Aspectual operators: Temporality, evaluativity, and polarity sensitivity

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Abstract The aspectual operator *still* features interesting properties related to temporality, evaluativity, and polarity sensitivity. This is not unique to *still* but rather true of aspectual operators more generally—very similar properties can be found in *already*, *anymore*, and *yet*. And it is not unique to aspectual operators either—very similar facts have been reported for disjunction, indefinites, minimizers, or numerals. This paper starts from Beck (2020)'s proposal for temporality in *still*; generalizes it to *already*, *anymore*, and *yet*; and then generalizes it even further to capture evaluativity and, partially, polarity sensitivity also, drawing on Mihoc (2021a)'s proposal for similar properties in superlative-modified numerals, which in turn draws on previous insights about disjunction, indefinites, minimizers, and other numerals. The result is a new solution to temporality, evaluativity and, partially, polarity sensitivity in *still* that unifies it not just with other aspectual operators but also with disjunction, indefinites, minimizers, and numerals.

Keywords: *still*; *anymore*; *already*; *yet*; temporality; evaluativity; polarity sensitivity; extents; alternatives; exhaustification

1 Introduction

The aspectual operator *still* displays an interesting set of patterns: (a) First, it is degraded in a negative context. (b) Second, in a positive context it gives rise to a number of temporal inferences: (i) That the positive property it combines with is true now; this is what we will call the 'current state' inference (CURR). (ii) That the property might not be true at a later time; this is what we will call the 'other state' inference (OTH). (iii) That the property is also true at an earlier time; this is what we will call the 'continuity' inference (CONT). And (iv) that the property holds later than expected by some relevant contextual standard; this is what we will call the 'evaluativity' inference (EVAL). (c) Third, it is degraded in combination with certain predicates, e.g., *be old*; this is what I will argue is a second form of polarity sensitivity, 'polarity sensitivity 2' (POL2).[1]

(1) a. Tim ✓is / #isn't **still** asleep. (POL1)
b. Tim is **still** asleep.
(i) asleep now (CURR)
(ii) not asleep later (OTH)
(iii) also asleep earlier (CONT)

[1] See, e.g., Beck (2020) for CURR, OTH, CONT. Beck (2020) also mentions EVAL, though not exactly in these terms (see her *It is still morning* example on p. 7). A clearer mention of EVAL can be found in Ippolito (2007). For mentions of POL1, see, e.g., Israel (1997) or Krifka (2000).

(iv) asleep later than expected[2] (EVAL)
c. Tim is **still** ✓young / #old. (POL2)

Interestingly, similar patterns can be found in the aspectual operators *already*, *anymore*, and *yet* also, just that sometimes in the opposite direction.[3]

(2) a. Tim ✓is / #isn't **already** asleep. (POL1)
b. Tim is **already** asleep.
(i) asleep now (CURR)
(ii) not asleep earlier (OTH)
(iii) also asleep later (CONT)
(iv) asleep earlier than expected (EVAL)
c. Tim is **already** #young / ✓old. (POL2)

(3) a. Tim #is / ✓isn't asleep **anymore**. (POL1)
b. Tim isn't asleep **anymore**.
(i) not asleep now (CURR)
(ii) asleep earlier (OTH)
(iii) also not asleep later (CONT)
(iv) not-asleep earlier than expected (EVAL)
c. Tim isn't ✓young / #old **anymore**. (POL2)

(4) a. Tim #is / ✓isn't asleep **yet**. (POL1)
b. Tim isn't asleep **yet**.
(i) not asleep now (CURR)
(ii) asleep later (OTH)
(iii) also not asleep earlier (CONT)
(iv) not-asleep later than expected (EVAL)
c. Tim isn't #young / ✓old **yet**. (POL2)

And, even more interestingly, similar patterns have been reported in many other categories of language as well including disjunction,[4] indefinites,[5] minimizers,[6] and bare,

[2]A reviewer argues that it is possible to say *As everyone expected, Tim was still asleep*', suggesting that this challenges a combination of OTH and EVAL. I agree with the judgment but not with the conclusion. I base this on a comparison of (a) the given *still* example, *As everyone expected, Tim was still asleep* and (b) its *still*-less counterpart, *As everyone expected, Tim was asleep*, specifically their compatibility with (i) a continuation such as *In fact, he never woke up* and (ii) a context such as *He was asleep later than expected*. A discourse consisting of (b) and (i) is slightly odd to me, as (i) seems completely out-of-the-blue. And (b) in no way conveys (ii). In contrast, (a) is perfectly coherent with (i) and it does convey (ii). As such, I think this examples is not an argument against OTH or EVAL but simply evidence that the expectations associated with EVAL may be relative to a variety of modal bases.

[3]Most of these are mentioned in the literature, though some more than others, and not always in the form we give them. E.g., Ladusaw (1980: 77) mentions CURR and OTH in *already*. Krifka (2000) mentions CURR in all, OTH in *still* and *already*, CONT in *anymore* and *yet*, POL1 in all. Israel (1997) mentions POL1 in all. It is not easy to find metions of EVAL or POL2 but there are some related to *still* that we mentioned earlier.

[4]For POL1-PPI-hood in disjunction, see Spector (2014) or Nicolae (2017).

[5]For POL1-NPI/PPI-hood in indefinites, see Szabolcsi (2004); Krifka (1995); Chierchia (2013), among many others. For POL2 in indefinites, see Cohen & Krifka (2014): *If you eat **some** spinach, I will ✓give you $10 / #whip you* and *If you eat **any** spinach, I will #give you $10 / ✓whip you* (p. 77).

[6]For POL1-NPI-hood in minimizers see Chierchia (2013); Crnič (2011; 2012), among many others. For POL2 in minimizers, see, e.g., Cohen & Krifka (2014), citing Regine Eckardt (p.c.): *If you budge an inch, I will ✓kill / #thank you* (p. 77). Or Crnič (2011): *Everyone that **lifted a finger** to help ✓was rewarded / ?? was wearing blue jeans* (p. 49).

comparative-modified, and superlative-modified numerals[7] also.[8] (Just that in those categories what we have so far labeled 'OTH' is more commonly known as 'scalar implicature'.)

(5) a. Tim ✓a dormi / #n'a pas dormi ici ou là. (POL1)
Tim slept / didn't sleep here or there
b. Tim slept here or there.
(i) not in both places (OTH)

(6) a. Tim ✓got / #didn't get **some** sleep. (POL1)
b. Tim got **some** sleep.
(i) not a lot (OTH)
c. If Tim got **some** sleep, he must be ✓(well) rested / #tired.

(7) a. Tim #slept / ✓didn't sleep **a wink**. (POL1)
b. If you slept **a wink** last night, you're #admitted / ✓disqualified. (POL2)

(8) Tim slept 3 hours.
a. slept 3 (an effect similar to CURR)
b. didn't sleep 4 or more (OTH)

(9) a. Tim ✓slept / #didn't sleep **no more than 3** hours. (POL1)
b. Tim slept **no more than 3 hours**.
(i) it is not the case that he slept no more than 2 (OTH)
(ii) that's little! (EVAL)
c. If Tim slept no more than 3 hours, he must be #(well) rested / ✓tired. (POL2)

(10) a. (i) Tim ✓slept / #didn't sleep **at least 3 hours**. (POL1)
(ii) Tim ✓slept / #didn't sleep **at most 3 hours**. (POL1)
b. (i) Tim slept **at least 3 hours**.
he didn't sleep, e.g., at least 5 (OTH)
that's many! (EVAL)
(ii) Tim slept **at most 5 hours**.
he didn't sleep, e.g., at most 3 (OTH)
that's few! (EVAL)
c. (i) If Tim slept **at least 3** hours, he must be ✓(well) rested / #tired. (POL2)
(ii) If Tim slept **at most 3** hours, he must be #(well) rested / ✓tired. (POL2)

There is a rich literature on aspectual operators.[9] However, from the point of view of the patterns in focus here, the various proposals usually suffer from the same general limitations: They engage with CURR, OTH, and CONT, but rarely with EVAL,[10] and almost never with POL2 or POL1.[11] And they do not address the fact that these patterns are

[7] For EVAL in *no Adj-er* comparatives, see Nouwen (2008) (who cites Jespersen 1949, 1966, who cites Stoffel 1894). For POL1-PPI-hood in superlative-modified numerals, see Geurts & Nouwen (2007); Spector (2014; 2015); Cohen & Krifka (2014); Mihoc (2020). For EVAL in superlative-modified numerals, see Mihoc (2021a). For POL2 in superlative-modified numerals, see Cohen & Krifka (2014); Mihoc (2021a). For experimental verification of both, see Mihoc & Davidson (2021).

[8] Many of these categories have been reported to carry an ignorance (IG) effect as well. We will put it aside for now, though we will return to it briefly later.

[9] For example, Horn (1970), Ladusaw (1980: Ch. 5), Löbner (1989), Michaelis (1992), Michaelis (1993), Mittwoch (1993), Israel (1997), Löbner (1999), Krifka (2000), Klein (2007), Ippolito (2007), Umbach (2012), Zimmermann (2018), Thomas (2018), Beck (2020), though some are not focused on the English aspectual operators discussed here but rather their cross-linguistic counterparts.

[10] E.g., Ippolito (2007) treats EVAL as going back to a separate meaning of *still*, and Beck (2020) as an afterthought orthogonal to the main meaning of *still*.

[11] The only exception that I am aware of is Israel (1997).

present in aspectual operators more generally, and in other categories of language also. The goal of this paper is to address these limitations.

In §2 we will go over a recent analysis of CURR, OTH, and CONT in *still* by Beck (2020). In §3 we will generalize it to cover the same patterns in *already*, *anymore*, and *yet*. In §4 we will generalize it further to align it a unified approach to similar phenomena in disjunction, indefinites, minimizers, or numerals due to Mihoc (2020; 2021a; b) and references therein—especially Kennedy (1997); Chierchia (2013); Crnič (2011; 2012)—using the result to try to make sense of EVAL and POL2 and, partially, POL1 as well. In §5 we conclude.

Note: Starting our story with *still* and Beck (2020) is somewhat arbitrary. The story could have been told from many other perspectives. For example, some other of the literature on aspectual operators, or from the literature on numerals, or from the literature on the various phenomena we discuss. However, our main contribution is about aspectual operators. Beck (2020) is the most recent prominent work on aspectual operators. And starting with just one allows our exposition to have a sharper and more manageable focus.

2 Beck (2020)'s proposal for *still*

Still exhibits many different patterns. Some of these are CURR, OTH, and CONT. In this section we review a recent account for these patterns due to Beck (2020).

Beck proposes that aspectual *still* has the meaning in (11).[12] (For a detailed composition tree, see Figure 1.) The truth conditions directly capture CURR, (12a). And the presupposition directly captures CONT, (12c). As for OTH, Beck reasons as follows: The truth conditions make reference to a scalar element, t. This naturally activates scalar alternatives. However, these meanings are non-monotonic, such that the resulting scale is not ordered by entailment. Still, assume an implicature calculation mechanism such as Chierchia et al. (2012)'s silent exhaustivity operator O, which negates any non-entailed alternative. This would be able to target all the alternatives. But targeting all the ones based on past times would generate unattested implicatures and moreover suggest a context in direct opposition to the one mandated by CONT. As such, Beck stipulates that only the 'pragmatically open alternatives' are targeted, which she takes to be those about the future. As such only the future-based alternatives are negated, correctly capturing OTH, (12b). (Here and going forward: $\prec$ / $\succ$ = 'is immediately before/after'; t_0 = 'utterance time' / 'now'; t_{-1} = 'time (immediately) before now'; and t_{+1}' = 'time (immediately) after now'.)

(11) $[\![\text{still}]\!] = \lambda t^*_i . \lambda t_i . \lambda P_{\langle i,t\rangle} : t^* \prec t \wedge P(t^*).\ P(t)$

(12) [[It is still raining]]

a. $\exists e[t_0 \subseteq \tau(e) \wedge \text{rain}(e)]$
raining now (CURR)

b. $\neg\exists e[t_{+1} \subseteq \tau(e) \wedge \text{rain}(e)]$
not raining later (OTH)

c. $\exists e[t_{-1} \subseteq \tau(e) \wedge \text{rain}(e)]$
also raining earlier (CONT)

As intended, Beck (2020)'s proposal for *still* captures CURR, OTH, and CONT. However, this solution comes at the cost of a couple of non-standard assumptions—a scale that it

[12] Beck (2020) also invokes a weak *presupposition* about the future. I am not convinced that that is needed. Unfortunately, I won't be able to discuss this any further in this paper.

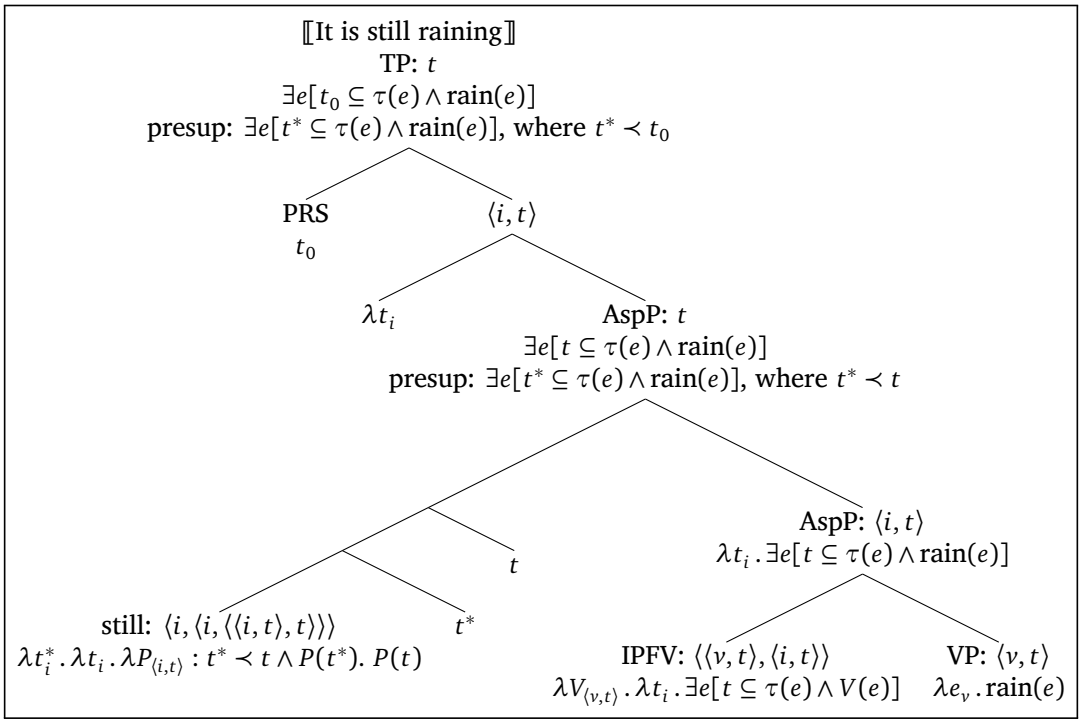


Figure 1: *Still* according to Beck (2020).

is not ordered by entailment[13] and an implicature calculation mechanism that can only target 'pragmatically open' alternatives.[14] And it does not mention or address EVAL,[15] POL2, or POL1, nor the fact that similar patterns are present in *already*, *anymore*, and *yet*, as well as disjunction, indefinites, minimizers, or numerals.

3 Beck (2020)-style proposal for *already*, *anymore*, and *yet*

As shown in §2, Beck (2020) provides a solution to CURR, OTH, and CONT in *still*. One of the limitations of the proposal is that it does not engage with the fact that we also find very similar patterns in *already*, *anymore*, and *yet*. In this section we will seek to address this gap.

As it turns out, although Beck doesn't state so, extending her idea for *still* to *already* isn't too hard—we just need to reverse the direction of OTH and CONT by replacing $t_{+/-1}$ with $t_{-/+1}$.

(13) $\llbracket\text{already}\rrbracket = \lambda t_i^* . \lambda t_i . \lambda P_{\langle i,t\rangle} : t^* \succ t \wedge P(t^*).\ P(t)$ ($\succ$ = 'is immediately after')

(14) ⟦It is already raining⟧

[13] As Beck herself notes, "scalar implicatures are usually said to work on alternatives on a scale of logical strength" (p. 20, fn. 7). See also Matsumoto (1995) for the idea that a fundamental condition on Horn (1972)-sets is ordering by monotonicity—an idea that carries sufficient weight for authors who deviate from it to make a special note of it as, for example, Mayr (2013) in his analysis of numerals.

[14] While Beck cites a precedent for this sort of assumption, it is definitely not a common assumption. Moreover, as in our presentation of the proposal, the main purpose it seems to serve in the analysis is to counteract the unintended consequences of the non-monotonic truth conditions and the nonstandard scale.

[15] That is, except for a tangential discussion on pp. 22-23, the conclusion of which is that any such effects are circumstantial

a. $\exists e[t_0 \subseteq \tau(e) \wedge \text{rain}(e)]$
raining now (CURR)
b. $\neg\exists e[t_{-1} \subseteq \tau(e) \wedge \text{rain}(e)]$
not raining earlier (OTH)
c. $\exists e[t_{+1} \subseteq \tau(e) \wedge \text{rain}(e)]$
also raining later (CONT)

With *anymore* and *yet* it's a little trickier as we're dealing with negative sentences and there are in principle multiple possibilities for where to add the negation—above or below the aspectual operator—with different consequences for whether the P that the operator combines with is positive or negative and for how we need to adjust the presupposition to get our desired meanings. Let's assume syntactic negation attaches above the operator; the property the operator combines with is syntactically positive; and the property condition of the presupposition in the lexical definition of the operator is negated. The results are as below—*anymore* can be defined as an *already* with a negation in the presupposition.

(15) $[\![\text{anymore}]\!] = \lambda t_i^* . \lambda t_i . \lambda P_{\langle i,t\rangle} : t^* \succ t \wedge \neg P(t^*).\ P(t)$

(16) [[It isn't raining anymore]]
a. $\neg\exists e[t_0 \subseteq \tau(e) \wedge \text{rain}(e)]$
not raining now (CURR)
b. $\neg\neg\exists e[t_{-1} \subseteq \tau(e) \wedge \text{rain}(e)]$
raining earlier (OTH)
c. $\neg\exists e[t_{+1} \subseteq \tau(e) \wedge \text{rain}(e)]$
also not raining later (CONT)

Analogously, *yet* can be defined as a *still* with a negation in the presupposition.

(17) $[\![\text{yet}]\!] = \lambda t_i^* . \lambda t_i . \lambda P_{\langle i,t\rangle} : t^* \prec t \wedge \neg P(t^*).\ P(t)$

(18) [[It isn't raining yet]]
a. $\neg\exists e[t_0 \subseteq \tau(e) \wedge \text{rain}(e)]$
not raining now (CURR)
b. $\neg\neg\exists e[t_{+1} \subseteq \tau(e) \wedge \text{rain}(e)]$
raining later (OTH)
c. $\neg\exists e[t_{-1} \subseteq \tau(e) \wedge \text{rain}(e)]$
also not raining earlier (CONT)

In §2 we outlined Beck (2020)'s proposal for CURR, OTH, and CONT in *still*. In this section we've added to it a Beck (2020)-style proposal for the same patterns *already*, *anymore*, and *yet*. However, the potentially questionable features of Beck (2020)'s analysis that we noted in §2 compound: To obtain the correct meanings for OTH, we keep having to change what counts as 'pragmatically open' alternatives. This seems to vary with the presupposition, the shape of which is non-trivially stipulative, and which seems to be doing a lot of work precisely because the truth conditions don't—they are not only non-monotonic but also always the same. The last point itself raises questions: While it makes sense for *still* to have the same truth conditions as *anymore* and *already* as *yet*, because they are suppletive pairs, it is odd for the truth conditions to be the same across all four. In addition to all of these, we still have no explanation for EVAL, POL2, and POL1, and nor why all of these phenomena have counterparts in other categories of languages also.

4 Mihoc-style proposal for *still*, *already*, *anymore*, and *yet*

We now have a more or less parallel analysis of CURR, OTH, and CONT in all of our aspectual operators. However, we still have no clue why we find similar patterns in other categories of language. Additionally, our analysis is quite stipulative and we still have no solution for EVAL, POL2, and POL1. In this section we will update our analysis of CURR, OTH, and CONT in aspectual operators using assumptions from Mihoc (2020; 2021a; b). This is not just because, judging from the patterns at the outset, aspectual operators seem closest to numerals and these works together cover CURR and OTH in numerals; it is also because they also cover (CONT,) EVAL, POL2, and POL1; and because they do so in a manner completely unified within the various types of numerals (bare, positive and negative comparative-modified, and superlative-modified) and from assumptions that, taking into account previous work—especially Kennedy (1997), Chierchia (2013), Crnič (2011; 2012) and works cited therein—are kept uniform across numerals, disjunction, indefinites, and minimizers. As such, they can help us address all of our current issues.

4.1 A general solution for CURR and OTH

In §2 we noted that Beck (2020)'s very simple and non-monotonic truth conditions for *still* (just $P(t)$) cause complications for implicature calculation (we have to make the non-standard assumption that only the 'pragmatically open' alternatives are excluded) in a way that also puts a lot of burden on the presupposition (Beck doesn't say so, but the pragmatically open alternatives are essentially those on the opposite side of the scale than the ones targeted by the presupposition). In §2 and 3 we noted that, as we try to extend the story to *already*, *anymore*, and *yet*, all these issues compound—the presupposition becomes increasingly non-trivial—and we start noticing yet another questionable feature—in addition to not doing much, the truth conditions are also the same across all four operators.

In this section we will add to this the fact that this is even more unusual when we consider the truth conditions people usually assume for disjunction, indefinites, minimizers, or numerals. While the literature can sometimes vary widely, all these items are usually assumed to be monotonic and to belong to entailment scales. When they don't, this usually leads to non-trivial complications[16] or even fatal issues[17].

In short, our discomfort at the simple and non-monotonic truth conditions we have for aspectual operator so far seems justified. But how do we update them to be more contentful and monotonic without losing the results we have obtained so far and hopefully also preparing the ground for more?

There are many ways to write monotonic truth conditions. However, Mihoc (2020; 2021a; b) suggests that—especially when it comes to pairs such as *more/less than n*, *at least/most n*,

[16] E.g., Mayr (2013)'s proposal for superlative-modified numerals assumes they have monotonic truth conditions but do not belong to entailment scales. The result is that it runs into complications for implicature calculation, which he acknowledges. Note that while, superficially, this issue sounds identical to the one we had for our aspectual operators so far, the details are actually different, because one *ad hoc* assumption engenders another, till we end up with a custom stack in every case.

[17] E.g., Nouwen (2010)'s proposal for superlative-modified numerals assumes they have non-monotonic truth conditions and thus also do not belong to an entailment scale. It would be too much to try to go into detail here, but some examples are:the analyses in Mayr (2013) or Nouwen (2010), which do this for numerals, wind up with complications for implicature calculation—see, e.g., an explicit acknowledgment of this in Mayr (2013), similar to Beck (2020)'s—or even fatal issues for, e.g., negation—Nouwen (2010)'s non-monotonic meaning for superlative-modified numerals makes the wrong prediction for their meaning under negation.

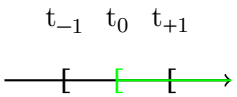
which seem to cover opposite halves of the same scale—not all are equally safe. Moreover, not all are equally helpful in deriving, e.g., POL1. Indeed, Mihoc (2020; 2021a; b) concludes that the best way to address both issues is to take inspiration from the extent-based analysis of adjective pairs such as *tall/short* (Seuren 1984; Kennedy 1997; 2001) and to derive monotonicity from positive and negative extents where, given a scale S of degrees, the positive extent of d, POS(d), is the set of degrees below d and including d, and the negative extent of d is the set of degrees above d and including d.

(19) $[\![\text{POS(d)}]\!] = \{\lambda d' . d' \leq d\}$

(20) $[\![\text{NEG(d)}]\!] = \{\lambda d' . d' \geq d\}$

In what follows we will adopt this idea for our aspectual operators as well. We will propose that *still* and *anymore* both refer to a negative extent of times (times after and including the relevant time) and specifically have the identical truth conditions in (22) and (26) and *already* and *yet* both refer to a positive extent of times and specifically have the identical truth conditions in (24) and (28). For a detailed composition tree, see Figure 2. Note that, while they all continue to have a component that is non-monotonic and the same ($P(t)$), like before, they now also have a component that is monotonic and, though identical within the suppletive pairs (*still-anymore*, *already-yet*), different within the complementary-perspective pairs (*still-already*, *anymore-yet*) (POS(t_0) and NEG(t_0), highlighted in red below). From here onward we reason like before, though this time implicature calculation is straightforward: Aspectual operators make reference in their truth conditions to a scalar element, t_0 (highlighted in blue below). This naturally activates scalar alternatives (SA). Just like Beck (2020), we assume these are factored into the silent exhaustivity operator O(nly), (21) (though nothing so far hinges on this). Unlike Beck (2020), we don't have to invoke 'pragmatically open' alternatives. Through completely standard implicature calculation, this gives rise to scalar implicatures. And through this mechanism we can derive both CURR and OTH, though their predicted status is slightly different than before: Before CURR was always entailed and OTH always implicated, but this time this is true only for *anymore* and *yet*—for *still* and *already* CURR is guaranteed only through the combination of the truth conditions and the implicature. (Here and going forward, the figures on the top-right of each example provide an orientative scale of times, with the negative/positive extent referenced in the truth conditions or in the alternatives being highlighted in green. For the negative examples, the scale also marks the complement set of this extent.)

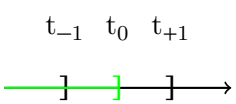
(21) $[\![\text{O}]\!](C_{\langle\langle s,t\rangle,t\rangle}, p_{\langle s,t\rangle}, w_s)$
true iff $p(w) \wedge \forall q \in C[q(w) \rightarrow p \subseteq q]$
(all the alternatives that are true are entailed; the formulation from Chierchia 2013, equivalent to the Chierchia et al. 2012 definition used by Beck 2020)



(22) $[\![\text{still}]\!] = \lambda P_{\langle i,t\rangle} . \lambda t_i . \exists t'[t' \in \underbrace{\text{NEG}(t)}_{\{t, t_{+1}, \ldots\}} \wedge P(t')]$

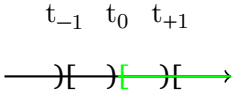
(23) $[\![\text{O}_{\text{SA}}(\text{It is still raining})]\!]$
$\text{O}_{\text{SA}}(\exists t'[t' \in \text{NEG}(t_0) \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]])$
true iff
$\exists t'[t' \in \text{NEG}(t_0) \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]] \wedge$

$\neg\exists t'[t' \in \text{NEG}(t_{+1}) \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]]$ (not raining later; OTH)
$\Rightarrow \exists e[t_0 \subseteq \tau(e) \wedge \text{rain}(e)]$ (raining now; CURR)



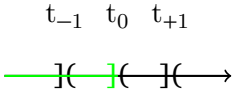
(24) $[\![\text{already}]\!] = \lambda P_{\langle i,t\rangle} . \lambda t_i . \exists t'[t' \in \underbrace{\text{POS}(t)}_{\{t,t_{+1},\ldots\}} \wedge P(t')]$

(25) $[\![\text{O}_{\text{SA}}(\text{It is already raining})]\!]$
$\text{O}_{\text{SA}}(\exists t'[t' \in \text{POS}(t_0) \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]])$
true iff
$\exists t'[t' \in \text{POS}(t_0) \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]] \wedge$
$\neg\exists t'[t' \in \text{POS}(t_{-1}) \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]]$ (not raining earlier; OTH)
$\Rightarrow \exists e[t_0 \subseteq \tau(e) \wedge \text{rain}(e)]$ (raining now; CURR)



(26) $[\![\text{anymore}]\!] = \lambda P_{\langle i,t\rangle} . \lambda t_i . \exists t'[t' \in \underbrace{\text{NEG}(t)}_{\{t,t_{+1},\ldots\}} \wedge P(t')]$

(27) $[\![\text{O}_{\text{SA}}(\text{It isn't raining anymore})]\!]$
$\text{O}_{\text{SA}}(\neg\exists t'[t' \in \text{NEG}(t_0) \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]])$
true iff
$\neg\exists t'[t' \in \text{NEG}(t_0) \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]] \wedge$ (not raining now; CURR)
$\neg\neg\exists t'[t' \in \text{NEG}(t_{-1}) \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]]$
$\Rightarrow \exists e[t_{-1} \subseteq \tau(e) \wedge \text{rain}(e)]$ (raining earlier; OTH)



(28) $[\![\text{yet}]\!] = \lambda P_{\langle i,t\rangle} . \lambda t_i . \exists t'[t' \in \underbrace{\text{POS}(t)}_{\{t,t_{+1},\ldots\}} \wedge P(t')]$

(29) $[\![\text{O}_{\text{SA}}(\text{It isn't raining yet})]\!]$
$\text{O}_{\text{SA}}(\neg\exists t'[t' \in \text{POS}(t_0) \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]])$
true iff
$\neg\exists t'[t' \in \text{POS}(t_0) \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]] \wedge$ (not raining now; CURR)
$\neg\neg\exists t'[t' \in \text{POS}(t_{+1}) \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]]$
$\Rightarrow \exists e[t_{+1} \subseteq \tau(e) \wedge \text{rain}(e)]$ (raining later; OTH)

We now have more contentful and monotonic truth conditions for aspectual operators. However, the new truth conditions do not straightforwardly map onto naive judgments as to what interval each operator corresponds to. For example, *still* and *anymore* naively correspond to an upper-bounded interval, and *already* and *yet* to a lower-bounded interval,[18] but here we map them the other way around—*still* and *anymore* are associated with $[t_0, \ldots]$ and *already* and *yet* with $(\ldots, t_0]$. As a result of this, CURR is not always guaranteed by entailment but rather arises through combination of the truth conditions with an implicature. Does this mean we are on the wrong track? Perhaps not. Consider the following discussion of bare numerals. First, assume that, just as for aspectual operators CURR concerns the mentioned time—in our examples, t_0—for bare numerals it concerns the mentioned numeral, e.g., 3. Consider now the status of CURR in the examples below.

[18] Indeed, the only other analysis that I am aware of that associates these aspectual operators with some interval, Israel (1997), does precisely this.

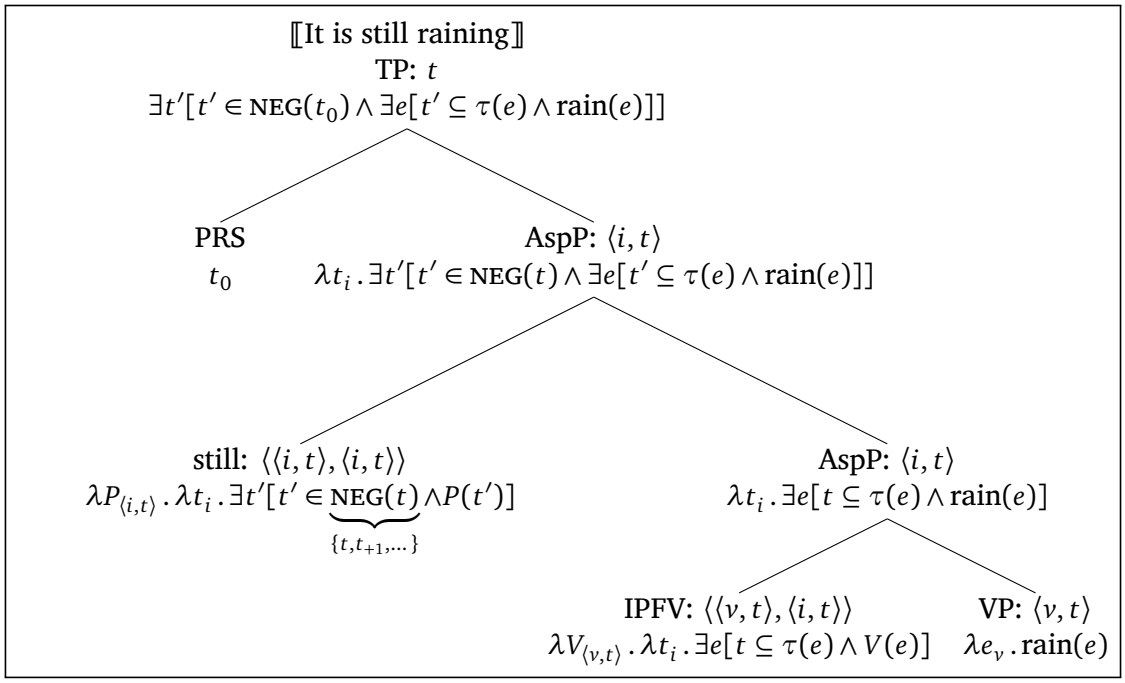


Figure 2: Mihoc (2020; 2021a; b)-style *still*. *Mutatis mutandis*, also *already*, *anymore*, *yet*.

In a positive context, the value 3 is guaranteed only through scalar implicature, (30). On the other hand, in a negative context the value 3 is excluded through entailment, (31). Thus, rather than being wrong, our truth conditions might actually capture something deep. And it is a fact that they help us articulate a solution for OTH that is fully general.

(30) ⟦O_{SA}(Tim found 3 puppies)⟧
$\text{O}_{\text{SA}}(\exists x[|x| = 3 \wedge P(x) \wedge F(T, x)])$
true iff
$\exists x[|x| = 3 \wedge P(x) \wedge F(T, x)] \wedge$
$\neg\exists x[|x| = 4 \wedge P(x) \wedge F(T, x)] \wedge$ (not four; OTH)
$\Rightarrow |\lambda x \,.\, P(x) \wedge F(T, x)| = 3$ (exactly three; 'CURR')

(31) ⟦O_{SA}(Tim didn't find 3 puppies)⟧
$\text{O}_{\text{SA}}(\exists x[|x| = 3 \wedge P(x) \wedge F(T, x)])$
true iff
$\neg\exists x[|x| = 3 \wedge P(x) \wedge F(T, x)] \wedge$
$\neg\exists x[|x| = 4 \wedge P(x) \wedge F(T, x)] \wedge$ (not three; 'CURR')
…[19]

Time to move on to CONT, EVAL, POL2, and POL1.

4.2 A general solution for CONT, EVAL, and POL2

Beck (2020) derived CONT from a presupposition. We challenged the role of this presupposition in deriving OTH, but now that we have a general solution for OTH, we can put that concern aside. However, we also noted that, although systematic, the shape of the presupposition was also in some cases highly non-trivial and even included a negation. In

[19] As discussed, e.g., in Spector (2013), this actually yields the implicature that he found exactly two. See Mihoc (2021a) for some suggestions as to why this implicature is in fact blocked.

this section we will use a combination of Crnič (2011)'s solution for POL2 in minimizers, Mihoc (2020; 2021a; b)'s solution for EVAL and POL2 in numerals, and a modification of our own to provide a general solution to update our solution to CONT in aspectual operators to a more general form and then add to it a general solution to EVAL and POL2 as well.

Crnič (2011; 2012) notices that POL2 effects in miminizers are similar to effects one obtains via overt *even* in general. He proposes that POL2 effects are due to a silent exhaustivity operator similar to *even*, E(ven), whcih can be defined as follows: E asserts that the prejacent is true and presupposes that some alternative different from it is also true (existential presupposition), and that the prejacent is less likely than any alternative different from it (scalar presupposition). After investigation of further patterns, Crnič (2011; 2012) updates the proposal to say that the scalar element in both the prejacent and the alternatives is understood exhaustively (as if locally prefixed with O), and the likelihood ordering between the resulting non-monotonic meanings is understood as referring to some relevant contextual standard. And he uses this, especially the scalar presupposition, to derive POL2 in minimizers.

Mihoc (2021a; b) adopts Crnič (2011; 2012)'s scalar presupposition of E to derive POL2 in numerals also. However, she argues that, for non-end-of-scale items, this presupposition must be modified. Instead of invoking scalar alternatives that are different, it must invoke scalar alternatives that are *entailed*. She then uses this modified scalar presupposition successfully to derive EVAL and POL2 in numerals.

Mihoc (2021a; b) doesn't really use the existential presupposition. However, it is quite obviously the key to CONT. Except, again, in its original form it is not really useful to non-end-of-scale items such as aspectual operators. Following Mihoc (2021a; b), we will assume it too invokes not scalar alternatives that are different from the prejacent in generals but rather, specifically, scalar alternatives that are *entailed* by the prejacent.

The resulting meaning of E is given in (32) below.

(32) $[\![\text{E}]\!](C_{\langle\langle s,t\rangle,t\rangle}, p_{\langle s,t\rangle}, w_s)$

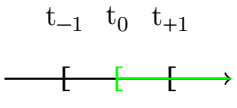
a. true iff $p(w)$ (assertion)

b. defined iff $\exists q \in C[p \subseteq q \wedge q^*(w)]$ (existential presupposition)

c. defined iff $\forall q \in C[p \subseteq q \rightarrow p^* \prec q^*]$ (scalar presupposition)

where * on the prejacent and the alternatives is shorthand for "interpreted this in a strengthened sense, as if the scalar were locally exhaustified via O".

As we suspected, the existential presupposition does indeed help derive CONT and, as in Mihoc (2021a; b), the scalar presupposition also helps derive EVAL and POL2—which turn out to be merely two faces of the same coin. See concrete demonstrations below. (Note: The alternative considered in the presuppositions is just an example of a contextually salient alternative from the set of entailed alternatives. The '⇒ indicates what an expression can be simplified to. As for the check and cross marks in POL2, ✓= fits common expectations and ✗= doesn't fit common expectations.)

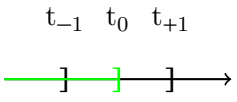


(33) $[\![\text{E}_{\text{SA}}(\text{It is still raining})]\!]$

$\text{E}_{\text{SA}}(\exists t'[t' \in \text{NEG}(t_0) \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]])$

a. defined iff
$\exists t'[O_{SA}(t' \in \text{NEG}(t_{-1})) \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]]$
$\Rightarrow \exists e[t_{-1} \subseteq \tau(e) \wedge \text{rain}(e)]$ (also raining earlier; CONT)

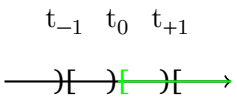
b. defined iff any scalar alternative that is true is less likely
$\exists t'[O_{SA}(t' \in \text{NEG}(t_0)) \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]] \prec$
$\exists t'[O_{SA}(t' \in \text{NEG}(t_{-1})) \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]]$
$\Rightarrow \exists e[t_0 \subseteq \tau(e) \wedge \text{rain}(e)] \prec \exists e[t_{-1} \subseteq \tau(e) \wedge \text{rain}(e)]$
('raining now less expected than raining earlier')
(⇒ 'raining later than expected'; EVAL)
Note: For *Tim is still* ✓*young* / #*old*: (POL2)
(i) 'young now less expected than young earlier' ✓
(ii) 'old now less expected than old earlier' ✗



(34) $[\![E_{SA}(\text{It is already raining})]\!]$
$E_{SA}(\exists t'[t' \in \text{POS}(t_0) \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]])$

a. defined iff
$\exists t'[O_{SA}(t' \in \text{POS}(t_{+1})) \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]]$
$\Rightarrow \exists e[t_{+1} \subseteq \tau(e) \wedge \text{rain}(e)]$ (also raining later; CONT)

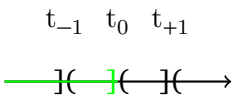
b. defined iff
$\exists t'[O_{SA}(t' \in \text{POS}(t_0)) \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]] \prec$
$\exists t'[O_{SA}(t' \in \text{POS}(t_{+1})) \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]]$
$\Rightarrow \exists e[t_0 \subseteq \tau(e) \wedge \text{rain}(e)] \prec \exists e[t_{+1} \subseteq \tau(e) \wedge \text{rain}(e)]$
('raining now less expected than raining later')
(⇒ 'raining earlier than expected'; EVAL)
Note: For *Tim is already* #*young* / ✓*old*: (POL2)
(i) 'young now less expected than young later' ✗
(ii) 'old now less expected than old later' ✓



(35) $[\![E_{SA}(\text{It isn't raining anymore})]\!]$
$E_{SA}(\exists t'[t' \in \text{NEG}(t_0) \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]])$

(35) defined iff
$\neg\exists t'[O_{SA}(t' \in \text{NEG}(t_{+1})) \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]]$
$\Rightarrow \neg\exists e[t_{+1} \subseteq \tau(e) \wedge \text{rain}(e)]$ (also not-raining later; CONT)

(35) defined iff
$\neg\exists t'[O_{SA}(t' \in \text{NEG}(t_0)) \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]] \prec$
$\neg\exists t'[O_{SA}(t' \in \text{NEG}(t_{+1})) \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]]$
$\Rightarrow \neg\exists e[t_0 \subseteq \tau(e) \wedge \text{rain}(e)] \prec \neg\exists e[t_{+1} \subseteq \tau(e) \wedge \text{rain}(e)]$
('not-raining now less expected than not-raining later')
(⇒ 'not-raining earlier than expected'; EVAL)
Note: For *Tim isn't* ✓*young* / #*old anymore*: (POL2)
a. 'not-young now less expected than not-young later' ✓
b. 'not-old now less expected than not-old later' ✗



(36) $[\![\mathrm{E}_{\mathrm{SA}}(\text{It isn't raining yet})]\!]$
$\mathrm{E}_{\mathrm{SA}}(\exists t'[t' \in \mathrm{POS}(t_0) \wedge \exists e[t' \subseteq \tau(e) \wedge \mathrm{rain}(e)]])$

(36) defined iff
$\neg\exists t'[\mathrm{O}_{\mathrm{SA}}(t' \in \mathrm{POS}(t_{-1})) \wedge \exists e[t' \subseteq \tau(e) \wedge \mathrm{rain}(e)]]$
$\Rightarrow \neg\exists e[t_{-1} \subseteq \tau(e) \wedge \mathrm{rain}(e)]$ (also not-raining earlier; CONT)

(36) defined iff
$\neg\exists t'[\mathrm{O}_{\mathrm{SA}}(t' \in \mathrm{POS}(t_0)) \wedge \exists e[t' \subseteq \tau(e) \wedge \mathrm{rain}(e)]] \prec$
$\neg\exists t'[\mathrm{O}_{\mathrm{SA}}(t' \in \mathrm{POS}(t_{-1})) \wedge \exists e[t' \subseteq \tau(e) \wedge \mathrm{rain}(e)]]$
$\Rightarrow \neg\exists e[t_0 \subseteq \tau(e) \wedge \mathrm{rain}(e)] \prec \neg\exists e[t_{-1} \subseteq \tau(e) \wedge \mathrm{rain}(e)]$
('not-raining now less expected than not-raining earlier')
($\Rightarrow$ 'not-raining later than expected'; EVAL)

Note: For *Tim isn't #young / ✓old yet*: (POL2)

a. 'not-young now less expected than not-young earlier' ✗
b. 'not-old now less expected than not-old earlier' ✓

Our story for aspectual operators now features an updated solution for CONT and a solution for EVAL, and POL2 as well. But just like the Beck (2020)/Beck (2020)-style solutions for CONT, these solutions might seem fairly stipulative. However, whereas before the stipulations were at the level of each individual item, here they are all about E, that is, the general mechanism. And, insofar as I can tell, they are backward-compatible.[20] As such I believe the present analysis does in fact represent progress.

Time to turn our attention to POL1.

4.3 Toward a general solution for POL1

Our proposal so far covers CURR, OTH, CONT, EVAL, and POL2. However, we still don't have an answer for POL1. Still, when setting up the new truth conditions in §4.1, we suggested that the new truth conditions would set us up for a general solution to POL1 also. In this section we will try to articulate a bit more clearly how.

We anticipated the basic idea in our discussion of truth conditions. There we were looking for a way to make our truth conditions monotonic. At the same time, we noted that not all are equally safe for CURR, OTH, CONT, EVAL, and POL2, or equally helpful when it comes to POL1. And we picked Mihoc (2020; 2021a; b)'s extent-based model because we thought it struck the right balance on both counts. But why exactly was that?

Our truth conditions made reference to a scalar element. But that was not all. The way it did was in a completely classical sense. We had monotonic truth conditions with monotonic alternatives from a scale ordered by entailment yielding classical scalar alternatives (SA) and classical scalar implicatures. In spite of any of the particulars that make our aspectual operators what they are, from the point of view of scalarity they were all fundamentally similar to any other scalar, for example, an indefinite. This was why we were able to derive CURR, OTH, CONT, EVAL, and POL2 in aspectual operators in essentially the same way that Mihoc (2020; 2021a; b) derived them in numerals or that the literature before derived them in disjunction, indefinites, or minimizers.

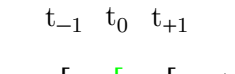
[20] E.g., in *I didn't sleep a wink*, the prejacent based on a minimizers entails any alternative of the form *I didn't sleep amount x*. Thus, any alternative different from the prejacent would be an alternative entailed by the prejacent.

The idea then is that our truth conditions have another crucial feature—they make reference to a domain. This too in a very classical sense—modulo reference to times, our truth conditions essentially have the same logical shape as an indefinite. This allows us to naturally derive subdomain alternatives (DA). And in Mihoc (2020; 2021a; b)—as in the literature this work builds on, especially Chierchia (2013)—that's the main prerequisite before you can derive POL1.

4.3.1 Deriving the contrast in negative contexts

Mihoc (2020; 2021a; b)—following Chierchia (2013)—derives POL1 in negative contexts from O_{DA} or O_{ExhDA} and a lexically specified requirement that this exhaustification lead to a properly stronger meaning. The idea is that for some types of meanings this exhaustification is vacuous. If a given item requires O_{DA}/O_{ExhDA}, but requires that O_{DA}/O_{ExhDA} must lead to a properly stronger meaning, that is the reason why it is bad under negation.

Given that our aspectual operators are formally analogous to all the other items for which this reasoning has been verified, we expect this to work here too. Indeed I think it does. Consider the example below, where we exhaustify an utterance with *still / anymore* under negation. O_{DA}/O_{ExhDA} asserts the prejacent, thus, that in the interval starting now (and extended some time into the future, as relevant) there is no time when it rains. Then, O_{DA} attempts to negate each DA/ExhDA (below, D always refers to a strict subset of the domain $\text{NEG}(t_0)$). However, as it turns out, this is always vacuous. Consider, for example, the DA in (37b). Each DA says that it didn't rain in the time corresponding to some subset of the domain. But this is already entailed by the prejacent. Consider now, for example, the ExhDA in (37c). Each ExhDAsays something to the effect that there is didn't rain in the time corresponding in some subset of the domain but that it rained in the time corresponding to every other subset of the domain. This is incompatible with the prejacent, so, already excluded by it. So, in both cases, O winds up vacuous. Thus, if an item requires either O_{DA} or O_{ExhDA}, and also that it lead to a properly stronger meaning, it would wind up being degraded under negation. Suppose now that *still* and *anymore* both come with a requirement that they must undergo O_{DA} or O_{ExhDA}. Additionally, suppose that *still* but not *anymore* also requires that O_{DA}/O_{ExhDA} must always yield a properly stronger meaning. This would capture their distribution under negation.



(37) $O_{ExhDA}(\llbracket$It isn't $^{\#}$still raining / It isn't raining $^{\checkmark}$anymore$\rrbracket)$

a. $\neg\exists t'[t' \in \overbrace{\text{NEG}(t_0)}^{\{t_0, t_{+1}, \ldots\}} \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]]$ (prejacent)

b. (i) $\neg\exists t'[t' \in D'_1 \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]]$ (DA)

(ii) $\neg\exists t'[t' \in D'_2 \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]]$ (DA)

c. (i) $O(\neg\exists t'[t' \in D'_1 \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]])$ (ExhDA)

(ii) $O(\neg\exists t'[t' \in D'_2 \wedge \exists e[t' \subseteq \tau(e) \wedge \text{rain}(e)]])$ (ExhDA)

(iii) …

The same reasoning carries over, *mutatis mutandis*, to *already* and *anymore*.

This story might again seem stipulative. But the stipulations again concern mechanisms that otherwise work very generally. Beyond all the categories of languages covered in Mihoc (2020; 2021a; b) and references therein, and the aspectual operators we have discussed here, this story for POL1 might also explain further variation in the variants of

the same aspectual operator in various languages. For example, the German counterpart of *still*, *noch*, is fine under negation. We could pin this down to non-obligatory $O_{(Exh)DA}$, or obligatory $O_{(Exh)DA}$ but without a requirement for proper strengthening. But there are other differences between *still* and *noch*—for example, it is also used in places where in English one might use *yet*. As, at least on the present analysis, *still* and *yet* are built on top of different types of extents—negative vs. positive—this is likely that requires a lot more further discussion. Even so, we can now say that we have the beginning of a general story for POL1 in negative contexts.

Time to start looking at POL1 in positive contexts

4.3.2 Deriving the contrast in positive contexts

According to Chierchia (2013), POL1 in positive contexts is also due to obligatory $O_{(Exh)DA}$. The idea is that in a positive context O_{ExhDA} yields a free choice effect (in plain contexts, ignorance, due to a null matrix level epistemic necessity modal) and O_{DA} yields a contradiction. Thus, if two items both require obligatory use of their DA, but one allows them to be used in pre-exhaustified form and the other does not, the former will be felicitous in a positive context, exhibiting a free choice effect, while the latter will be degraded, capturing POL1 in positive contexts.

The demonstration for O_{ExhDA} is quite involved, and the one for O_{DA} somewhat unclear, as Chierchia (2013) discusses it only tentatively and, being concerned only with modified numerals and assuming from the start that they involve O_{ExhDA}, Mihoc (2020; 2021a; b) does not discuss it at all. As such, we will not attempt to go into any detail of this for aspectual operators here. However, if this idea turns out to be on the right track, then the difference between *still* and *anymore*, or *already* and *yet*, could be put down to the fact that, while all require obligatory use of their subdomain alternatives (because they all exhibit some form of POL1), for *still* and *already* it is ExhDA whereas for *anymore* and *yet* it is plain DA.

However, if that were so, then we would expect *still* and *already* not just to be fine in positive contexts, but also to exhibit a modal free choice effect. The problem is that simple utterances with *still* and *already* do not give off any obvious modal vibe.

(38) a. Tim is **still** sleeping. (?modal effect)
b. Tim is **already** sleeping. (?modal effect)

Is this story then on the wrong track? Not necessarily. Here it helps again to connect to the literature on modified numerals. A major puzzle about superlative-modified numerals in positive contexts is that they do not give rise to the expected scalar implicatures. On the other hand, they give rise to ignorance. It may be tempting to say that they undergo O_{ExhDA} but not O_{SA}. Based on patterns like the ones we have shown at the outset, but also others, Mihoc (2020; 2021a; b) argues that they undergo both. The problem is that in a positive context the scalar implicatures generated by O_{SA} clash with the silent epistemic free choice (ignorance) implicatures generated by O_{ExhDA}. It is not clear how exactly to settle this from a formal perspective. However, judging from the results, we can see that for superlative-modified numerals it is O_{ExhDA} that wins, which is why we don't have a scalar implicature here but instead have ignorance, whereas for aspectual operators it is O_{SA} that wins, which is why we don't have ignorance here but we do have a strong scalar implicature effect—resulting in the strong CURR meaning that might explain why on Beck (2020)'s original analysis for *still* it was derived as an entailment.

But, if this story is on the right track, we have some further expectations for *anymore* and *yet* as well—they should not just be degraded in a plain episodic context, rather, they should be degraded in an overtly modal context as well. Both predictions seem to be correct.

(39) a. #Tim may be sleeping **yet**.
b. #Tim may be sleeping**anymore**.

However, the following example remains a puzzle:

(40) Tim may **yet** sleep.

We will leave all these issues to future research.

5 Conclusion and outlook

In this paper we started from a puzzle about *still*; noted it's really a puzzle about aspectual operators more generally; and noted it's a puzzle about the phenomena in the puzzle more generally—as the same or very similar patterns show up in many different categories of language, including disjunction, indefinites, minimizers, and numerals.

To address this puzzle, we began with the latest recent analysis of some of these patterns in *still* by Beck (2020), and noticed some issues; we tried to generalize the analysis to the parallel patterns in *already*, *anymore*, and *yet*, and noticed some further issues; and then we concluded that there is really just one issue, namely, an issue of generality. As such, we updated and extended our analysis in light of a comprehensive treatment of a comprehensive parallel set of patterns in numerals, aligned with disjunction, indefinites, and minimizers, by Mihoc (2020; 2021a; b). The final proposal marries insights from the literature on aspectual operators, specifically Beck (2020) and the literature cited therein, with insights from the literature on disjunction, indefinites, minimizers, or numerals, specifically Mihoc (2021a) and the literature cited therein, the result being a uniform approach to a rich set of patterns, and their formalization from an alternatives-and-exhaustification perspective, across all these categories.

The account however also has many open issues. Among the most immediately relevant are the following:

First, we have started out with a vast amount of patterns, and claimed they support a cross-categorial puzzle. While each of these patterns has been mentioned in some form of other in the literature, and we have tried to identify the sources, in some cases the judgments might not be widely shared and might require further discussion and even experimental investigation.

Second, being focused on unifying aspectual operators in line with other categories of language across specific dimensions, we have had to limit our engagement with the existing literature on aspectual operators, engaging theoretically only with Beck (2020) and empirically only with a subset of the patterns, namely, only those directly relevant to our unifying story, and only for English. This has certainly been necessary—had we tried to engage with every account and every empirical puzzle, we would have likely never been able to carry on with our unifying mission. Even so, the literature on aspectual operators is very rich and deserves a lot more discussion. It would also be interesting to see how our account can be integrated with solutions to other puzzles.

Third, even though focused on just a subset of the patterns, the proposal we have put forth is in many ways incomplete. The section on POL1, for example, but not just. There are many further relevant facts and predictions that could be discussed further.

Finally, the approach taken here is in many ways admittedly stipulative. We have repeatedly used the excuse that the stipulations we use are general (they have been used in many other places, most prominently Mihoc (2020; 2021a; b), in turn indebted to Kennedy 1997, Chierchia 2013, Crnič (2011; 2012), and references therein, or are about general things, like the definition of E or the interaction between various types of concomitant exhaustification). Even so, this only means we need to scrutinize them harder.

I hope to do each of these better justice in future research.

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