

Assertion and presupposition with change-of-state items*

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1 Introduction

There are two kinds of presupposition trigger, according to Sudo (2012), Zehr & Schwarz (2018), Doron, Fox & Wehbe (2025), and Abusch (2002), among others. The first kind, referred to as *soft* triggers by Abusch (2002), is represented by *stop*, which for example presupposes that the predicate take as the argument of *stop* holds at a prior time.

- (1) a. John stopped smoking. $\rightsquigarrow$ John used to smoke.
- b. John didn't stop smoking. $\rightsquigarrow$ John used to smoke.

It is easy to obtain a totally locally accommodation reading under *exactly*:

- (2) a. Among these three students, exactly one stopped smoking.
- b. **A prominent reading:** true iff (i) there is one student who used to smoke and transitioned to non-smoking, and (ii) every other student either didn't use to smoke or did not transition.
- c. **Possible general statement:** 'Exactly one student φ ' is true iff $\exists x. |x| = 1 \wedge \llbracket \varphi \rrbracket(x) = 1 \wedge \forall y. y \neq x \rightarrow \llbracket \varphi \rrbracket(y) = \# \vee \llbracket \varphi \rrbracket(y) = 0$

The second kind, referred to as *hard* triggers by Abusch (2002), is represented by *herself* (or more precisely, the gender feature [FEM] thereon):

- (3) a. Alex likes herself. $\rightsquigarrow$ Alex is female.
- b. Alex doesn't like herself. $\rightsquigarrow$ Alex is female.

Under *exactly*, the presupposition is difficult to totally accommodation. The resulting reading isn't even easy to state given the usual trivalent or partial architecture of presupposition specification:

- (4) a. Among these three students, exactly one likes herself.
- b. **A prominent reading:** true iff (i) there is one student that is female and likes herself, and (ii) all other students do not like themselves (whether or not they are female)
- c. **Possible general statement:** ??

The behavior in polar questions mirrors this difference. It is very difficult to use the *yes* answer when the presupposition of *stop* is unsatisfied, even if the intuitive asserted content is true:

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- (5) A: Did John stop smoking?
 B: #Yes, although he never smoked before. (in case John does not smoke now)
 B: No, because he never smoked before.

However, it is easy to use the *yes* answer when the presupposition of [FEM] is unsatisfied but the intuitive asserted content is true:

- (6) A: Does Alex like herself?
 B: Yes, although Alex is a boy. (in case Alex likes *himself*)
 B': No, because Alex is a boy.

In some sense, the *herself*-type presupposition can be ignored while the rest of the intuitive assertion is used alone; the presupposition is orthogonal to the assertion. The *stop*-type presupposition cannot be ignored; for the assertion to be true, the presupposition must also be true; the presupposition is *entailed* by the assertion.

This paradigm prompted Sudo (2012) to develop a two-dimensional architecture for presupposition specification: the denotation of an LF is the pair of its presupposition and its assertion $\langle p, A \rangle$, which can be independently true or false. The presupposition of *Alex likes herself* can then be independent from its assertion, while the assertion entails the presupposition with *John stopped smoking*:

- (7) a. $\langle \lambda w. \text{Alex is female in } w, \lambda w. \text{Alex likes themselves in } w \rangle$
 b. $\langle \lambda w. \text{John used to smoke in } w, \lambda w. \text{John used to smoke and stopped smoking in } w \rangle$.

Then, for the polar question case, we can say that the *yes* answer will be available when the assertion is true, even if the presupposition is not met. Likewise, it will be possible to devise a theory of presupposition projection that derives the results seen above, given these two-dimensional denotations, but I will omit the details for reasons of space.

There is a concern about two-dimensional semantics raised in Doron, Fox & Wehbe (2025): it is a restatement of the puzzle, without a real explanation. Individual lexical stipulations are needed to account for the differences, and the unattested reverse pattern can also be easily formulated in the system. For example, a gendered anaphor that is just like *herself* except that the presupposition is entailed by the assertion:

- (8) $\langle \lambda w. \text{Alex is female in } w, \lambda w. \text{Alex is female and Alex likes themselves in } w \rangle$

On the other hand, trivalent and partial systems are much more constrained, to the point of not straightforwardly deriving the different patterns shown above seen with different types of presupposition triggers. In response, Doron, Fox & Wehbe (2025) propose a new system where presuppositions and assertions of the sort posited by the two-dimensional system can be retrieved from LFs and their trivalent denotations.

According to the theory developed in Doron, Fox & Wehbe (2025), the prominent readings are derived both after the nuclear scopes' presuppositions are accommodated. The difference in the readings is attributed to the difference retrieved *assertion* of the sentences, which is again attributed to the difference in the nature of the presupposition trigger, i.e., whether the trigger is *deletable*.

- (9) A trigger T is deletable iff T can be deleted from φ resulting in a sentence α such that $\llbracket \alpha \rrbracket$ is Strawson-equivalent to $\llbracket \varphi \rrbracket$.¹
 (10) Procedure for retrieving the assertion for φ :

¹ $\varphi \Rightarrow_{\text{Strawson}} \psi$ iff $\forall w. \llbracket \varphi \rrbracket(w) = 1 \rightarrow \llbracket \psi \rrbracket(w) \neq 0$; $\varphi \Leftrightarrow_{\text{Strawson}} \psi$ iff $\varphi \Rightarrow_{\text{Strawson}} \psi$ and $\psi \Rightarrow_{\text{Strawson}} \varphi$.

- a. If the trigger T is deletable, then $\text{Asr}(\varphi) = \llbracket \alpha \rrbracket$, where $\alpha = \varphi - T$.
- b. If the trigger T is non-deletable, then the assertion is $\text{Asr}(\varphi) = \llbracket A \varphi \rrbracket$.

The presupposition of φ is simply $\text{Prs}(\varphi) = \lambda w. \llbracket \varphi \rrbracket(w) \neq \#$. In (2), *stop* is the presupposition trigger, which is non-deletable. One can either say that *stop* cannot be deleted because the remaining structure is ill-formed and cannot be composed, or say that if one forcibly compose the remaining structure, it is not Strawson-equivalent to the original. In (4), the gender feature is the presupposition trigger, which is deletable. One can assume that the result of deleting FEM from *herself* is the gender-neutral form, e.g., for the old-fashioned, *himself*, and in the present usage, *themselves*. The operation of local accommodation (LA) is also redefined: it is weakening the presupposition with the assertion:

$$(11) \quad \llbracket \text{LA } \varphi \rrbracket = \left\langle \begin{array}{ll} \text{Prs} & \text{Asr}(\varphi) \rightarrow \text{Prs}(\varphi) \\ \text{Asr} & \text{Asr}(\varphi) \end{array} \right\rangle$$

In the case of non-deletable triggers like *stop* in (12), the presupposition is totally removed after local accommodation, because $\text{Asr}(x \text{ stopped smoking})$ entails $\text{Prs}(x \text{ stopped smoking})$.

$$(12) \quad \text{a. } \lambda x. x \text{ stopped smoking} = \lambda x. \begin{cases} 1 & x \text{ used to smoke and transitioned to non-smoking} \\ 0 & x \text{ used to smoke and didn't transition to non-smoking} \\ \# & \text{otherwise (} x \text{ didn't use to smoke)} \end{cases}$$

$$\text{b. } \lambda x. \left\langle \begin{array}{ll} \text{Prs} & x \text{ used to smoke} \\ \text{Asr} & x \text{ used to smoke and transitioned to non-smoking} \end{array} \right\rangle$$

$$(13) \quad \text{a. } \lambda x. \text{LA}[x \text{ stopped smoking}]$$

$$\text{b. } \lambda x. \left\langle \begin{array}{ll} \text{Prs} & x \text{ used to smoke and transitioned to non-smoking} \rightarrow x \text{ used to smoke} = \text{True} \\ \text{Asr} & x \text{ used to smoke and transitioned to non-smoking} \end{array} \right\rangle$$

In the case of deletable triggers like *herself* in (14), we have a residual presupposition after accommodation:

$$(14) \quad \text{a. } \lambda x. x \text{ likes herself}_x = \lambda x. \begin{cases} 1 & x \text{ likes } x \text{ and } x \text{ is female} \\ 0 & x \text{ doesn't like } x \text{ and } x \text{ is female} \\ \# & \text{otherwise (} x \text{ is not female)} \end{cases}$$

$$\text{b. } \lambda x. \left\langle \begin{array}{ll} \text{Prs} & x \text{ is female} \\ \text{Asr} & x \text{ likes } x \end{array} \right\rangle$$

$$(15) \quad \text{a. } \lambda x. \text{LA}[x \text{ likes herself}_x]$$

$$\text{b. } \lambda x. \left\langle \begin{array}{ll} \text{Prs} & x \text{ likes } x \rightarrow x \text{ is female} \\ \text{Asr} & x \text{ likes } x \end{array} \right\rangle$$

$$\text{c. After universal projection: } \forall x. x \text{ likes } x \rightarrow x \text{ is female}$$

Then, the locally accommodated versions are embedded under *exactly one*, the behavior described in (2) and (4) is obtained. Namely, there is one student who is female and likes herself; the rest don't like themselves, and because a conditional is true if the antecedent is false, the presupposition is satisfied whether they are female.

A telling way to describe the patterns above would be to say that for a sentence φ that presupposes p , the assertion of φ is either $p \wedge q$ (in case the presupposition is due to a non-deletable trigger) or q (in case the presupposition is due to a deletable trigger), where q is logically independent from

p . And so $\varphi = \left\langle \begin{smallmatrix} \text{Prs} & p \\ \text{Asr} & p \wedge q \end{smallmatrix} \right\rangle$ or $\varphi = \left\langle \begin{smallmatrix} \text{Prs} & p \\ \text{Asr} & q \end{smallmatrix} \right\rangle$.²

- (16) a. “ $\left\langle \begin{smallmatrix} \text{Prs} & p \\ \text{Asr} & p \wedge q \end{smallmatrix} \right\rangle$?” can have the *yes* answer if $p \wedge q$ is true.
b. “ $\left\langle \begin{smallmatrix} \text{Prs} & p \\ \text{Asr} & q \end{smallmatrix} \right\rangle$?” can have the *yes* answer if q is true.

- (17) a. “Exactly one $\lambda x. \left\langle \begin{smallmatrix} \text{Prs} & P(x) \\ \text{Asr} & P(x) \wedge Q(x) \end{smallmatrix} \right\rangle$ ”
 $\rightsquigarrow \exists x. \left[\begin{smallmatrix} P(x) \wedge Q(x) \\ \forall y \neq x. \neg P(y) \vee \neg Q(y) \end{smallmatrix} \right]$
b. “Exactly one $\lambda x. \left\langle \begin{smallmatrix} \text{Prs} & P(x) \\ \text{Asr} & Q(x) \end{smallmatrix} \right\rangle$ ”
 $\rightsquigarrow \exists x. \left[\begin{smallmatrix} P(x) \wedge Q(x) \\ \forall y \neq x. \neg Q(y) \end{smallmatrix} \right]$

In what follows, I will try to show the following: change-of-state predicates like *arrive at the party* alternate between behavior characteristic of deletable and non-deletable presupposition triggers depending on whether the tense is present Perfect or simple past. I will present a decomposition of change-of-state predicates that derives this alternation.

2 Potential meanings for *arrive*

Change-of-state verbs usually have an assertion that entails that the result state holds and presupposes that there is a prior opposite state. The difference between entailed and non-entailed presuppositions is therefore just whether ‘there is a prior opposite state’ is also entailed by the assertion. Then consider a predicate like *arrive at the party*. Its assertion certainly entails that the theme is at the party, and its presupposition is certainly the theme was not at the party previously. The point of variation is then whether the assertion also entails the theme was not at the party previously. Let’s denote the time of the aftermath, t_1 , and the previous time, t_0 , where $t_0 < t_1$. Then, the two potential specifications of *arrive at the party* are in (18):

- (18) a. $\llbracket \text{arrive at the party} \rrbracket = \lambda x. \left\langle \begin{smallmatrix} \text{Prs} & \neg \text{party}(x, t_0) \\ \text{Asr} & \text{party}(x, t_1) \end{smallmatrix} \right\rangle$
b. $\llbracket \text{arrive at the party} \rrbracket = \lambda x. \left\langle \begin{smallmatrix} \text{Prs} & \neg \text{party}(x, t_0) \\ \text{Asr} & \neg \text{party}(x, t_0) \wedge \text{party}(x, t_1) \end{smallmatrix} \right\rangle$

Then, if it is the first case, we predict that in a polar question involving *arrive at the party*, we **can** answer *yes* as long as $\text{party}(x, t_1)$, regardless of whether $\text{party}(x, t_0)$.

And in the *exactly* test, we predict that we can get a reading where we require one student to transition from $\neg \text{party}(x, t_0)$ to $\text{party}(x, t_1)$, and the rest of the students $\neg \text{party}(x, t_1)$, regardless

²Note that $\left\langle \begin{smallmatrix} \text{Prs} & p \\ \text{Asr} & p \wedge q \end{smallmatrix} \right\rangle$ and $\left\langle \begin{smallmatrix} \text{Prs} & p \\ \text{Asr} & q \end{smallmatrix} \right\rangle$ indeed express the same trivalent proposition:

- (i) $\lambda w. \begin{cases} 1 & p(w) \wedge q(w) \\ 0 & p(w) \wedge \neg q(w) \\ \# & \text{otherwise } (\neg p(w)) \end{cases}$

of whether $\text{party}(x, t_0)$.

$$(19) \quad \exists x. \left[\begin{array}{l} \neg \text{party}(x, t_0) \wedge \text{party}(x, t_1) \\ \forall y \neq x. \neg \text{party}(y, t_1) \end{array} \right]$$

If it is the second case, we predict that in a polar question involving *arrive at the party*, we **can-not** answer *yes* simply because $\text{party}(x, t_1)$; rather, $\neg \text{party}(x, t_0)$ is a necessary condition for the *yes* answer.

And in the *exactly* test, we predict that we can get a reading where we require one x to transition from $\neg \text{party}(x, t_0)$ to $\text{party}(x, t_1)$, and each of the rest of the students y can either $\text{party}(y, t_0)$ (in which case it doesn't matter whether $\text{party}(y, t_1)$) or $\neg \text{party}(y, t_1)$ (in which case it doesn't matter if $\text{party}(y, t_0)$).

$$(20) \quad \exists x. \left[\begin{array}{l} \neg \text{party}(x, t_0) \wedge \text{party}(x, t_1) \\ \forall y \neq x. \text{party}(y, t_0) \vee \neg \text{party}(y, t_1) \end{array} \right]$$

What I will show below is that surprisingly, *arrive at the party* can show both patterns, depending on which aspect it is situated in.

3 present Perfect: *Have arrived*

First, we see that *have arrived* does have an associated presupposition:

- (21) a. John has arrived at the office. $\rightsquigarrow$ John wasn't at the office.
b. John hasn't arrived at the office. $\rightsquigarrow$ John wasn't at the office.

Consider the two tests, i.e., polar question and embedding under *exactly*. The *yes*-answer is preferred for the polar question, like deletable triggers:

- (22) Context: *The party is held at John's house. A knows where the party is, without knowing it is John's house. A has arrived at the party. A wants to talk to John.*
A: Has John arrived at the party?
B: Yes, although he has been here all day as he lives here.
B: #No, because he has been here all day as he lives here.

(22) shows that the intuited assertion of *John has arrived at the party* is 'John is at the party.' As long as that assertion is true, the *yes* answer can be used. We can then give a tentative entry for *have arrived at the party*:

$$(23) \quad \llbracket \text{have arrived at the party} \rrbracket = \lambda x. \left\langle \begin{array}{l} \text{Prs} \quad \neg \text{party}(x, t_{\text{prev}}) \\ \text{Asr} \quad \text{party}(x, t_{\text{now}}) \end{array} \right\rangle$$

This is clearly a case of non-entailed presupposition. Compare (23) with an alternative entry, with an entailed presupposition:

$$(24) \quad \llbracket \text{have arrived at the party} \rrbracket = \lambda x. \left\langle \begin{array}{l} \text{Prs} \quad \neg \text{party}(x, t_{\text{prev}}) \\ \text{Asr} \quad \neg \text{party}(x, t_{\text{prev}}) \wedge \text{party}(x, t_{\text{now}}) \end{array} \right\rangle$$

We have three readings for embedding under *exactly*, as predicted by choosing 1) no accommodation, 2) accommodation with non-entailed presupposition (like *herself*), and 3) accommodation with entailed presupposition (like *stop*). These are shown in table 1 and we should see which ones

are actually acceptable readings. #1 in table 1 is clearly a very natural reading of (24). #2 in table 1 is degraded but still accessible. #3 in table 1, on the other hand, is very bizarre.

Table 1: Readings for *Exactly one of my three friends has arrived at the party.*

reading	type	description	formula
✓	#1	none	Previously, none was here, and now exactly one is here.
			$\left[\begin{array}{l} \forall x. \neg \text{party}(x, t_{\text{prev}}) \\ \exists! x. \text{party}(x, t_{\text{now}}) \end{array} \right]$
?	#2	<i>herself</i>	Now, one has arrived, and no one else is at the party, and it doesn't matter whether the others were at the party previously.
			$\exists x. \left[\begin{array}{l} \neg \text{party}(x, t_{\text{prev}}) \wedge \text{party}(x, t_{\text{now}}) \\ \forall y \neq x. \neg \text{party}(y, t_{\text{now}}) \end{array} \right]$
✗	#3	<i>stop</i>	Now, one has arrived, and the others have either always been at the party or still haven't arrived.
			$\exists x. \left[\begin{array}{l} \neg \text{party}(x, t_{\text{prev}}) \wedge \text{party}(x, t_{\text{now}}) \\ \forall y \neq x. \text{party}(y, t_{\text{prev}}) \vee \neg \text{party}(y, t_{\text{now}}) \end{array} \right]$

Because of the complexity of the readings, we can make the distinctions sharper by looking at the judgments in scenarios shown in table 2. Imagine my three friends are Bill, Mary, and Sue. #1 in table 2 verifies the predicted reading with no accommodation. #2 in table 2 verifies the predicted reading with *herself*-type accommodation as well as the predicted reading with *stop*-type accommodation. #3 in table 2 verifies the predicted reading with *stop*-type accommodation but not the predicted reading with *herself*-type accommodation. The target sentence is definitely felicitous and true in #1 in table 2, and this is expected, as #1 in table 2 perfectly satisfies the universal projected presupposition that every one of my three friends were previously not at the party. The target sentence is acceptable in #2 in table 2, and this is expected because the scenario verifies the *herself*-accommodation pattern. But the target sentence is terrible in #3 in table 2, as the scenario does not verify the *herself*-accommodation pattern. *Have arrived* behaves like *herself*, as if it has a non-entailed presupposition, and therefore a deletable trigger.

4 Simple past: *Arrived (at 2pm)*

In simple past with a specific point in time, such as *arrived at 2pm*, the behavior is different. First, there is also a presupposition about a prior opposite state:

- (25) a. At 2pm, John arrived at the party. $\rightsquigarrow$ John wasn't at the party before.
b. At 2pm, John didn't arrive at the party. $\rightsquigarrow$ John wasn't at the party before.

Some people have suggested that (25b), with a fronted temporal adverbial above negation, is rather odd. I think the following context (or any other context that supports the topic-hood of *2pm*) could improve it: Imagine if it is in the schedule that John should show up at 2pm. Then, it was 2pm, and the speaker checked that John didn't arrive as planned. The adverbial is preposed to avoiding complications related to the problem of focus on the adverbial under negation, which generate different inferences.

- (26) John didn't arrive at the party at 2PM; he arrived at 1pm.

Table 2: Scenarios for *Exactly one of my three friends has arrived at the party.*

scenario	description	illustration
#1	Previously, none of B, M, S were at the party. Then, B arrived and remains to be at the party till now.	
#2	B arrived at the party and remains to be at the party. M and S are residents of the party venue, and so they were at the party from the very beginning. But they left the party just now.	
#3	B arrived at the party and remains to be at the party. M and S are residents of party venue, and they have been at the party throughout.	

(27) John didn't ARRIVE at the party at 2pm; he was already at the party by 2pm.

Setting this prosody aside, we can apply the tests.

- (28) A: At 2pm, did John arrive at the party?
 B: #Yes, although he had always been here as he lives here.
 B: No, because he had always been here as he lives here.

That the *yes* answer is unavailable shows that the assertion is clearly not 'John was at the party at 2pm.' Rather, having an arrival event at 2pm take place is a part of the assertion. A rough sketch of the entry for *arrived at 2pm* is therefore:

$$(29) \quad \llbracket \text{arrive at the party at 2pm} \rrbracket = \lambda x. \left\langle \begin{array}{l} \text{Prs} \quad \neg \text{party}(x, t_{\text{prev}}) \\ \text{Asr} \quad \neg \text{party}(x, t_{\text{prev}}) \wedge \text{party}(x, t_{2\text{pm}}) \end{array} \right\rangle$$

Compare (29) with (30), which is the entry we would have had if the behavior from the present Perfect is carried over:

$$(30) \quad \llbracket \text{arrive at the party at 2pm} \rrbracket = \lambda x. \left\langle \begin{array}{l} \text{Prs} \quad \neg \text{party}(x, t_{\text{prev}}) \\ \text{Asr} \quad \text{party}(x, t_{2\text{pm}}) \end{array} \right\rangle$$

We can also look at the projection behavior from under *exactly*. The predicted readings given no accommodation, *herself*-accommodation, and *stop*-accommodation are given in table 3. #1 in table 3 is an available reading. #2 in table 3 is not an available reading. #3 in table 3 is an available reading. *Arrived at 2pm* behaves like *stop*, as if it has an entailed presupposition, and therefore a non-deletable trigger.

Table 3: Readings for *At 2pm, exactly one of my three friends arrived at the party.*

reading	type	description	formula
✓	#1	none	Before 2pm, none were at the party. At 2pm, exactly one arrived.
✗	#2	herself	Exactly one arrived at 2pm and no one else was at the party at 2pm.
✓	#3	stop	Exactly one friend wasn't at the party before and showed up at 2pm. The others either were already at the party by 2pm or still hadn't arrived.

5 Puzzle

Have arrived at the party is as if it contains a deletable trigger; *arrived at the party at 2pm* is as if it contains a non-deletable trigger. The latter case is more understandable: *arrived* is likely the trigger, and presumably *arrived* cannot be deleted, for the same reasons as *stop*. What about *have arrived*?

6 Sketch of a contextually deletable trigger in *arrive*

The proposal is that *arrive at the party* is decomposed into a presupposition trigger + *be at the party*. This trigger is CoS, which will be shown to be deletable in the present Perfect, but non-deletable in the simple past. In particular, *arrive at the party* is decomposed into a resulting state of the theme being at the party and CoS, which introduces the change of change event as well the presupposition that there is a prior state that is the negation of the resulting state. CoS is a presuppositional type-shifter:

$$(31) \quad {}^u\llbracket \text{CoS} \rrbracket^i := \lambda V. \lambda e. \lambda s. \begin{cases} 1 & \left[\begin{array}{l} \exists s'. \tau(s') < \tau(s) \wedge \text{Neg}(V)(s') = 1 \\ \text{cause}(e, s) = V(s) = 1 \end{array} \right] \\ 0 & \left[\begin{array}{l} \exists s'. \tau(s') < \tau(s) \wedge \text{Neg}(V)(s') = 1 \\ \text{cause}(e, s) = 0 \vee V(s) = 0 \end{array} \right] \\ \# & \text{otherwise} \end{cases} \quad (v_s \rightarrow t) \rightarrow v_e \rightarrow v_s \rightarrow t$$

I will also use the partial semantics notation for simplicity; the presupposition is underlined.

$$(32) \quad {}^u\llbracket \text{CoS} \rrbracket^i = \lambda V. \lambda e. \lambda s : \underline{\exists s'. \tau(s') < \tau(s) \wedge \text{Neg}(V)(s') = 1}. \text{cause}(e, s) = V(s) = 1$$

Just keep in mind that I always intend the actual denotation to be the trivalent one, even if other notations are employed.

Following [von Stechow & Iatridou \(2019\)](#), the index u on the left of ${}^u\llbracket \cdot \rrbracket^i$ is the utterance time, while the index i on the right is the evaluation time. Above, *Neg* produces negative events in the

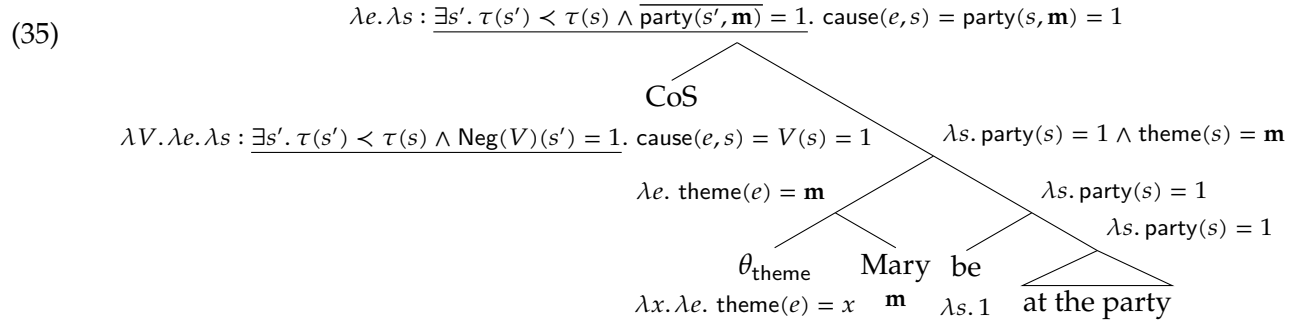
sense of Bernard & Champollion (2024):³

- (33) Principle of Negation (relativized to times)
 $\forall i. \forall V. [\exists e. i \subseteq \tau(e) \wedge V(e) = 1] \leftrightarrow [\neg \exists e. i \subseteq \tau(e) \wedge \text{Neg}(V)(e) = 1]$

CoS takes a stative predicate of type $v_s \rightarrow t$ and returns a partial telic predicate of type $v_e \rightarrow v_s \rightarrow t$, i.e., a relation between a (change-of-state) event and a result state; it is only defined for change-of-state event e and result state s , if s has a prior negative state. The other less important but necessary or customary formal ingredients are as follows:

- (34) a. $\llbracket \text{be} \rrbracket = \lambda s. 1$ $v \rightarrow t$
 b. $\llbracket \text{at the party} \rrbracket = \lambda s. \text{party}(s) = 1$ $v \rightarrow t$
 c. $\llbracket \theta_{\text{theme}} \rrbracket = \lambda x. \lambda e. \text{theme}(e) = x$ $e \rightarrow v \rightarrow t$

(35) illustrates the bottom layers of the composition. Below, $\text{party}(s', \mathbf{m})$ abbreviates $\text{party}(s') = 1 \wedge \text{theme}(s') = \mathbf{m}$. $\overline{\text{party}(s', \mathbf{m})}$ abbreviates $\text{Neg}(\lambda s''. \text{party}(s'') = 1 \wedge \text{theme}(s'') = \mathbf{m})(s')$. It is only after the merger of CoS that *arrive* becomes a true telic predicate. We can say that *be* head-moves to CoS, and that complex head is spelled out as *arrive*.



6.1 On tense and aspect

I assume the following semantics of tense, PRS for present, and PST for past; however, these won't really matter much for solving the problem. The notation has utterance time u on the left and evaluation time i on the right, following von Fintel & Iatridou (2019). Note that u, i are time intervals rather than time points.

- (36) a. ${}^u \llbracket \text{PRS } \varphi \rrbracket^i = 1$ iff ${}^u \llbracket \varphi \rrbracket^u = 1$
 b. ${}^u \llbracket \text{PST } \varphi \rrbracket^i = 1$ iff $\exists i' < i. {}^u \llbracket \varphi \rrbracket^{i'} = 1$

Tense basically shifts the evaluation time of the prejacent to one that stands in a certain relationship with the utterance time.

6.1.1 Aspect

The much more crucial part is aspect, in particular the lower aspect.

present Perfect I assume following standard analyses (Pancheva 2012, von Fintel & Iatridou 2019) in that the Perfect in English actually involves two separate layers of aspectual projections. The first

³Alternatively, without using Neg, we can simply state there is no prior state of the theme being at the party.

layer is always the Perfect, *PRF*, which replaces the evaluation time with a final sub-interval of the evaluation time, known as the Perfect Time Span (PTS).

$$(37) \quad \begin{aligned} \llbracket \text{PRF } \varphi \rrbracket^i &= 1 \text{ iff } \exists i'. \text{PTS}(i, i') \wedge \llbracket \varphi \rrbracket^{i'} = 1, \\ \text{where } \text{PTS}(i, i') &\text{ iff } i' \text{ is a final subinterval of } i'. \end{aligned}$$

The lower of the two aspects, or *viewpoint aspect*, have more variability, due to the diversity of readings obtained under the Perfect. Consider the following:

- (38) a. John has lived in Boston since 2000.
 Universal reading: throughout the PTS, John is in Boston
 b. John has once lived in Boston.
 Existential/Experiential reading: John is in Boston in some subinterval of the PTS
 c. John has arrived in Boston.
 Resultative reading: John arrived in Boston in the PTS, and John is now in Boston

The following lower aspects, *IPFV* (imperfective), *PFV* (perfective), and *RES* (resultative), can handle the three readings:

$$(39) \quad \begin{aligned} \text{a. } \llbracket \text{IPFV} \rrbracket^i &= \lambda V_{\text{atelic}}. \exists e. \tau(e) \supset i \wedge V(e) \\ \text{b. } \llbracket \text{PFV} \rrbracket^i &= \lambda V_{\text{atelic}}. \exists e. \tau(e) \subset i \wedge V(e) \\ \text{c. } \llbracket \text{RES} \rrbracket^i &= \lambda V_{\text{telic}}. \exists e. \exists s. i \sqsubseteq \tau(s) \wedge V(e, s), \\ &\text{where } i \sqsubseteq i' \text{ iff } i' \neq \emptyset \wedge \exists t. \exists t'. t \in i \wedge t \notin i' \wedge t' \notin i \wedge t < t'. \end{aligned}$$

IPFV and *PFV* take sets of atelic events $V_{\text{atelic}} : v \rightarrow \mathfrak{t}$, and then asserts that there is event e in V and its runtime $t(e)$ is a superset or subset of the evaluation time i , respectively. *IPFV* is not very compatible with telic predicates like *arrive*, and so we leave it out from now. *RES* normally takes telic predicates, which are relations $V_{\text{telic}} : v_e \rightarrow v_s \rightarrow \mathfrak{t}$ between events e and their result states s , and asserts that the runtime of the result state $\tau(s)$ starts after the start of the evaluation time i and ends after the end of i .

PFV should also work with telic predicates. Clearly (40) does not make us infer that John is now at the office.

$$(40) \quad \text{John has once arrived at the office late.}$$

We then make *PFV* type-flexible, so that it is compatible with both telic and atelic predicates.

$$(41) \quad \llbracket \text{PFV} \rrbracket^i = \lambda V. \begin{cases} \exists e. \exists s. \tau(e) \subset i \wedge V(e, s) & V : v_e \rightarrow v_s \rightarrow \mathfrak{t} \\ \exists e. \tau(e) \subset i \wedge V(e) & V : v \rightarrow \mathfrak{t} \end{cases}$$

While normally *RES* cannot be combined with statives, but I nevertheless make *RES* type-flexible as well, so that it combines with both telics and statives:⁴

$$(42) \quad \llbracket \text{RES} \rrbracket^i = \lambda V. \begin{cases} \exists e. \exists s. i \sqsubseteq \tau(s) \wedge V(e, s) & V : v_e \rightarrow v_s \rightarrow \mathfrak{t} \\ \exists s. i \sqsubseteq \tau(s) \wedge V(s) & V : v_s \rightarrow \mathfrak{t} \end{cases},$$

where $i \sqsubseteq i'$ iff $i' \neq \emptyset \wedge \exists t. \exists t'. t \in i \wedge t \notin i' \wedge t' \notin i \wedge t < t'$.

I assume that in the present Perfect without special modification, *arrive* must be used under the resultative. This is because the result state, i.e., that Mary is at the party, cannot be cancelled:

⁴There is no reason to believe *RES* combines with statives in normal usage. However, assuming the possibility also doesn't do much harm, as the reading produced is just a slightly weaker *IPFV*.

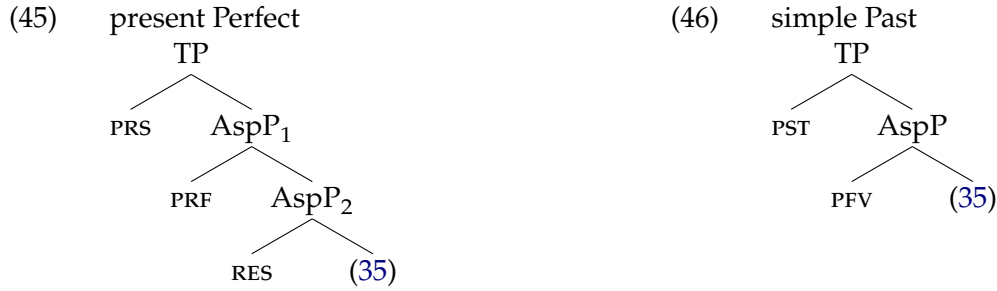
(43) #Mary has arrived at the party. However, she then left so she is not at the party now.

Following [Bertrand et al. \(2022\)](#), I conclude that the result state holding at the right boundary is an entailment, which can only be delivered by RES rather than PFV.

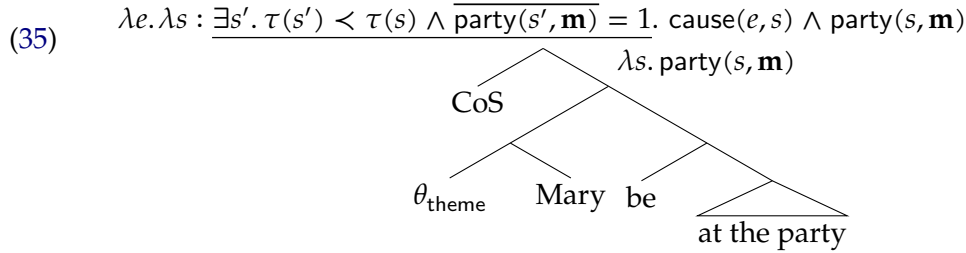
Simple past In the simple past, there is just one aspect layer, i.e., there is no Perfect. Tense directly combines with the viewpoint aspect. With verbs like *arrive*, the only reasonable choice is PFV: it is the change-of-state event that must take place in the evaluation time, and it is not implied that the result state still holds at the end of the evaluation time. Compare (44) with (43):

(44) John arrived in Boston yesterday. But he left later that day.

Summary: Aspects We then have the following for present Perfect and simple past for *arrive*:



We should also be reminded of (35), the bottom of the structures and its final denotation:



The goal is to derive the results in (47) and (48):

- (47) present Perfect
 $\llbracket [\text{AspP}_2 \text{ RES } [\text{CoS } [\text{Mary-be-at-party}]]] \rrbracket \Leftrightarrow_{\text{Strawson}} \llbracket [\text{AspP}_2 \text{ RES } [\text{Mary-be-at-party}]] \rrbracket$
- (48) Simple past
 $\llbracket [\text{AspP}_2 \text{ PFV } [\text{CoS } [\text{Mary-be-at-party}]]] \rrbracket \not\Leftrightarrow_{\text{Strawson}} \llbracket [\text{AspP}_2 \text{ PFV } [\text{Mary-be-at-party}]] \rrbracket$

Note that on the right-hand side, CoS is deleted from the structure. The difference in Strawson-equivalence is made once we reach the viewpoint aspect layer; there is no need to compute anything above, as tense and Perfect just shifts the evaluation time.

Derivation: present Perfect With Strong Kleene projection, we obtain the following results for AspP_2 with CoS (49) and without CoS (50) and without CoS (50):

$$(49) \quad \llbracket \text{AspP}_2 \rrbracket^i = \begin{cases} 1 & \exists e. \exists s. i \sqsubseteq \tau(s) \wedge \left[\begin{array}{l} \exists s'. \tau(s') < \tau(s) \wedge \overline{\text{party}(s', \mathbf{m})} = 1 \\ \text{cause}(e, s) = \text{party}(s, \mathbf{m}) = 1 \end{array} \right] \\ 0 & \forall e. \forall s. i \sqsubseteq \tau(s) \rightarrow \left[\begin{array}{l} \exists s'. \tau(s') < \tau(s) \wedge \overline{\text{party}(s', \mathbf{m})} = 1 \\ \text{cause}(e, s) = 0 \vee \text{party}(s, \mathbf{m}) = 0 \end{array} \right] \\ \# & \text{otherwise} \end{cases}$$

$$(50) \quad \llbracket \text{AspP}_2 \rrbracket^i = \begin{cases} 1 & \exists s. i \sqsubseteq \tau(s) \wedge \text{party}(s, \mathbf{m}) \\ 0 & \text{otherwise} \end{cases}$$

When (49) is true, (50) is clearly true, because (49) logically entails (50). When (50) is true, if (49) is defined, then (49) is also true, but this requires a few ontological assumptions:

(51) PSR ('principle of sufficient reason'):
For all stative V , $[\exists s. \exists s'. \text{Neg}(V)(s) \wedge V(s') \wedge \tau(s) < \tau(s')] \rightarrow [\exists e. \exists s. \text{cause}(e)(s) \wedge V(s)]$.

(52) SUBINTERVAL:
For all stative V , $\forall i. [\exists s. \tau(s) = i \wedge V(s)] \rightarrow [\forall i' \subseteq i. \exists s'. \tau(s') = i' \wedge V(s')]$ (Bennett & Partee 2004, Bach 1981: a.o.).

PSR is probably natural, in that if there is a change of states, i.e., a transition from a state to a negative state, then there is a change-of-state event that is causally responsible for the change. SUBINTERVAL is already well-established in the literature and says that if a stative predicate is instantiated at i , then for each sub-interval i' of i , the stative predicate is also instantiated at i' . Then in our case, if Mary is at the party now (the end of i in present Perfect), and there is a prior state of Mary not being at the party, then there must be a change-of-state event (an arrival event e) that caused Mary to be at the party. When e took place doesn't matter, because the entry for RES doesn't place constraints on e due to SUBINTERVAL. e could in principle take place before the start of i ; in this case, the result state associated with that e does begin prior to i , which does not satisfy $i \sqsubseteq \tau(s)$. However, SUBINTERVAL ensures that there is s' such that $\tau(s') \sqsubseteq i$ that is also a Mary being at the party state, which begins after the start of i .

Derivation: Simple past Switching to the simple past, we then have the result for AspP with CoS (53) and without CoS (54):

$$(53) \quad \llbracket \text{AspP} \rrbracket^i = \begin{cases} 1 & \exists e. \exists s. \tau(e) \subset i \wedge \left[\begin{array}{l} \exists s'. \tau(s') < \tau(s) \wedge \overline{\text{party}(s', \mathbf{m})} \\ \text{cause}(e, s) \wedge \text{party}(s, \mathbf{m}) \end{array} \right] \\ 0 & \forall e. \forall s. \tau(e) \subset i \rightarrow \left[\begin{array}{l} \exists s'. \tau(s') < \tau(s) \wedge \overline{\text{party}(s', \mathbf{m})} \\ \neg \text{cause}(e, s) \vee \neg \text{party}(s, \mathbf{m}) \end{array} \right]^5 \\ \# & \text{otherwise} \end{cases}$$

$$(54) \quad \llbracket \text{AspP} \rrbracket^i = \begin{cases} 1 & \exists s. \tau(s) \subset i \wedge \text{party}(s, \mathbf{m}) \\ 0 & \text{otherwise} \end{cases}$$

I will show that (54) $\not\Rightarrow_{\text{Strawson}}$ (53). Suppose $\exists s. \tau(s) \supset i \wedge \text{party}(s, \mathbf{m})$, and so Mary was at the party throughout i . By SUBINTERVAL, (54) is true. Then, when (53) is defined, PSR guarantees an arrival event e . However, in this case, $\tau(e) \not\subset i$ because $\tau(e) < i$. Essentially, RES does not care about the time of the arrival event, while PFV does, and so even with the help of SUBINTERVAL

⁵I think we need to place a restriction on s , or else the falsity condition says Mary was not at the party for an eternity. Maybe $\text{cause}(e, s)$ also contributes a presupposition, i.e., $e < s$ or e abuts s .

and PSR, Strawson-entailment from the version without CoS to the version with CoS does not hold for PFV.

6.2 A prediction

A prediction that follows is that whenever there is an adverbial modifying the change-of-state event *e* (it need not be temporal), *arrive* should behave as if containing a non-deletable trigger, even under the present Perfect. This is because the Strawson-equivalence breaks down due to the modification of the change-of-state event *e*. That Mary was previously not at the party (presupposition) and is at the party now guarantees does not guarantee the existence of a change-of-state event *satisfying the modification*, even with the help of PSR. This way, the trigger is no longer deletable. This prediction seems to be borne out.

- (55) A: Has John arrived at the party by bus?
 B: #Yes, although he has been here all day as he lives here.
- (56) Exactly one of my three friends has arrived at the party by bus.
 ↗ The rest are either always at the party, haven't arrived, or have arrived but not by bus.

7 Asymmetry with *stop*

There is a potential problem with the analysis above: why can't the same analysis apply to *stop*, therefore predicting *stop* to also alternate between the two projection patterns depending on aspect? At the first glance, *stop* does not seem to alternate, i.e., the behavior under the present Perfect is the same as in the simple past:

- (57) A: Has John stopped smoking?
 B: #Yes, although he never smoked before. (in case John does not smoke now)
 B': No, because he never smoked before.
- (58) Exactly one of my three friends has stopped smoking.⁶
- a. ✓ All of my three friends used to smoke. Now, exactly one of them doesn't smoke.
no accommodation
 - b. ✗ Exactly one my three friends has transitioned from smoking to non-smoking. The others either used to smoke and still smoke or has just begun smoking.
herself-accommodation
 - c. ✓ Exactly one of my three friends has transitioned from smoking to non-smoking. The others either never smokes or used to smoke and still smoke.
stop-accommodation

However, the judgment seems to be different is *stop* is used in a non-agentive, purely change-of-state way: it describes the reversal of a state, rather than giving up a habit. This is most easily seen with inanimate subjects, as in the following examples:

- (59) A: Has the machine stopped working?
 B: Yes, although it has never worked.
 B': ?No, because it has never worked. (OK only if *stop* is stressed)
- (60) Exactly of the three machines has stopped working.

⁶I am not quite sure of the judgments. But replacing *stop* with *quit* or *give up* would make the judgments rather sharp.

- a. $\leadsto$ The rest of the machines work and have always worked.
b. $? \leadsto$ The rest of the machines work and it doesn't matter whether they have worked in the past.
c. $\nrightarrow$ The rest of the machines either have always worked or have never worked.
- (61) A: At 2pm, did the machine stop working?
B: #Yes, although it never worked.
B': No, because it never worked.
- (62) At 2pm, exactly one of the three machines stopped working.
 $\leadsto$ The rest of the machines either worked until 2pm and then continued to work or have never worked.

Here, *stop* displays the behavior of *arrive*, in that *herself*-accommodation is available in the present perfect, while *stop*-accommodation is available in the simple past. If the difference is simply about agentivity, we can foresee the following analysis:

- (63) Non-agentive *stop*, *The machine has stopped working*.
 $\exists e. \exists s : \exists s'. \tau(s') < \tau(s) \wedge \text{work}(s', \mathbf{m}). i \not\models \tau(s) \wedge \text{cause}(e, s) \wedge \overline{\text{work}(s, \mathbf{m})}$
- (64) Agentive *stop*, *Mary has stopped smoking*.
 $\exists e. \exists s : \exists s'. \tau(s') < \tau(s) \wedge \text{smoke}(s', \mathbf{j}). i \not\models \tau(s) \wedge \text{agent}(e) = \mathbf{j} \wedge \text{cause}(e) \wedge \overline{\text{smoke}(s, \mathbf{j})}$

Because agentivity involves modification of the change-of-state event, deleting CoS will not maintain Strawson-equivalence, much like *by train* in the case of *arrive*. However, the next section shows that this move is unlikely to cover the full picture.

7.1 Decomposition adverb *again*

One of the main previous arguments for lexical decomposition of change-of-state verbs like *stop* and *open* is the ability of presuppositional adverbs like *again* to target either the resulting state or the change-of-state event, producing the so-called *restitutive* and *repetitive* readings, respectively (von Stechow 1996, 2011, Beck 2005, 2006).

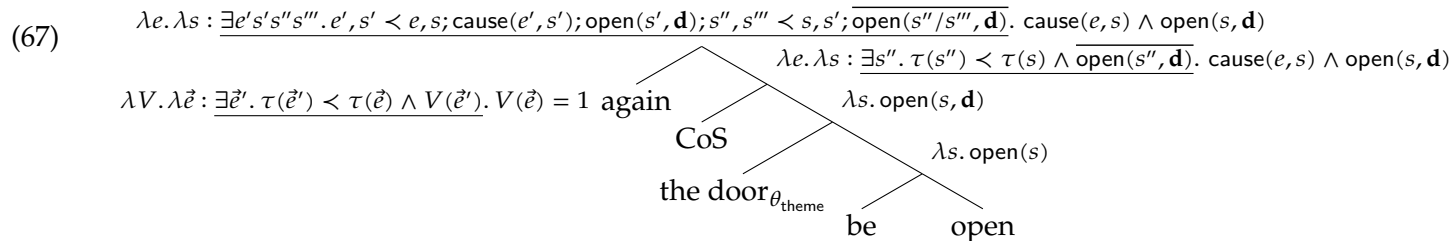
- (65) The door opened again.
- a. The door opened, and that had happened before. **repetitive**
b. The door opened, and the door had been open before. **restitutive**

(65) can be captured, if we decompose *open* into CoS and a stative.

With *again* as the sister of the result state, below CoS, we get the restitutive reading:

- (66)
- $$\begin{array}{c}
 \lambda e. \lambda s : \exists s' s''. \tau(s') < \tau(s) \wedge \text{open}(s', \mathbf{d}) \wedge \tau(s'') < \tau(s) \wedge \overline{\text{open}(s'', \mathbf{d})}. \text{cause}(e, s) \wedge \text{open}(s, \mathbf{d}) \\
 \begin{array}{ccc}
 & \lambda s : \exists s'. \tau(s') < \tau(s) \wedge \overline{\text{open}(s', \mathbf{d})}. \text{open}(s, \mathbf{d}) & \\
 \text{CoS} & \swarrow \quad \searrow & \\
 \lambda V. \lambda \vec{e} : \exists \vec{e}'. \tau(\vec{e}') < \tau(\vec{e}) \wedge V(\vec{e}'). V(\vec{e}) = 1 & \text{again} & \lambda s. \text{open}(s, \mathbf{d}) \\
 & \swarrow \quad \searrow & \\
 \text{the door}_{\theta_{\text{theme}}} & \text{be} & \text{open}
 \end{array}
 \end{array}$$

With *again* as the sister of the entire phrase, above CoS, we get the repetitive reading.



Agentive *stop*, with the meaning ‘getting rid of the habit of smoking,’ seems to not have the restitutive reading, as can be shown in the available readings and felicity contrasts in (68) and (69).

- (68) John stopped smoking again.
- a. $\rightsquigarrow$ John stopped smoking before. **repetitive**
 - b. $\nrightarrow$ John started as a non-smoker, smoked, and then returned to non-smoking. **restitutive**
- (69) a. *John smoked during college. He stopped smoking when he graduated. He resumed smoking when he was 50.*
✓He stopped smoking again at 60.
b. *Prior to attending college, John never smoked. He smoked during college.*
✗When he graduated, he stopped smoking again.

However, it could be the case that is limited to the very use of *stop smoking* meaning *get rid of the habit of smoking*. Imagine if *stop smoking* merely means ‘terminate a smoking event’.

- (70) John stopped smoking again.
- a. $\rightsquigarrow$ John stopped smoking before. **repetitive**
 - b. $\rightsquigarrow$ John was not smoking, then he smoked, and then he stopped smoking. **restitutive**

The two readings can be made sharper when a full context is provided.

- (71) *At the beginning of the water break, John was not smoking. Then he lit a cigarette and smoked. Five minutes later, he stopped smoking. Another three minutes passed, he lit another cigarette and smoked.*
✓At the end of the break, he stopped smoking again.
- (72) *At the beginning of the water break, John was not smoking. Then he lit a cigarette and smoked.*
✓Five minutes later, he stopped smoking again.

Projection tests from under *exactly* show the *herself*-pattern.

- (73) The event is starting. By now, exactly one of the three students has stopped smoking.
- a. $\rightsquigarrow$ Previously, all were smoking, and now one has stopped.
 - b. $? \rightsquigarrow$ Now, one has stopped smoking, and everyone else is smoking, and it doesn’t matter whether they were smoking before.
 - c. $\nrightarrow$ Now, one has stopped smoking, and the others either never smoked or are still smoking.

Truth-value judgments

- (74) Context: *The smoke-free event is starting.*

Target sentence: By now, exactly one of the three students has stopped smoking.

- a. Previously, all were smoking, and now John has stopped smoking. **true**
- b. Previously, John was smoking, and Bill and Mary were not smoking. Now, John has stopped smoking, and Bill and Mary just started to smoke. **borderline true**
- c. Previously, John was smoking, and Bill and Mary weren't smoking. Now, John has stopped smoking, and Bill and Mary still aren't smoking. **borderline false**

(74b) can be seen in the following conversation:

(75) Same scenario as in (74c)

A: By now, exactly one of the three students has stopped smoking.

B: ?That's wrong. I see two students not smoking.

B: That's misleading. I see two students not smoking.

Polar question test:

(76) *A believes John always smokes whenever he has a chance. But a smoke-free event is about to start.*

A: By now, has John stopped smoking?

B: Yes, although he has never smoked here.

I conjecture that this use of *stop*, where it simply describes a change-of-state that has nothing to do with getting rid of a habit, is also non-agentive, even when the subject is in principle capable of being an agent. It is merely interested in the state that the subject is in, and does not ascribe agentivity to the subject. Looking back at the *machine* examples, we see that the negative state is accessible by *again*, if *stop* is clearly non-agentive, i.e., when the subject is incapable of being an agent:

(77) The machine stopped working again.

a. ↗ The machine stopped working before.

repetitive

b. ↗ The machine was built defective, was fixed and started to work for a while, and then broke again. **restitutive**

Again, given more detailed contexts, the readings are made clearer:

(78) *The machine worked as soon as it was built. After three months, it broke and stopped working. The technician fixed it and it worked for another three months.*

✓Then it stopped working again.

(79) *The machine was built defective. The technician fixed and it worked for three months.*

✓Then it stopped working again.

Projection tests show the same, at least according to my judgment:

(80) Exactly one of the three machines has stopped working.

a. ↗ The rest of the machines work and have always worked.

b. ?↗ The rest of the machines work and it doesn't matter whether they have worked in the past.

c. ↗ The rest of the machines either have always worked or have never worked.

- (81) Target sentence: Exactly one of the machines has stopped working.
- a. Previously, all the machines worked. Now, machine 1 alone doesn't work. **true**
 - b. Previously, machine 1 worked, machine 2 and 3 didn't work. Now, machine 1 doesn't work, but machines 2 and 3 work. **borderline true**
 - c. Previously, machine 1 worked, machine 2 didn't work, and machine 3 worked. Now, machine 1 doesn't work, machine 2 still doesn't work, and machine 3 still works. **borderline false**
- (82) Same context as (81c)
- A: By now, exactly one of the three machines has stopped working.
 B: ?That's wrong. I see two machines not working.
 B: That's misleading. I see two machines not working.

Polar questions:

- (83) A: Has the machine stopped working?
 B: Yes, although it has never worked.
 B': ?No, because it has never worked. (OK only if *stop* is stressed)
- (84) A: At 2pm, did the machine stop working?
 B: #Yes, although it never worked.
 B': No, because it never worked.

So, projection tests do correlate with *again* tests and agentivity: if *stop* is agentive (on its habitual reading), the negative state can be targeted by *again*, and the behavior of *stop* is of the deletable pattern; if *stop* is non-agentive, the negative state cannot be targeted by *again*, and the behavior of *stop* is of the non-deletable pattern.⁷

	stop (habitual)	stop (change-of-state)
(85) non-agentivity	✗	✓
deletable projection in PRS PRF	✗	✓
restitutive <i>again</i>	✗	✓

It cannot be just a difference about whether there is an additional $\text{agent}(e) = j$ conjunct in the event predicate, as section 7 conjectured at the end. Rather, *stop* is structurally ambiguous; if there is $\text{agent}(e) = j$, then NCoS is used instead of CoS.

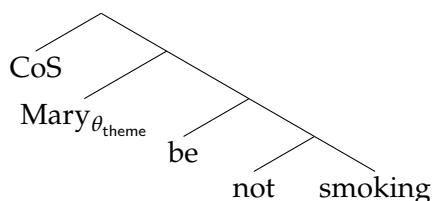
$$(86) \quad {}^u\llbracket \text{CoS} \rrbracket^i = \lambda V. \lambda e. \lambda s : \exists s'. \tau(s') < \tau(s) \wedge \text{Neg}(V)(s') = 1. \text{cause}(e, s) = V(s) = 1$$

$$(87) \quad {}^u\llbracket \text{NCoS} \rrbracket^i = \lambda V. \lambda e. \lambda s : \exists s'. \tau(s') < \tau(s) \wedge V(s'). \text{cause}(e, s) \wedge \text{Neg}(V)(s)$$

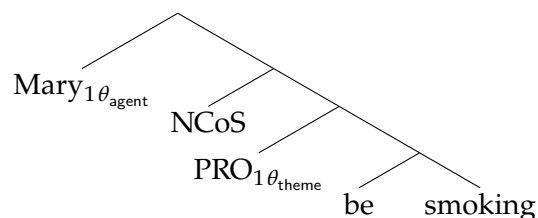
⁷Here is another case of non-agentive use of *stop*, but with a sentient subject:

- (i) Mary stopped having menstrual cramps again.
 - a. $\rightsquigarrow$ Mary stopped having cramps before.
 - b. $\rightsquigarrow$ Mary started with no cramps, then had cramps, and now doesn't have cramps.
- (ii) When Mary started her periods, she had menstrual cramps. After three years, she stopped having them. But the cramps came back a year later.
 ✓Another three years passed, she stopped having menstrual cramps again.
- (iii) When Mary started her periods, she didn't have menstrual cramps. However, after three years, she started to have them.
 ✓Fortunately, a year later, she stopped having cramps again.

(88) Non-agentive, change-of-state *stop*



(89) Agentive, habitual *stop*



8 Removability/Independence Hypothesis and *return*

The framework in Doron, Fox & Wehbe (2025) is anticipated by a proposal raised and then rejected in Zehr & Schwarz (2018):

- (90) The Removability/Independence Hypothesis (RIH)
 Presuppositions are NOT entailed if and only iff
 removing triggering material yields (non-strictly) weaker interpretation of sentences.

This is illustrated with the examples of *again* and *stop*:

- (91) a. Did Aki's PC just crash again?
 (i) Presupposed: Aki's PC crashed before.
 (ii) Questioned content: Aki's PC just crashed.
 b. Did Aki's PC just crash ~~again~~?
 (i) ~~Presupposed: Aki's PC crashed before.~~
 (ii) Questioned content: Aki's PC just crashed.

However, the hope for an explanatory account of the split is quickly dashed when their experiments show that *return* triggers a non-entailed presupposition, even though *return* does not seem to be removable. The experimental data suggests that a sentence involving *return* should have the following status:

- (92) Did Dominique ~~return~~(=go back to) the shop?
 a. ~~Presupposed: Dominique previously went to the shop~~
 b. Questioned content: Dominique went to the shop.

Yet the problem is that *return* is **not** at surface *go back*, and if *return* as a whole is the presupposition trigger, then the only possibility to delete the presupposition is to delete *return* altogether, but that should result in ill-formedness, i.e., the missing of the main predicate.

- (93) *Did Dominique ~~return~~ to the shop?

(93) is exactly the situation prescribed for entailed presuppositions, like those triggered by *stop*:

- (94) *Did Aki's PC ~~stop~~ crashing?
 a. ~~Presupposed: Aki's PC crashed before~~
 b. Questioned content: ?? Aki's PC ~~does not~~ crash ~~now~~.

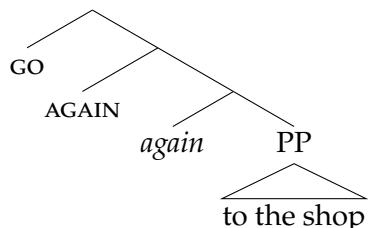
Deleting *stop* is impossible as it is the main predicate of the sentence, and according to the RIH, the presupposition is correctly predicted to be entailed.

But then the discussion up to this point raises a salient question: what if *return* is indeed *go back*, i.e., it can be decomposed into a trigger like *again* or *back* plus a plain main meaning like *go to*? I will again use the adverb *again* to show that *return* can indeed be decomposed into *again* and *go*.

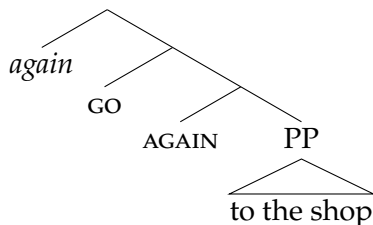
8.1 Diagnosis with *again*, again

If *return* is underlying *GO* plus *AGAIN*, then we should expect that overt *again* should also have two different attachment sites, producing two different readings.

(95)



(96)



In particular, (95) is restitutive, while (96) is repetitive. I do think *return again* can have these readings. Consider:

(97) Context: *John was born in Boston. He left Boston when he was five.*

When he was ten, John returned to Boston again

restitutive

(98) Context: *John was born in Boston. He left Boston when he was five. He returned to Boston when he was eight.*

When he was ten, John returned to Boston again.

repetitive

In particular, in (97), what happened again is not *returning to Boston*; rather, it is *being in Boston*.

Iterated *again* There are two instances of *again* in (95), but I claimed that it corresponds to the ordinary restitutive reading, and just one prior state satisfying the PP is sufficient. This claim requires some justification.

First, we see that assuming a simple trivalent semantics for *again*, the resulting denotation event predicate V' of applying *again* to an event predicate V twice in a row actually presupposes for an event $e \in V'$ that there are two events e', e'' such that e'' precedes e' and e' precedes e and both e' and e'' satisfy V .

I assume the following semantics for *again*. It is a trivalent function from event predicates to event predicates.

$$(99) \quad \llbracket \text{again} \rrbracket(V) = \lambda e. \begin{cases} 1 & \begin{bmatrix} \exists e'. \tau(e') < \tau(e) \wedge V(e') = 1 \\ V(e) = 1 \end{bmatrix} \\ 0 & \begin{bmatrix} \exists e'. \tau(e') < \tau(e) \wedge V(e') = 1 \\ V(e) = 0 \end{bmatrix} \\ \# & \text{otherwise} \end{cases}$$

Then, we can derive the semantics of the iterated *again* seen in (95).

(100)

$$\begin{aligned} \llbracket \text{again} \rrbracket(\llbracket \text{again} \rrbracket(V)) &= \lambda e. \begin{cases} 1 & \begin{bmatrix} \exists e'. \tau(e') < \tau(e) \wedge \llbracket \text{again} \rrbracket(V)(e') = 1 \\ \llbracket \text{again} \rrbracket(V)(e) = 1 \end{bmatrix} \\ 0 & \begin{bmatrix} \exists e'. \tau(e') < \tau(e) \wedge \llbracket \text{again} \rrbracket(V)(e') = 1 \\ \llbracket \text{again} \rrbracket(V)(e) = 0 \end{bmatrix} \\ \# & \text{otherwise} \end{cases} \\ &= \lambda e. \begin{cases} 1 & \begin{bmatrix} \begin{bmatrix} \exists e'. \tau(e') < \tau(e) \wedge V(e') = 1 \\ V(e) = 1 \end{bmatrix} \\ \exists e'. \tau(e') < \tau(e) \wedge \begin{bmatrix} \exists e''. \tau(e'') < \tau(e') \wedge V(e'') = 1 \\ V(e') = 1 \end{bmatrix} \end{bmatrix} \\ 0 & \begin{bmatrix} \begin{bmatrix} \exists e'. \tau(e') < \tau(e) \wedge V(e') = 1 \\ V(e) = 0 \end{bmatrix} \\ \exists e'. \tau(e') < \tau(e) \wedge \begin{bmatrix} \exists e''. \tau(e'') < \tau(e') \wedge V(e'') = 1 \\ V(e') = 1 \end{bmatrix} \end{bmatrix} \\ \# & \text{otherwise} \end{cases} \\ &= \lambda e. \begin{cases} 1 & \begin{bmatrix} \exists e' e''. \tau(e'') < \tau(e') < \tau(e) \wedge V(e') = V(e'') = 1 \\ V(e) = 1 \end{bmatrix} \\ 0 & \begin{bmatrix} \exists e' e''. \tau(e'') < \tau(e') < \tau(e) \wedge V(e') = V(e'') = 1 \\ V(e) = 0 \end{bmatrix} \\ \# & \text{otherwise} \end{cases} \\ &= \lambda e. \left\langle \begin{array}{l} \text{Prs} \quad \exists e' e''. \tau(e'') < \tau(e') < \tau(e) \wedge V(e') \wedge V(e'') \\ \text{Asr} \quad V(e) \end{array} \right\rangle \end{aligned}$$

This does not intuitively correspond to the restitutive reading. However, we should notice that there is a restriction on V in our case. The restitutive reading of *again* is derived when *again* is attached to the stative portion of the event. If V is stative, then by SUBINTERVAL, if there is one prior state s satisfying V , then it is also possible to identify sub-states s' and s'' of s such that $\tau(s'') < \tau(s')$ satisfying V .

$$(101) \quad \llbracket \text{again} \rrbracket(\llbracket \text{again} \rrbracket(V_{\langle e_s, t \rangle})) = \lambda s. \begin{cases} 1 & \begin{bmatrix} \exists s'. \tau(s') < \tau(s) \wedge V(s') = 1 \\ V(s) = 1 \end{bmatrix} \\ 0 & \begin{bmatrix} \exists s'. \tau(s') < \tau(s) \wedge V(s') = 1 \\ V(s) = 0 \end{bmatrix} \\ \# & \text{otherwise} \end{cases}$$

This means that iterated *again* is equivalent to a single instance of *again* when applied to statives. Thus, there is reason to believe that *return* is in fact decomposable into *re-* meaning ‘again,’ and

go, and so *re-* is the deletable trigger responsible for the polar question and projection behavior of *return*.

Preventing trivialization The strategy above is a double-edged sword. It predicts that the presupposition of *again* can be trivially satisfied with statives, regardless of aspect.

$$(102) \quad \exists s. \tau(s) \supset i \wedge V(s) \iff \exists s, s'. \tau(s') < \tau(s) \wedge \tau(s) \supset i \wedge V(s) \wedge V(s')$$

For simple imperfective uses, a competition story can be told. *Again* competes with *still*, which specifies that the state in question has held continuously.

$$(103) \quad \llbracket \text{still} \rrbracket(V) = \lambda e. \begin{cases} 1 & \begin{bmatrix} \exists e'. \tau(e') \text{ abuts } \tau(e) \wedge V(e') = 1 \\ V(e) = 1 \end{bmatrix} \\ 0 & \begin{bmatrix} \exists e'. \tau(e') \text{ abuts } \tau(e) \wedge V(e') = 1 \\ V(e) = 0 \end{bmatrix} \\ \# & \text{otherwise} \end{cases}$$

If *again* is used instead of *still*, that can implicate that the truth condition for *still* isn't met. The effect is the primary state must be the maximal one, and the prior state must be discontinuous from it.

For change-of-state restitutive reading cases, competition with *still* cannot apply because *still* does not have a restitutive reading that can compete; the sentences with *still* are outright unacceptable.

(104) *John returned to Boston still.

(104) can only work if *still* is used concessively.

The hope is for the change-of-state element to introduce an upper bound for the relevant state, and then the prior state must precede the change-of-state event, and this means that the prior state must be a separate state from the resulting state.

Recall:

$$(105) \quad {}^u\llbracket \text{CoS} \rrbracket^i := \lambda V. \lambda e. \lambda s. \begin{cases} 1 & \begin{bmatrix} \exists s'. \tau(s') < \tau(s) \wedge \text{Neg}(V)(s') = 1 \\ \text{cause}(e, s) = V(s) = 1 \end{bmatrix} \\ 0 & \begin{bmatrix} \exists s'. \tau(s') < \tau(s) \wedge \text{Neg}(V)(s') = 1 \\ \text{cause}(e, s) = 0 \vee V(s) = 0 \end{bmatrix} \\ \# & \text{otherwise} \end{cases}$$

However, because there is no requirement that the change-of-state event *e* abuts the resulting state *s*, (*s* could be a sub-state of the maximal resulting state that abuts *e*), along with SUBINTERVAL, *again*'s presupposition is trivially satisfied even with CoS merged.

But if we require that CoS ensures *e* abuts *s*, then the Strawson-equivalence in present Perfect breaks down, because if *i* $\nsubseteq$ $\tau(s)$ and $\tau(e)$ abuts $\tau(s)$, then it is entailed that $\tau(e)$ overlaps with *i*. In this case, if the last maximal prior negative state *s'* ends before *i* starts, the runtime of the change-of-state event guaranteed by PSR might not overlap with *i*.

But Strawson-equivalence might show up at the next level with this strengthened CoS.

$$(106) \quad {}^u\llbracket \text{CoS} \rrbracket^i := \lambda V. \lambda e. \lambda s. \begin{cases} 1 & \left[\begin{array}{l} \exists s'. \tau(s') < \tau(s) \wedge \text{Neg}(V)(s') = 1 \\ \tau(e) \text{ abuts } \tau(s) \wedge \text{cause}(e, s) = V(s) = 1 \end{array} \right] \\ 0 & \left[\begin{array}{l} \exists s'. \tau(s') < \tau(s) \wedge \text{Neg}(V)(s') = 1 \\ \neg \tau(e) \text{ abuts } \tau(s) \vee \text{cause}(e, s) = 0 \vee V(s) = 0 \end{array} \right] \\ \# & \text{otherwise} \end{cases}$$

$$(107) \quad {}^u\llbracket \text{PRF AspP}_2 \rrbracket^i = \begin{cases} 1 & \exists i'. \exists e. \exists s. \text{PTS}(i, i') \wedge i' \not\sqsubseteq \tau(s) \wedge \left[\begin{array}{l} \exists s'. \tau(s') < \tau(s) \wedge \overline{\text{party}(s', \mathbf{m})} = 1 \\ \text{cause}(e, s) = \text{party}(s, \mathbf{m}) = 1 \end{array} \right] \\ 0 & \forall i'. \forall e. \forall s. \text{PTS}(i, i') \rightarrow i' \not\sqsubseteq \tau(s) \rightarrow \left[\begin{array}{l} \exists s'. \tau(s') < \tau(s) \wedge \overline{\text{party}(s', \mathbf{m})} = 1 \\ \text{cause}(e, s) = 0 \vee \text{party}(s, \mathbf{m}) = 0 \end{array} \right] \\ \# & \text{otherwise} \end{cases}$$

Regardless of when the maximal last prior state s' is, there is always a way to find a final subinterval i' of i so that i' overlaps with s' , rendering the change-of-state event e overlapping with i' .

Helpful for us is the fact that with the resultative Perfect, there is no way to set the left boundary of the PTS with *since*:

(108) #John has arrived at the party since 2pm.

This means that it is likely that the PTS can be stretched arbitrarily to the past.⁸

But this trick works with the past tense as well, as long as past tense is also quantificational. But there are prominent pronominal approaches to tense, e.g., [Abusch \(1997\)](#).

(109) ${}^u\llbracket \text{PST}_j \rrbracket^{g,i}$ is defined only if $g(j) < i$, in which case ${}^u\llbracket \text{PST}_j \rrbracket^{g,i} = g(j)$.

This removes the flexibility on i in the simple past.

9 Conclusion and outlook

The framework in [Doron, Fox & Wehbe \(2025\)](#) and lexical decomposition furnish an approach to the alternation in presupposition and assertion of change-of-state verbs in different aspects. *Stop* might be structurally ambiguous between an agentive use with non-deletable projection, and a non-agentive use with deletable projection. It might not be the poster child for entailed presuppositions and weak presupposition triggers that we want it to be.

⁸There are a few constructions where *since* is compatible with the present Perfect of *arrive*.

- (i) Since 2pm, John_{FEM} has arrived at the party.
- (ii) Since 2pm, exactly three students have arrived at the party.
- (iii) Exactly three students have arrived at the party since 2pm.

The questions are: 1) are these resultative or experiential? 2) what is the projection pattern?

I feel the result entailment is much weaker than without *since 2pm*.

- (iv) A: Since 2pm, has John arrived at the party?
- B: Yes, although he has always been at the party.

(iva) sounds odd to me. And even if (iva) is accepted, (ivb) sounds in appropriate.

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