

The lexical aspect and argument structure of atemporal uses of change-of-state verbs

It is well known that change-of-state verbs have dynamic readings which are atemporal in nature (Sweetser 1997; Gawron 2009; Koontz-Garboden 2010; Deo et al 2013). (1a) describes change over time, but (1b) describes a change across space.

- (1) a. The sky darkened between 8pm and 9pm last night.
b. Kim's skin darkens between his calf and his knee.

Some work argues (1) both entail the same notion of change measured along a scale. The difference is the interval ("axis") it happens over: time in (1a) but space in (1b), with the knock-off effect that change over a non-temporal axis is inherently stative and not eventive, e.g. it disallows progressive aspect, unlike temporal change (Gawron 2009):

- (2) a. The sky was darkening between 8pm and 9pm last night.
b. #Kim's skin is darkening between his calf and his knee.

While this line of thinking is promising, there are many open questions about whether the full set of properties that hold of temporal uses of these verbs extend to their atemporal uses, including the range of types of change, lexical aspectual properties, and diathesis alternations. We offer preliminary observations on these issues, which tentatively support both types of change being underlyingly the same, modulo the axis along which change is measured.

Atemporal change and eventuality types Temporal change exists for a range of scale types, including change in position, existence, and an array of properties (see e.g. Beavers 2011). Yet Koontz-Garboden (2010) and Beavers and Koontz-Garboden (2020) show that not all changes derive atemporal uses. Consider atemporal *cook*, which is impossible even in plausible contexts:

- (3) [A side of beef is cooked to different degrees along its length.]
The side of beef cooks between the rib and the joint.

This suggests a distinction in temporal and atemporal change. However, Koontz-Garboden (2010:299) and Beavers & Koontz-Garboden (2020:71) argue that such effects are lexicalized: the same verbs also impose various other conditions on their changes (e.g. whether it is caused, its mereologically complex, any endpoints on the scale, etc.). This supports a view wherein temporal and atemporal change are underlyingly identical, save the axis of measurement.

Aspectual properties A well-known property of at least some temporal change verbs is incrementality, i.e. the event progresses step-by-step, as the patient changes in degrees on the scale, in ways that determine durativity and telicity (Tenny 1994, Dowty 1991, Krifka 1998, Beavers 2012, *inter alia*). Indeed, Gawron (2009) argued that telicity patterns similarly for temporal and atemporal change (which we expand on the talk with more comparisons rooted in Beavers 2012). However, atemporal change shows some properties inconsistent with incrementality:

- (4) a. The rock fell 500 feet down the mountain. (temporal)
b. The mountain fell 500 feet at the 40th parallel. (spatial)

Temporal *fall* requires the patient to be at all such n between its initial location x and its final location $x - 500\text{ft}$ at some point on the temporal axis. But (4b) can be instantaneous: on one side of the 40th parallel the mountain had height x and due to a sheer cliff on the other side is $x - 500\text{ft}$. At no point in between did it hold any height n for $x > n > x - 500\text{ft}$. By contrast, temperature verbs do not allow this: in spatial *The desert cools 15° at the 40th parallel* each temperature between the initial and final ones will be attested at some spatial point.

We suggest the differences are rooted not in a difference in temporal or atemporal change but of the pragmatics of scalar (re)conceptualization: in context gradable scales may be treated as non-gradable by collapsing or ignoring degrees (e.g. *stomp the tulips flat* can have durative or punctual readings depending on how fast the action is; Beavers 2008, 2012; see also Gyarmathy 2014, 2015 on gradable readings of non-gradable scales). Other pragmatic factors may preclude such reconceptualization: thermodynamically, temperatures cannot show sharp boundaries in

time or space, but heights across space can, and in relatively fantastical contexts even across time (e.g. *The rock moved 500ft. in an instant* is possible with no intervening locations in a sci-fi teleporter context). Thus we suggest the distinctions above are orthogonal to nature of change, and hinge solely on how scales of change are conceived of in distinct contexts.

Diathesis alternations Verbs fall into semantic classes according to the alternations they participate in (Levin 1993). For example, change-of-state verbs (with some well-defined exceptions; Koontz-Garboden 2009) show the causative alternation (5a), while contact verbs do not (5b):

- (5) a. The blue paint darkened the room./The room darkened (when the lights were dimmed).
b. Kim touched the table./*The table touched.

Sweetser (1997: 132) observed that spatial readings of such verbs lack causative variants:

- (6) # He deepened the wells as you go up the road. (Sweetser 1997:132)

We might think this is due to a tendency for (lexical) causatives to be eventive, though stative causatives have been entertained before (see Van Valin and LaPolla 1997: 402-403 and Pylkkänen 1999: 142-143), albeit not with canonical change-of-state verbs (see also Maienborn and Herdtfelder 2017 on German *von* PPs and stative causation more broadly). However, we believe the confound in (6) is due to the human subject. It is not clear pragmatically how, other than doing something, a human can cause a certain spatial state. But this would require an event for what is otherwise a stative predicate. However, it's possible that certain immutable environmental factors can conspire to ensure a certain spatial change, wherein causality could be attributed to those factors. Such scenarios naturally lend themselves to description via causative uses of atemporal change of state verbs:

- (7) [A canyon narrows to the south because of a rock formation that lines both walls]
The rock formation narrows the canyon on the south end.

Other spatial change verbs also admit causatives uses, when broader contextual factors conspire to ensure a given spatial configuration:

- (8) a. 1980s style lengthens the dress in the back.
b. Kim's medical condition darkens her skin between the calf and the knee.

The conclusion is thus that while some factors about the nature of causation with certain causers make causatives uses harder to get on atemporal change interpretations, they *are* possible, meaning there is no categorical distinction between temporal and atemporal change.

Similar conclusions hold of other diathesis alternations. For example, the conative is not possible with temporal change but with atemporal change:

- (9) a. John slashed his tires. c. Geographical features narrow the canyon.
b. John slashed at his tires. d. #Geographical features narrow at the canyon.

However, there is a subject-manner condition that is part of the meaning of the conative (e.g. *John/#The car hit at the wall* requires agentivity; Guerssel et al. 1985; Beavers 2013) that would be incompatible with the stativity of atemporal change. Thus the lack of a conative is due to independent properties of the verb's meaning, not a difference between temporal and atemporal change *per se* (and we show the same holds for locative and *swarm* alternations). Conversely, alternations that have no clashes, such as possessor ascension, are possible (as are resultatives):

- (10) a. Current style lengthens the dress at the back.
b. Current style lengthens the dress's back.

In sum, atemporal change uses show the same alternations as temporal change uses, unless ruled out for independent reasons. The conclusion is that diathesis alternations are constrained in the same way in both temporal and atemporal uses, by verb meanings and meanings tied to each variant, without regard to the (a)temporal distinction as such.

Conclusion The aspectual and argument structure behavior of temporal uses of change of state verbs is mirrored in atemporal uses. This supports the idea that both changes can be reduced to the same notion, with the difference between the two being in the axis the change is over.