Restitutive *again* without lexical decomposition

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A well known puzzle: restitutive *again*

The word *again* (as well as its counterparts in other languages, e.g. German *wieder*) gives rise to a well-known ambiguity between repetitive and restitutive readings (Dowty 1979, von Stechow 1995, 1996, Fabricius-Hansen 2001, Beck & Johnson 2004, Beck 2005 a.m.o.)

(1) John opened the door again.
   a. John had previously opened the door. (repetitive)
   b. The door had previously been open. (restitutive)

(2) a. The temperature rose and then it fell again.
   b. The car broke down, but then I fixed it again.
   c. His health deteriorated but then it improved again.

The ambiguity is governed by the position of *again/wieder*: a left-adjoined (=unambiguously high) adverb only has the repetitive reading (von Stechow 1995, 1996, Beck 2005):

(3) a. John again opened the door. [only repetitive]
   b. weil Ottilie die Tür wieder öffnete.
      because O. the door again opened [repetitive/restitutive]
   c. weil Ottilie wieder die Tür öffnete.
      because O. again the door opened [only repetitive]

- This has been taken, especially by von Stechow 1995, 1996, as evidence that change-of-state verbs can be syntactically decomposed into an eventive component and a stative component (5) (see also e.g. Ramchand & Svenonius 2002, Ramchand 2008)
- *again* has a univocal semantics, (4) (contra Fabricius-Hansen 2001); the ambiguity depends on where *again* takes scope

(4) $[\![\text{again}]\!] = \lambda P_{\langle i,t\rangle}.\lambda i.P(i)$ (*i* eventualities)
iff $\exists i'.P(i')$ and i' temporally precedes i; otherwise undefined.

(5) John opened the door again.
   a. John [CAUSE [[the door open] again]] (restitutive)
   b. John [[CAUSE [the door open]] again] (repetitive)

(6) weil Ottilie wieder die Tür öffnete.
Ottilie [wieder [CAUSE [[the door] open]]] (only repetitive, von Stechow 1996)

Should all target state verbs be decomposed?

- The above structural theory of *again*-modification is plausible for cases where the result state is visible in the syntax (e.g. *paint the door red again, walk to town again* (Beck 2005))
- And lexical decomposition is plausible for verbs that are transparently built from stative components:

(7) the door is open – the door opened – John opened the door

- However, the examples in (2) suggest that restitutive *again* is compatible with some verbs which do not transparently decompose in the syntax in this way.
- The *again* facts have been taken as evidence (by e.g. von Stechow 1996) that such verbs nevertheless do decompose in the syntax, e.g.:

(8) a. *fix the car again* ≈ [CAUSE [[NOT-BROKEN the car] again]]
   b. *the temperature fall again* ≈ [BECOME [[LOWER the temperature] again]]

Aim of this poster: to show that a univocal semantics for *again* can capture the scope-ambiguity without syntactically decomposing (all) verbs in the above way.

Encoding target states in the semantics

Kratzer 2000 notes that (target) state passives of eventive verbs always have event implications (*the car is fixed* means there was a fixing event, not just that it is working).

- Suppose, following (but adapting) Kratzer 2000, that (the roots of) such verbs introduce a target state argument as well as their event argument:

(9) a. $[\![\sqrt{\text{fix}}]\!] = \lambda x.\lambda e.\lambda s.\text{event}(e)$ & $R(x)(s)$
where if x is a vase, R = 'intact'; if x is a car, R = 'working', ...
   b. $[\![\sqrt{\text{fix}}\ [\text{the car}]]\!] = \lambda e.\lambda s.\text{event}(e)$ & $\text{working}(\text{car})(s)$

- I depart from Kratzer in proposing that such roots do not encode a causal relation between the event and target state
- Rather, this is done by verbalizers (10a) or stativizers (10b), which (as in Kratzer 2000) also existentially bind either the state or event argument:

(10) a. $[\![v]\!] = \lambda P_{\langle v,st\rangle}.\lambda e.\exists s.P(e)(s)$ & $\text{cause}(e)(s)$ (v, s sorts of type i)
   b. $[\![\text{-en}_a]\!] = \lambda P_{\langle v,st\rangle}.\lambda s.\exists e.P(e)(s)$ & $\text{cause}(e)(s)$

(11) a. $[\![v\ [\sqrt{\text{fix}}\ \text{the car}]]\!] = \lambda e.\exists s.\text{event}(e)$ & $\text{working}(\text{car})(s)$ & $\text{cause}(e)(s)$
   b. $[\![\text{-en}_a\ [\sqrt{\text{fix}}\ \text{the car}]]\!] = \lambda s.\exists e.\text{event}(e)$ & $\text{working}(\text{car})(s)$ & $\text{cause}(e)(s)$
   (i.e. *the car is fixed* = there was an event that (directly) caused the current working state of the car)

Again via Function Composition

Given these denotations, *again* will work as before if it is merged above the categorizing heads, giving the repetitive reading:

(12) $[\![[v\ [\sqrt{\text{fix}}\ \text{the car}]]\ \text{again}]\!] = \lambda e.\exists s.\text{event}(e)$ & $\text{working}(\text{car})(s)$ & $\text{cause}(e)(s)$
iff $\exists e'.\exists s'.\text{event}(e')$ & $\text{working}(\text{car})(s')$ & $\text{cause}(e')(s')$ & e' temporally precedes e

If, however, *again* is allowed to merge below the functional head – i.e. with (9b) – it can semantically combine via Function Composition (13), (14) (see Kratzer 2000, Keine & Bhatt 2016 and refs therein on FC at the lexical level):

(13) **Function Composition**
If F is of type $\langle\sigma,\tau\rangle$ and G is of type $\langle\tau,\rho\rangle$, then $F \circ G = \lambda x_\sigma.G(F(x))$.

(14) $[\![\text{fix the car}]\!]_{\langle v,st\rangle} \circ [\![\text{again}]\!]_{\langle it,it\rangle} = \lambda e.[\![\text{again}]\!]([\![\text{fix the car}]\!](e))$
$= \lambda e.[\![\text{again}]\!](\lambda s.\text{event}(e)$ & $\text{working}(\text{car})(s))$
$= \lambda e.\lambda s.\text{event}(e)$ & $\text{working}(\text{car})(s)$,
iff $\exists s'.\text{event}(e)$ & $\text{working}(\text{car})(s')$ & s' temporally precedes s.

- (14) captures the restitutive reading. It presupposes that the car was previously working – but not that there was a previous event of causing the car to be working.
- The only presupposition about events in (14) is the harmless one that e (the event in the main assertion) is an event.

The above analysis therefore:
- retains a univocal semantics for *again*
- captures the structural ambiguity: lower merge allows the restitutive reading
- but without requiring lexical decomposition in the syntax.

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Extension to *fall*

(15) The temperature rose and then it fell again.
(= it fell to some degree d, and it had previously been at d)

von Stechow 1996's analysis of (15) entails a structure (16a), where the stative component has the denotation (16b) (p. 125, slightly adapted)

(16) a. [BECOME [LOWER the temperature]]
   b. $\lambda s.\text{MORE}(\lambda d.\text{low}(d)(\text{temp})(s), \lambda d.\text{low}(d)(\text{temp})(\text{beg}(e)))$
   i.e. a predicate of states s where the degree of lowness of the temperature at s is greater than at the beginning of e

But: in von Stechow's formula in (16b), the event variable e is introduced free; some account would have to be given of how it is bound (i.e. how it becomes identified with the event of the temperature becoming lower).

- A denotation for *fall* without lexical decomposition (17), i.e. which introduces an event argument from the start, can encode easily the correct meaning for *fall*
- And such a denotation can undergo function composition with *again* to deliver the restitutive reading (18)

(17) $[\![\sqrt{\text{fall}}]\!] = \lambda x.\lambda e.\lambda s.\text{event}(e)$ &
$\text{MORE}(\lambda d.\text{low}(d)(x)(s), \lambda d.\text{low}(d)(x)(\text{beg}(e)))$

(18) $[\![\sqrt{\text{fall}}\ \text{the temperature}]\!] \circ [\![\text{again}]\!] =$
$\lambda e.\lambda s.\text{event}(e)$ & $\text{MORE}(\lambda d.\text{low}(d)(\text{temp})(s), \lambda d.\text{low}(d)(\text{temp})(\text{beg}(e)))$
iff $\exists s'.\text{event}(e)$ & $\text{MORE}(\lambda d.\text{low}(d)(\text{temp})(s'), \lambda d.\text{low}(d)(\text{temp})(\text{beg}(e)))$
i.e. presupposes that there was previously a state in which the temperature was below the temperature at the beginning of the event *in the main assertion*

D-adverbs and the Visibility Parameter?

Rapp & von Stechow 1999 note that only certain adverbs ('D(ecomposition)-adverbs') can 'look into' verbs and modify their result states; e.g. *once more*, and German *erneut*, only allow repetitive readings, not restitutive readings:

(19) #The temperature rose, and then it fell once more.

Within the decompositional framework, Rapp & von Stechow propose the Visibility Parameter for adverbs, elaborated by Beck 2005:

(20) It is a lexical property of any particular adverb whether it can attach to a phrase without a phonologically expressed head.
e.g. *again/wieder* can but *once more/erneut* cannot.

However, the current proposal suggests a different possible parameterization:

- 'D-adverbs' are those which can combine (via Function Composition) with bare roots (plus perhaps their arguments), as in (9b)
- Non-D-adverbs are those which must combine with a syntactically categorized phrase, as in (11a).

This is clearly reminiscent of Pylkkänen 2008's proposal that some argument-introducing heads select roots, while others select categorized verbs (or phases): further comparison of these approaches is left as a project for future work.

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