, t_{run}) is not a constituent and hence cannot be a target.[12] To derive (22c) from (23), the smallest constituent that could be a target is $\bar{v}$, a phrase. Thus, K_2's account of (17) applies to (21) as well.

4.2 The privilege of AT_g

Appealing to such details of syntactic analysis as I have just done might bring to mind the predicate "ad hoc" as a label for my account. This label is unwarranted to the extent that the account squares with linguistic intuitions beyond those discussed in the last subsection. I will now argue that this is the case. Consider (24).

(24) A: Bill did some of the homework. He [$_\alpha$ did not do all of them].
B: What about John?
A: John [$_\beta$ did some of the homework].

A's response, repeated in (25a), is predicted to have both (25b) = [β/α](25a) and (25c) = [some/all](25a) as alternatives.

(25) a. John [$_\beta$ did some of the homework]
b. John did not do all of the homework
c. John did all of the homework

Let us call $\psi = [x/y](\varphi)$ a "contextual alternative" of φ if $y \in AT_c$, and a "grammatical alternative" of φ if $y \in AT_g$. In other words, the derivation of contextual alternatives has phrases, while the derivation of grammatical alternatives has words, as substitutes. Thus, (25c) is a contextual alternative, while (25b) is a grammatical alternative, of (25a). Now, given that (25b) and (25c) are symmetric alternatives of (25a), we predict (25a) not to have the EM = (25a) $\wedge \neg$(25c). However, it does: A's response in (24) is admittedly weird, but it is weird precisely because it has to be construed as saying that John is the same as Bill, i.e. that he did some but not all of the homework. Note, also, that it is simply impossible to construe A's response as saying that John is different from Bill, i.e. that he did all of the homework. This fact suggests the following generalization.[13]

(26) Symmetry can be broken in favor of grammatical alternatives against contextual alternatives, but not the other way around

Let us, once more, come back to the conversation below.

[12] Also, note that I will make the standard assumption that in head-chains, the higher copy does not c-command the lower one, therefore the latter cannot be a variable. This means that it is not possible to replace just the higher copy without also replacing the lower one.

[13] Fox and Katzir (2011) hypothesize, in footnotes 16 and 23, that alternatives constructed from contextually salient materials are "not necessarily members of F." This amounts, practically, to the generalization in (26). See also Trinh and Haida (2015), footnote 22, for remarks to the same effect.

(27) A: Bill ran. He did not smoke.
B: What about John?
A: John ran.

As discussed previously, A's reponse has a reading which entails John is different from Bill in that he smoked, but it also has a reading which entails John is exactly like Bill in that he ran and did not smoke. The second reading is harder to get, but it is there, and can be brought out more naturally by flanking the verb **ran** with **only** and **also**, which makes the sentence sound better for reasons orthogonal to the issue at hand. This means symmetry can be broken either in favor of (28b) against (28c), or the other way around.

(28) a. John ran
b. John did not smoke
c. John smoked

Given the generalization in (26), this fact would be surprising if (28c), but not (28b), is a grammatical alternative of (28a). However, it would be predicted if both (28b) and (28c) are contextual alternatives of (28a), as I propose.

When is symmetry predicted to be unbreakable by my proposal? Obviously, when the symmetric alternatives are both contextual, and are both permitted by Atomicity^{+} to be in F. Disjunctions exemplify such a case. Consider (29).

(29) $[_{\alpha}$ $[_{\beta}$ John talked to Mary] $[_{\gamma}$ or $[_{\delta}$ John talked to Sue]]]

Both β and δ are in SUB(c), since both have been uttered, and none contains the other as subconstituent. Thus, both $[\alpha/\beta](\alpha) = \beta$ and $[\alpha/\delta](\alpha) = \delta$ are in F. But β and γ are symmetric alternatives of α, as $(\alpha \wedge \neg\beta) \wedge (\alpha \wedge \neg\gamma) \equiv \bot$. The prediction is, then, that neither $\neg\beta$ nor $\neg\gamma$ is an SI of α. This prediction is correct.[14]

5 Conclusion and a loose end

Let us recap. Our starting point is a truism on how to keep it simple: structures do not become more complex when their subparts are replaced with syntactic atoms. What are syntactic atoms? By definition, lexical items are. Katzir (2007), and latter Fox and Katzir (2011), propose the novel idea that phrases which have been uttered can also be considered atomic in the sense that they can be used as substitutes just like lexical items. Trinh and Haida (2015) adds that subparts of what is considered atomic cannot themselves be targets of substitution. This paper improves on Trinh and Haida's theory, adding that subparts of what is considered atomic cannot themselves be considered atomic. The last addition is made in response to empirical challenges presented as evidence against the idea that scalar inference depends on both semantic

[14] When symmetry cannot be broken, the inference is derived that the speaker is "ignorant" about the symmetric alternatives, if these are more informative than the prejacent (cf. von Fintel and Heim 1997; von Fintel and Fox 2002. I will not discuss the details of this derivation here. I will note, however, that we now have an explanation for the fact that disjunctions give rise to ignorance inferences much more naturally than such cases as (21). This fact, as far as I can see, is a puzzle for Fox and Katzir (2011).

content and syntactic structure. It turns out, interestingly, that more facts are explained when details of standard syntactic analysis are taken seriously—specifically, when a more articulate structure of the verb phrase is assumed.

I will end by tying up a loose end. Breheny et al. (2017), henceforth BKRS, present another set of data, pertaining to adjectives, as posing a problem for Trinh and Haida (2015), henceforth TH. The representative example is (30).

(30) The cup is not full

BKRS make two observations about (30): (a) it licenses the inference that the cup is not empty, and (b) it does not license the inference that the cup is empty. Assuming (30) to have the analysis in (31), where **pos** introduces the contextual standard of fullness (cf. Bartsch and Vennemann 1972; Cresswell 1976; Klein 1980; Wheeler 1972; Stechow 1984),

(31) $[_{TP}$ The cup $[\ \lambda_x\ [_{\overline{T}}\ [_T$ be T $]\ [_{NegP}$ not $[_{VP}\ t_{be}\ [_{AP}\ t_x\ [_A$ pos full$]]]]]]]$

these observations are then argued to be problematic for TH in the following sense. First, TH can account for (a) but the account does not generalize to all adjectives. Second, TH cannot account for (b). I will now address both of these criticisms, starting with the first.

BKRS note that TH could say **pos** alternates with modifiers such as **partly** and **half**, and thus that (31) has ¬([pos/partly](31)) and ¬([pos/half](31)) as SIs, which entail the glass is not empty. BKRS then objects that this account is not general by pointing out that it applies neither to adjectives such that **tall** and **safe** which cannot combine with **partly** and **half**, nor to adjectives such as **transparent**, which can.

(32) a. John is not tall $\not\rightsquigarrow$ John is not small
b. This town is not safe $\not\rightsquigarrow$ This town is not dangerous
c. The glass is not transparent $\not\rightsquigarrow$ The glass is not opaque

My reply to this objection will start with noting the fact that while (30) licenses the inference that the glass is not empty, it licences no inference about how full the glass is, e.g. no inference that the glass is half full. This is evidence that the 'not empty' inference of (30) does not come about through **pos** alternating with the adverbs mentioned above. Given that expressions such as **two-thirds full** are well-formed, I will suggest that **pos** alternates with the rational numbers in $(0, 1)$. The density of this set is what accounts for the lack of inference about how full the glass is, just as the density of the set of rationals in $[0, \infty)$, which alternate with **thirty** in (33), accounts for the lack of inference licensed by (33) about how many cigarettes John smoked.[15]

(33) John did not smoke thirty cigarettes

[15] The reader is refered to Fox and Hackl (2006) for such an account. Note that the reason for associating **pos** and **thirty** with $(0, 1)$ and $[0, \infty)$, respectively, is the fact that ***zero full** and ***one full** are ill-formed, while **zero cigarettes** is well-formed. For all I know, this difference may or may not be orthogonal to the issue at hand.

Now note that (33) licenses the inference that John did not smoke zero cigarettes. To the best of my knowledge, there is no theory on the market which derives this inference. I conjecture that whichever theory explains the 'non-zero' inference of (33) will explain the 'not empty' inference of (30), and leave the formulation of such a theory for future work. I will note now, however, that that theory will likely be able to predict the fact that **tall**, **safe**, and **transparent** do not behave like **full**, as none of these adjectives can combine with modifiers such as **two-thirds**.

I now turn to BKRS's second criticism, which is that (30) cannot license the inference that the cup is empty, but TH predicts that it can. I agree that TH does make this prediction, since [full/empty](31) is K_2-derivable from (31), and I agree that this prediction is false. However, there is a simple addition to K_2 which can be made to solve this problem. Suppose we exclude from F all sentences whose negation is strictly stronger than the prejacent,

(34) $\quad F = \{\psi \mid \psi \precsim_c^{K_2} \text{PREJ}\} \cap \{\psi \mid \neg\psi \not\Rightarrow \text{PREJ}\}.$

Then, [full/empty](31) will not be a scalar alternative of (31), which means (30) will not have the SI that the cup is empty.[16] The addition will account for the following intuitions as well.[17]

(35) a. The soup is not hot $\not\rightsquigarrow$ The soup is cold
b. The dress is not expensive $\not\rightsquigarrow$ The dress is cheap
c. The road is not long $\not\rightsquigarrow$ The road is short

It is, therefore, stipulative but not totally ad hoc.

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[16] Note that given the new definition of F in (34), both observations (a) and (b) about (30), stated in the paragraph below (30), would follow if **the cup is empty** is K_2-derivable from (30). This, however, is not the case, assuming that (31) is the structure of (30), and that **empty**, presumably, is not of the same semantic type as NegP.

[17] I will leave such uses of language as litotes, or conventionally polite speech, out of consideration here.

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