Alternatives, density, and *in*-adverbials*

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1. Introduction

Temporal *in*-adverbials are adverbial modifiers of the form "in *n time*", where *n* is a numerical value and *time* is some temporal unit of measurement. We find among this class expressions such as "in three days" or "in twenty seconds".[1] A commonly observed distributional fact concerning such adverbials is that while they are happy in the context of perfective telics, they reject environments which contain perfective atelics.

(1) a. Mary read War & Peace in three days.
b. *Mary rested in three days.

In addition to this restriction on lexical aspect, *in*-adverbials seem to interact with negation in interesting ways. In out of the blue contexts, (2) is reported to be strange.

(2) ?Mary didn't read War & Peace in three days.

Though odd without a proper context, (2) seems perfectly grammatical under what we will call a "denial reading", which usually involves a context where whether or not it took *exactly* three days to read War & Peace is at issue. Such context can be highlighted if we follow (2) with the continuations in (3a) or (3b).

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[1] We exclude from our analysis so-called bare temporal *in*-adverbials of the form "in years" or "in days", which lack overt numerical modification. Such adverbials display a number of properties which, albeit interesting, would complicate our current analysis.

(3) Mary didn't read War & Peace in three days…

a. … she read it in two days.
b. … she read it in four days.

Note that unsurprisingly with atelic predicates, negation has no effect whatever, such that *in*-adverbials are deviant with perfective atelics be it in positive or negative environments. Indeed, (4) cannot be rescued by highlighting the sort of at-issue content which render (3) felicitous.

(4) #Mary didn't rest in three days …

a. … she rested in two days.
b. … she rested in four days.

While the restriction of *in*-adverbials against atelic predicates has been discussed extensively in the literature, usually involving restrictions against certain algebraic properties of events (Dowty 1979, Krifka 1998, Rothstein 2004), little has been said concerning their interaction with negation. In this paper, we will show that the oddness of *in*-adverbials under negation can be accounted for by making three assumptions. The first is that a sentence containing an *in*-adverbial obligatorily competes with a set of formal alternatives defined by substituting their numerical modifier with another numerical value. The second is that, following Fox and Hackl (2006), the numerical scale used to define alternatives is dense. The final assumption will be that the competition between alternatives is resolved by the presence of a covert exhaustification operator akin to "only" (Chierchia 2005, Chierchia et al. 2008, Fox 2007).

The framework we will assume in this paper will be a dynamic implementation of exhaustification Sudo (2016, 2019). Using such a framework is advantageous notably because it allows us to avoid deriving implicatures for scalar items embedded under existential quantification which are too strong. Indeed, as we will discuss, standard accounts of scalar implicatures derive incorrect inferences whenever a scalar item is below an existential quantifier. Since *in*-adverbials interact with events assumed to scope below an existential closure, this problem will necessarily need to be addressed in any system in which such adverbials trigger any kind of competition. We will be assuming that the existential closure over events introduces random assignments over events, and that exhaustification is sensitive to anaphoric potential in such a way that it derives weaker inferences than static accounts.

2. Motivating alternatives

Whereas a sentence like (5a) may at first seem to be interpreted as (5b), this has been argued since at least Dowty to be the result of some form of strengthening of a more basic meaning.

(5) a. Mary read War & Peace in three days.
b. $(\exists e)(\textsf{m-read-w}(e) \wedge \textsf{days}(\tau(e)) = 3)$

To see that (5b) does not correspond to the basic meaning of (5a), consider what happens when an *in*-adverbial is in a downward-monotone environment such as the antecedent of a conditional.

(6) If Mary reads War & Peace in three days, she will qualify for the speed reading competition.

The most natural way to understand (6) is not that if Mary reads War & Peace in *exactly* three days she will qualify for the speed reading competition. Rather, we understand the sentence as stating that if Mary reads War & Peace in three days *or less*, she will qualify for the competition. This implies that in downward-monotone environments, higher-valued numerals entail lower-valued ones. This can easily be captured if we assume that the *in*-adverbial "in three days" does not have as its literal meaning "in exactly three days", but rather "in at most three days". Hence, we can represent the literal meaning of (7a) as (7b).

(7) a. Mary read War & Peace in three days.
b. $(\exists e)(\textsf{m-read-w}(e) \wedge \textsf{days}(\tau(e)) \leq 3)$

While this meaning for (7a) seems relatively well motivated, it seems to make faulty prediction for its negation. Indeed, we expect (8a) to be interpreted a (8b), which says that any eventuality of Mary reading War & Peace lasted more than three days.

(8) a. Mary didn't read War & Peace in three days.
b. $\neg(\exists e)(\textsf{m-read-w}(e) \wedge \textsf{days}(\tau(e)) \leq 3)$

But if (8a) were truly interpreted and (8b), we would expect (8a) to be false whenever Mary read the book in three days or less. However, this prediction does not seem reflected in the discourse in (9), where B's assertion seems very odd, if not contradictory.

(9) A: Mary didn't read War & Peace in three days.
B: #That's not true, she read War & Peace in two days.

Yet, we would expect B's response in (9) to be completely felicitous under the semantics proposed for *in*-adverbials. However, if anything, the discourse below seems more appropriate.

(10) A: Mary didn't read War & Peace in three days.
B: That's right, she read War & Peace in two days.

And furthermore, it seems as though B's answer is equally appropriate were she to state that Mary read War & Peace in more than three days,

(11) A: Mary didn't read War & Peace in three days.
B: That's right, she read War & Peace in four days.

So we find ourselves in a strange situation. While it seems that in positive environments we have reason to think *in*-adverbials have an *at most* reading, they seem to have an exactly reading below negation. Indeed, both of B's responses in (10-11) suggest that neither lower nor higher numeral modifiers entail "three", which would seem to suggest that (12a) is in fact interpreted as (12b).

(12) a. Mary didn't read War & Peace in three days.
b. $\neg(\exists e)(\textsf{m-read-w}(e) \wedge \textsf{days}(\tau(e)) = 3)$

If we admit that the *exactly* reading of *in*-adverbials in positive contexts is the product of some form of enrichment, it seems like a negative sentence containing *in*-adverbials such as (12a) is understood as the negation of some already enriched meaning. This may be taken to suggest that *in*-adverbials always compete with a set of formal alternatives, but for some reason this competition must be resolved before the application of negation in (12a).

3. Existential quantification and embedded scalar items

We have proposed that while (13a) is conversationally understood as stating that Mary read War & Peace in *exactly* three days, its literal meaning should be something more akin to one which states she did so in *at most* three days, as repeated in (13b).

(13) a. Mary read War & Peace in three days.
b. $(\exists e)(\textsf{m-read-w}(e) \wedge \textsf{days}(\tau(e)) \leq 3)$

To obtain the strengthened meaning of (13a), we might assume that it competes with the set of alternatives defined in (14), where we substitute for "3" some other positive integer.

(14) $\{(\exists e)(\textsf{m-read-w}(e) \wedge \textsf{days}(\tau(e)) \leq n) \mid n \in \mathbb{Z}^{+}\}$

Those alternatives in (14) where the value of n is less than "3" will strictly entail (13b). If we assume implicatures are calculated by negating logically stronger alternatives, we expect for (13a) the enriched meaning in (15).

(15) $(\exists e)(\textsf{m-read-w}(e) \wedge \textsf{days}(\tau(e)) \leq 3) \wedge$
$(\forall n)(n < 3 \rightarrow \neg(\exists e)(\textsf{m-read-w}(e) \wedge \textsf{days}(\tau(e)) \leq n))$

Yet, there may be reason to think (15) is too strong a meaning. It is not clear that an utterance of "Mary read War & Peace in three days" implies she never read the book in less than three days. Indeed, such an inference would disallow the possibility that Mary ever read War & Peace in exactly two days, which does not seem appropriate.

One might suggest that the strength of this inference can be weakened by tense and aspect. The literal meaning of (13a) might be something like (16a), stating that there is an at most three-day long event of Mary reading War & Peace contained within the salient interval t° presupposed to precede the moment of utterance. Competing with (16a) will be the set fo alternatives in (16b), which relate events to that same interval.

(16) a. $(\exists e)(\textsf{m-read-w}(e) \wedge \textsf{days}(\tau(e)) \leq 3 \wedge \tau(e) \sqsubseteq t^\circ)$
b. $\{(\exists e)(\textsf{m-read-w}(e) \wedge \textsf{days}(\tau(e)) \leq n \wedge \tau(e) \sqsubseteq t^\circ) \mid n \in \mathbb{Z}^+\}$

The competition between (16a) and (16b) will result in the inference that within t°, there is an event of Mary reading War & Peace lasting at most three days and no event of Mary reading this book in less than three days. While this may seem at first blush a likely solution, Roger Schwarzschild (p.c.) notes that one still seems to get enrichment of the literal meaning of sentences containing *in*-adverbial even when it is clear that logically stronger alternatives do in fact occur within the same temporal interval. Imagine a scenario where a particular copy machine, the D530, is capable of producing two sets of copies at once, one set printed in high resolution, the other in low resolution. Suppose it takes exactly three minutes for twenty high resolution copies to be produced and exactly two minutes for twenty low resolution copies to be produced. Suppose at t°, Mary produces twenty high- and low- resolution copies. In this scenario, (17) would seem true.

(17) The D530 printed twenty copies in three minutes.

We would predict competition to render (17) as false in the scenario above, as it would state that at t°, there is an event of the D530 printing twenty copies in three minutes but no event of it printing twenty copies in two minutes. Yet, (17) is thought to be true because there is an event of the D530 printing twenty copies in *exactly* three minutes, irrespective of whether twenty copies were at the same time printed in exactly two minutes. In fact, it seems as though implicatures which are too strong are generally derived when scalar items are within the scope of an existential quantifier, as noted by Chierchia (2004) and Sudo (2016). Consider the behavior of disjunction below the scope of the indefinite in (18).

(18) Someone saw Bill or Ted.

The most natural interpretation for (18) is one in which there is someone who saw Bill or Ted, but not both. We may view this inference as resulting from the competition with the logically stronger conjunctive alternative in (19).

(19) Someone saw Bill and Ted.

The predicted inference resulting from this competition is not only that someone saw Bill or Ted but not both, but rather that nobody saw Bill and Ted. Yet (18) seems like it would be true so long as there was someone who saw Bill or Ted but not both, irrespective of whether another person saw both of them. Indeed, finding out that in addition to someone

seeing only one of Bill or Ted there is another person who saw both Bill and Ted would not falsify (18). It seems then that standard views on scalar implicatures predict overly strong inferences for scalar items embedded below existential quantifiers, be these quantifiers over entity or event variables.

4. Scalar implicatures in dynamic semantics

The conversational meaning one obtains from (18) seems to be that there is someone who saw Bill or Ted, but *that very person* did not see both Bill and Ted. It seems then that we want alternatives which are in a way anaphoric to (18). The same can be true regarding alternatives to "Mary read War & Peace in three days". Whereas we want the literal meaning of the sentence to be something like "there exists an at most three-day long event of Mary reading War & Peace", we want to negate alternatives stating that this very event lasted less than three days. A natural way to achieve this is to follow Sudo (2016, 2019) in assuming a dynamic framework for scalar implicatures. Following his lead, let us assume the basic update semantics below, assuming for concreteness that assignments are total functions from variables to member of our domain D, and that our model $\mathscr{M}$ consists of the triple $\langle D, W, F\rangle$, where W is the set of all possible worlds and F is the model's interpretation function. This semantics follows Heim (1982) in assuming a context c to consist of a set of world-assignment pairs and assuming meaning to effectively consist of contextual updates.

$$[t]^g_{\mathscr{M}} := \begin{cases} F(t) & \text{if } t \text{ is a constant} \\ g(t) & \text{if } t \text{ is a variable} \end{cases}$$

$$c[P(t_1,\ldots,t_n)]_{\mathscr{M}} := \{\langle w,g\rangle \in c \mid \langle [t_1]^g,\ldots,[t_n]^g\rangle \in F(w,P)\}$$

$$c[\neg\phi]_{\mathscr{M}} := \{\langle w,g\rangle \ \in c \mid \{\langle w,g\rangle\}[\phi] = \emptyset\}$$

$$c[(\phi \wedge \psi)]_{\mathscr{M}} := c[\phi][\psi]$$

$$c[(\phi \vee \psi)]_{\mathscr{M}} := c[\phi] \cup (c \setminus c[\phi])[\psi]$$

$$c[(t_1 = t_2)]_{\mathscr{M}} := \{\langle w,g\rangle \in c \mid [t_1]^g = [t_2]^g\}$$

In addition, we assume a semantics for existential quantifiers which treats them as introducing random assignments over a variable, as below.

$$c[\exists x]_{\mathscr{M}} := \{\langle w, g[x \mapsto d]\rangle \mid \langle w,g\rangle \in c \text{ and } d \in D\}$$

In this system, (20) translates to (20a), which updates c to the set of world-assignment pairs in (20b). These are those sets of world-assignment pairs in c where the assignment has been modified to map the variable x to a member of the domain of individuals D who either saw Bill or Ted, or both. Note that any pair in c where nobody in the world saw either Bill or Ted will not be in (20b).

(20) Someone saw Bill or Ted.

a. $\exists x \wedge (\mathsf{saw}(x,\mathsf{b}) \vee \mathsf{saw}(x,\mathsf{t}))$

b. $\{\langle w, g[x \mapsto d]\rangle \mid \langle w,g\rangle \in c$ and $d \in D$ and $\mathsf{saw}(d,\mathsf{b})$ in w or $\mathsf{saw}(d,\mathsf{t})$ in $w\}$

Suppose we assumed that the variable over which the indefinite introduces a random assignment is the same variable across alternatives. The conjunctive alternative to (20a) will be (21a), which updates the context to the set of world-assignment pairs where x is mapped to a member of D who saw both Bill and Ted.

(21) Someone saw Bill and Ted.

a. $\exists x \wedge (\mathsf{saw}(x,\mathsf{b}) \wedge \mathsf{saw}(x,\mathsf{t}))$

b. $\{\langle w, g[x \mapsto d]\rangle \mid \langle w,g\rangle \in c$ and $d \in D$ and $\mathsf{saw}(d,\mathsf{b})$ in w and $\mathsf{saw}(d,\mathsf{t})$ in $w\}$

As Sudo points out, there are at least two distinct semantic asymmetries one can discuss when comparing (20a) to the alternative in (21a). On the one hand, there is the fact that for any context c, the set of worlds in c[(21a)] will always be a subset of the set of worlds in c[(20a)], but not vice-versa. This corresponds quite straightforwardly to the classic notion of entailment on which standard views of scalar implicatures are based. On the other hand, there is also the fact that no matter the context c, the set of world-assignment pairs in c[(21a)] will always be a subset of the set of world-assignment pairs in c[(21a)]. Following Sudo's terminology, we can say of the first asymmetry that (21a) is *truth-conditionally* more informative than (20a), whereas we can state for the second asymmetry that (21a) is *dynamically* more informative than (20a).

(22) ϕ is **truth-conditionally more informative** than ψ, iff for each context c, $\{w \mid$ for some $\langle w,g\rangle \in c[\phi]\} \subseteq \{w \mid$ for some $\langle w,g\rangle \in c[\psi]\}$ but in some context c', $\{w \mid$ for some $\langle w,g\rangle \in c'[\psi]\} \not\subseteq \{w \mid$ for some $\langle w,g\rangle \in c'[\phi]\}$

(23) ϕ is **dynamically more informative** than ψ, $\phi \Rightarrow_d \psi$, iff for each context c, $c[\phi] \subseteq c[\psi]$ but in some context c', $c'[\psi] \not\subseteq c[\phi]$

We will show that if in our dynamic framework we derive scalar implicatures using the notion of dynamic informativity, we can obtain desirably weak inferences from scalar items in the scope of existential quantification. Indeed, suppose for concreteness we define an exhaustification operator (Chierchia 2005, Chierchia et al. 2008, Fox 2007) which removes from a context all and only pairs in the contextual update of alternatives dynamically more informative than its prejacent.

$$c[\mathsf{O}_Q\ \phi]_{\mathscr{M}} := \left\{ \langle w,g\rangle \in c[\phi] \;\middle|\; \begin{array}{l} \text{for each } \psi \in Q, \text{ if } \psi \Rightarrow_d \phi \\ \text{then for each } \langle w',g'\rangle \in c[\psi], \langle w,g\rangle \neq \langle w',g'\rangle \end{array} \right\}$$

Any context updated with (21a) will be a subset of a context updated with (20a), but the reverse is not true. Hence, (21a) is dynamically more informative than (20a). Updating

a context c with the exhaustification of (20a) boils down to updating c with (20a) and then removing from this update all those pairs which are also in the update of c with (21a). In other words, the set of pairs which will come about from this exhaustification will be those world-assignment pairs in the context c where a random assignment over the variable x picks out an individual who saw either Bill or Ted but did not see both.

$$c[\mathsf{O}_{\{(20a),(21a)\}}\ (20a)] = \left\{ \langle w, g[x \mapsto d] \rangle \;\middle|\; \begin{array}{l} \langle w, g \rangle \in c \text{ and } d \in D \text{ and} \\ (\mathsf{saw}_w(d, \mathsf{b}) \text{ or } \mathsf{saw}_w(d, \mathsf{t})) \text{ and} \\ (\text{not } \mathsf{saw}_w(d, \mathsf{b}) \text{ or not } \mathsf{saw}_w(d, \mathsf{t})) \end{array} \right\}$$

Our exhaustification operator defined in terms of dynamic informativity derives weaker inferences than those predicted by standard accounts. Instead of removing all world-assignment pairs in which it is true in the world that someone saw both Bill and Ted, this exhaustification operator only removes world-assignment pairs where the random assignment over x picks out an individual who saw both Bill and Ted. This allows us to keep pairs where someone did in fact see both Bill and Ted, provided the random assignment in this pair does not map to this person. This seems to produce the desirably week scalar implicature. We have thus shown how adopting a dynamic system allows us to define a form of competition which produces adequately weak inferences for scalar items under the scope of existential quantifiers.

5. Scalar implicatures and *in*-adverbials

We will in this section show how we can derive the behavior of *in*-adverbials in positive and negative environments assuming the type of competition above. We will show that in positive environments, *in*-adverbials produce sufficiently weak implicatures assuming the competition between them and their alternatives is resolved using an exhaustification operator sensitive to dynamic informativity. We will also show that assuming the scale used to define alternatives is dense, we will predict the oddness of negated *in*-adverbials. More specifically, our analysis will predict that unless negation scopes above the exhaustification operator, a contradiction will be derived. What we predict is therefore that the only readings available for negated *in*-adverbials involve the negation of an already enriched meaning, corresponding to the denial readings we reported as being the only available readings.

5.1 *in*-adverbials in positive environments

We proposed that the literal meaning of *in*-adverbials in an utterance like (24) states that Mary read War & Peace in at most three days. In the dynamic framework we have introduced in the previous section, we expect (24) to be translated as (24a). Furthermore, let us assume alternatives are generated as before by substituting the value of the numerical modifier for some other positive integer, as defined in (24b).

(24) Mary read War & Peace in three days.

a. $\exists e \wedge \textsf{m-read-w}(e) \wedge \textsf{days}(\tau(e)) \leq 3$

b. $\{\exists e \wedge \textsf{m-read-w}(e) \wedge \textsf{days}(\tau(e)) \leq n \mid n \in \mathbb{Z}^+\}$

All and only those alternatives in (24b) in which the numerical value of the modifier is less than three will be dynamically more informative than (24a). We thus expect the exhaustification of (24a) to result in the set of world-assignment pairs in which the random assignment over e introduced by the existential closure over events picks out an event of Mary reading War & Peace whose duration is at most three days but no less than three days. In other words, we obtain those world-assignment pairs where e is mapped to an event of Mary reading the book in exactly three days.[2]

$$c[\textsf{O}_{(24b)}\ (24a)] = \left\{ \langle w, g[e \mapsto e'] \rangle \;\middle|\; \begin{array}{l} \langle w, g \rangle \in c \text{ and } e' \in D \text{ and} \\ \textsf{m-read-w}(e') \text{ and } \textsf{days}(\tau(e')) = 3 \end{array} \right\}$$

We see that nothing is said in this strengthened meaning about whether or not there are events of Mary reading War & Peace in less than three days. It may well be that, for some $\langle w, g \rangle$ in the update above, it is the case there is some event of Mary reading War & Peace shorter than three days in w so long as $g(e)$ does not map to this event. What is required is simply that $g(e)$ maps to an event in each world w of Mary reading War & Peace in exactly three days. We thus predict sufficiently weak implicatures for *in*-adverbials in positive environments.

5.2 *In*-adverbials in negative environments

We expect for an *in*-adverbial below the scope of negation such as (25) the translation in (25a). We expect the set of alternatives in (25b) based on our previous assumptions.

(25) Mary didn't read War & Peace in three days.

a. $\neg(\exists e \wedge \textsf{m-read-w}(e) \wedge \textsf{days}(\tau(e)) \leq 3)$

b. $\{\neg(\exists e \wedge \textsf{m-read-w}(e) \wedge \textsf{days}(\tau(e)) \leq n) \mid n \in \mathbb{Z}^+\}$

This formula updates contexts by removing all those world-assignment pairs $\langle w, g \rangle$ in which one can find a random assignment over e which picks out an event of Mary reading War & Peace in three days or less in w. Thus, the contextual update brought about by (25a) will contain world-assignment pairs in which either Mary never read War & Peace or where each event of her reading War & Peace lasted more than three days. It follows then that alternatives defined by substituting a higher numerical modifier for "3" will be dynamically more informative than (25a). Indeed, substituting "4" for "3" will result in a set of world-assignments where either Mary never read War & Peace or every event of her reading it lasted more than 4 days.

[2] We are assuming here that D is the domain of both entities and events.

But now observe the fact that our exhaustification procedure makes faulty predictions. Exhaustifying (25a) will remove from this set all those pairs found in the updates of dynamically more informative alternatives. Thus, it will of course get rid of all those pairs where Mary never read War & Peace, as those pairs are found in every alternative. Moreover, it will get rid of those pairs where every event of Mary reading the book took more than four days, more than five days, more than six days, and so on. What it will not remove, however, are those pairs where every event of Mary reading War & Peace took more than three days but no more than four days, to wit those pairs where Mary read the book in exactly four days. Hence, we incorrectly predict that the exhaustified meaning of (25a) is one which states that Mary read War & Peace in exactly four days.

This problem is eerily reminiscent of cases examined in Fox and Hackl (2006), which they solve by assuming that alternatives for numerals are defined using a dense scale. We will show that the same solution works four our case if we assume *in*-adverbials obligatorily compete with formal alternatives. Let us assume for concreteness that alternatives are defined by substituting for "3" any positive real.

(26) $\{\neg(\exists e \wedge \textsf{m-read-w}(e) \wedge \textsf{days}(\tau(e)) \leq n) \mid n \in \mathbb{R}^{+}\}$

Consider now what we predict for the exhaustified meaning of (25a). Suppose we have a pair $\langle w, g\rangle \in c[(25a)]$. In w, either Mary never read War & Peace or every time she did, she read it in more than three days. We have already said that each of those pairs in which Mary never read the book always is in the contextual update of each dynamically more informative alternative, and so will always be removed by exhaustification. Now suppose that in w the shortest amount of time it took for Mary to read War & Peace was in n days, where $3 < n$. Given that we have defined our set of alternatives as in (26), there will be an alternative where the numerical modifier is some m such that $3 < m < n$, which will include only those pairs in which every event of Mary reading War & Peace, if there are any, lasted more than m days. But of course, this alternative will as a result contain $\langle w, g\rangle$. What we have shown here is that assuming a dense scale, each pair in (25a)'s contextual update will be contained in the update of c by a dynamically more informative alternative. Hence, exhaustification of (25a) will result in the empty set, or a contradiction.

$$c[\mathsf{O}_{(26)}\ (25a)] = \emptyset$$

We take the derivation of contradictions through exhaustification to lead to deviancy (Gajewski 2002, Chierchia 2013). However, we do predict that negation of *in*-adverbials will be possible if negation scopes above the exhaustification operator. The set of world-assignment pairs produced in doing so will be those where it is impossible to find a random assignment for an event of Mary reading War & Peace which lasted *exactly* three days. This happily corresponds to the denial reading we report for such utterance. In other words, our analysis predicts that the only available readings for negated *in*-adverbials will be denial readings.

6. Conclusion

We have shown that the interaction of *in*-adverbials with negation, more specifically the fact that these allow only for denial readings, is captured in our analysis by assuming obligatory competition between utterances containing such adverbials and a set of alternatives defined using a dense scale. This obligatory competition between alternatives is very interesting given how there exists in English a variety of *in*-adverbials which appear in perfect sentences which behave as negative polarity item (NPIs).

(27) a. *Mary has rested in three days.
b. Mary hasn't rested in three days.

While these *in*-adverbials do not impose restrictions on lexical aspect, they require the presence of negation. The fact that such adverbials behave like NPIs is striking under a view of polarity sensitivity which argues that such a behavior emerges from the logical relations that exist between utterances containing NPIs and a set of formal alternatives (Krifka 1995, Chierchia 2013). If we have been successful in arguing for an obligatory competition between the variety of *in*-adverbials presented in this paper and a set of alternatives, we may be one step closer to proposing a unified view of *in*-adverbials. We may view such items as behaving differently depending on the logical relationship existing between them and a set of formal alternatives, in the case we studied behaving essentially like positive polarity items. An interesting project to pursue would be to show whether it is indeed possible to propose such a unified picture, showing that *in*-adverbials generate in different environments alternatives leading them to sometimes behave like PPIs and other times as NPIs.

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