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Argument Realization and Aspect at the Boundaries of Affectedness
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1 Introduction

- My research is largely in the field of lexical semantics, and in that work there have been a few larger driving questions I've explored:

  - What are the basic building blocks of verb meaning — what units are they broken down into and how are those units put together to form more complex meanings? What conditions are there on putting such pieces together?
  - How are those chunks of verb meaning interpreted truth conditionally? What are the contexts in which a word can and can't be used?
  - How is a verb's meaning related to its grammatical properties? Does truth conditional content tell us everything about a verb's morphosyntax, or are there mediating levels of representation? And whwat other non-semantic factors matter?

- Quite a lot of my earliest work was about taking supposedly grammatically relevant aspects of verb meaning (say, thematic roles) and figuring out what their semantics is, with a goal of then seeing whether the supposed grammatical correlates of those notions tied together consistently with the semantics we needed to analyze them (Beavers 2006, 2010, 2011b).

- This is a bit of a fool's errand in some ways — intermediary notions like "agent" and "patient" are arguably purely linguistic constructs, placeholders for a real semantics (though see Rissman and Majid 2019). So does it even make sense to "analyze" them?

- Perhaps not, but in some "safe spaces" it makes sense. The one I spent most of my time on was the notion of being a patient or a theme, which is tied to an intuitively identifiable notion of **affectedness**, qua (the degree of) **change of state**.

- And notions of affectedness are indeed central to many phenomena that give us insight into lexical meaning, including lexical aspectual classes (e.g. Dowty 1979) and argument alternations (Fillmore 1970, Anderson 1971).

#1 Affectedness figures into telicity qua reaching a final result state (e.g. as per Dowty 1979, Hay et al. 1999, Kratzer 2004, Krifka 1998, Filip 2008, Beavers 2011b, Kardos 2012, 2016):

  (1)   a. Maxine hammered the metal flat in/?for two minutes.   (quantized change)
        b. The soup cooled for/in two minutes.   (nonquantized change)
        c. Maxine pet her cat for/??in two minutes.   (no change)

#2 Argument alternations like the conative are sensitive to affectedness (Beavers 2010):

  (2)   a. Sally wrote her thesis. $\Rightarrow$ Sally wrote on her thesis.(quantized $\Rightarrow$ nonquantized)
        b. Sally cut the tomato. $\Rightarrow$ Sally cut at the tomato.   (nonquantized $\Rightarrow$ no change)

∴ Thus affectedness, as rooted in change, has truth conditional and grammatical significance. So it's a great case study for the truth conditional link to grammatical behavior.

- Traditionally change was treated as sort of a binary (Dowty 1979): at the beginning of the event the patient has property $\neg\phi$ and at the end of the event it has property ϕ.

- Nowadays it is often treated as scalar: when patient x changes in event e it transitions in the degrees to whcih it holds some property ϕ along a scale s of degrees, in a way that measures the progress of e (Tenny 1994, Krifka 1998, Hay et al. 1999, Beavers 2008a, 2012, Kennedy and Levin 2008, Koontz-Garboden 2010, Rappaport Hovav 2014, *inter alia*).

- However, recent work has called into question whether scalar transition leads to a change:

  - Beavers and Koontz-Garboden (2017) showed that it's possible to have scalar change without a new state, owing to the possibility of scalar circularity (e.g. in motion).
  - Some work in nonculmination has posited sublexical modalities that bleed inferences of change (e.g. Bar-el et al. 2005, Tatevosov 2008, and Martin and Schäfer 2012, 2017, Beavers and Lee 2020; see also Dowty 1979 and Beavers 2011a).

- Given how much work on argument realization and aspect has relied on scalar change to final states, do we need to rethink the role of scalar change in these phenomena? Well, sorta:

  #1 Scalar circularity and sublexical modality are technically orthogonal to change, but do call for a revised notion of affectedness for the phenomena it has been implicated in.

  #2 The resulting theory of affectedness, like the original one, does actually figure into argument realization, as I'll show with data from English dispositional middles.

  #3 Aspectual properties like (a)telicity end up as a lot more diverse phenomena.

- I'll recap prior work on scalar change and affectedness, and then turn to confounding patterns and a revision to the notion that admits them. I'll then explore various middles that exemplify the linguistic significance of this revised theory, before musing a bit on telicity.

- A secondary goal is that a lot of work on middles has used the same constructed examples. We also wanted to look at corpus evidence to get a broader of look at what verbs show it.

2 Change, Incrementality, and Degrees of Affectedness
2.1 Scales of Change and Lexical Aspect

- Cruse (1973) identified patients as undergoing a *happening to*, plus we'd assume (Fillmore 1970, Kratzer 2004, Beavers 2011b) it'd be contradictory to deny that this change occured:

  (3) Sandy cleaned/moved/destroyed the vase.
      a. What happened to the vase is Sandy cleaned/moved/destroyed it.
      b. Sandy (just) cleaned/moved/destroyed the vase, #but it is no cleaner than before/not anywhere different/still perfectly in tact.

- Assuming scales, entailing x has a new degree d on s derives the change inference.

- Scales also come in qualitative types, e.g. property (e.g. *clean*, *fix*), location (path) (e.g. *push*, *move*), and existence (e.g. *eat, destroy*), and furthermore have mereological properties that determine aspect and argument realization. I'll review the aspectual factors first.

- **Telic** predicates name a final degree on s (Hay et al. 1999, Kennedy and Levin 2008):

  (4) A predicate P over events is telic iff for any event it describes it does not describe any non-final subevent of that event.   (per Beavers 2012: 35, (2.23))
      a. The can of paint flowed onto the floor in/?for two minutes.   (bounded s: **telic**)
      b. The can of paint flowed for/??in two minutes.   (nonbounded s: **atelic**)

- **Durativity** hinges on scalar complexity (Wechsler 2005, Beavers 2008a). Gradable scales favor durative readings and nongradable scales punctual readings (testable by whether a durational reading or just an *after* reading arises with *in an hour* modifiers; Kearns 2000):

  (5) A predicate P over events is durative iff every event it describes has at least three distinct subparts (a beginning, a middle, and an end)   (per Beavers 2012: 46-48)
      a. The hiker can cross the border in one day.   (*after* = nongradable s: **punctual**)
      b. The hiker can cross the desert in one day.   (*during* = gradable s: **durative**)

- An approach that captures telicity and durativity well is Krifka's (1998: 224, (68), 255, (71)) Movement Relation (MR), which treats scales as mereological objects (rather than a set of degrees) that are related homomorphically to events as mereological objects. Being "at" a place on the scale is tatamount to holding a degree on a Kennedy-style approach.

  (6) **Movement relation (MR):** e is MR-related to path p if each unique part of e is related to a unique part of p and temporal adjacency in e corresponds to spatial adjacency in p. Furthermore, for any events e, e' MR-related to paths x, y respectively where e precedes e' and y picks up where x stops, $e \oplus e'$ is MR-related to $x \oplus y$.

- (6) ensures that the more scale there is the more event there is (durativity), and that specified scalar endpoints derive specified event endpoints (telicity) (see Beavers 2012 for a summary).

- However, Beavers (2012) (building on Krifka 1998) shows that mereological properties of x *also* matter, e.g. a predicate is telic iff s has an upper bound *and* x has quantized reference:

  (7) Paint flowed onto the floor for/??in an hour.   (nonquantized x, bounded s: **atelic**)

- Relatedly, quantity of the theme matters for durativity:

  (8) The hikers can cross the border in one day.
                          (*during* = nonatomic x, nongradable s: **durative**)

- The effect is much like the analysis of Strict Incrementality Krifka introduced to handle classic effects of theme expression for consumption verbs like *drink*:

  (9) **Strictly Incremental Relation (SINC):** e is SINC-related to patient x such that every unique part of e corresponds to a unique part of x and vice versa.

- As above, the more patient there is the more event there is (durativity), and knowing the exact quantity of the patient means knowing the exact quantity of the event (telicity).

- But the SINC and MR do not take each other into account. So we need something that puts them together. Beavers (2012: 38, (2.26)) analyzes change as a ternary Figure/Path Relation:

  (10) **Figure/Path Relation (FPR, informal):** An event e, patient x, and a scale s stand in an FPR iff every unique part $x' \leq x$ corresponds to a unique subevent $e' \leq e$ (qua a SINC), each of which stands in an MR with a subscale $s' \leq s$.

- Thus in *The soup cooled*, different bits of the soup maybe change (up and down) at different rates, until everything settles to its final temperature.

- So a scalar analysis takes theme properties into account can handle aspectual phenomena. But to handle argument realization we need something more than just this.

2.2 Affectedness and Argument Realization

- *Affectedness* is based on the FPR, but comes in degrees (Hopper and Thompson 1980) defined in terms of how specific the predicate is about x's progress on s in e (Beavers 2011b):

  (11)   a. **Quantized change** ("telic change"): x reaches *specific* state g on s in e:
       i.   Alice peeled the apple, #but nothing's different about it.
       ii. Alice peeled the apple in/?for five minutes.
       iii. What happened to the apple is Alice peeled it.
      b. **Nonquantized change** ("atelic change"): x reaches *some* state g on s in e:
       i.   Alice cut the apple, #but nothing's different about it.
       ii. Alice cut the apple for/?in five minutes.
       iii. What happened to the apple is Alice cut it.
      c. **Potential for change** ("force recipient"): x *might* reach some state g on s in e:
       i.   Alice hit the apple, but nothing's different about it.
       ii. Alice hit the apple (for/?in an hour), but nothing's different about it.
       iii. What happened to the apple is Alice hit it.
      d. **Unspecified for change** ("none of the above"): x is a participant in e:
       i.   Alice saw the apple, but nothing's different about it.
       ii. Alice saw the apple for/?in an hour, but nothing's different about it.
       iii. #What happened to the apple is Alice saw it.

- These definitions derive an implicational *Affectedness Hierarchy*:

  (12)   For all x, ϕ, $quantized \rightarrow non\text{-}quantized \rightarrow potential \rightarrow unspecified$

#1 (12) explains why the predicates in (11) fall into subset relations in terms of standard affectedness tests, since if a test targets one degree of affectedness it targets all to its left:

(13)

Diagnostics	*peel x*	*cut x*	*hit x*	*see x*
Telic	✓	×	×	×
Change entailed	✓	✓	×	×
What happened to X is Y	✓	✓	✓	×

- Inferences of change and telicity follow as above, but we need to define Cruse's test:

  (14)   *What happened to x is P* is true iff x has potential for change in P.

#2 Object/oblique alternations like the conative reflect decreasing affectedness (Beavers 2010):

  (15)   a. Sally ate her lunch. $\Rightarrow$ Sally ate at her lunch.   (quantized $\Rightarrow$ nonquantized)
      b. Sally cut the tomato. $\Rightarrow$ Sally cut at the tomato.   (nonquantized $\Rightarrow$ potential)
      c. Sally hit the tomato. $\Rightarrow$ Sally hit at the tomato.   (potential $\Rightarrow$ unspecified)

- The tests above point to these being the right categories, meaning these data give syntactic justification for the grammatical significance of affectedness.

3 Problems of Affectedness
3.1 Circular Change

- Canonical property change verbs (e.g. *cool*) entail that the event involves transition along a scale (16a), and the final state on the scale differs from the initial one (16b):

  (16) a. The soup just cooled, #but hasn't changed its temperature at all.

  b. The soup just cooled, #and is still the same temperature it was before.

- But as Beavers and Koontz-Garboden (2017) show, motion verbs don't always require both a transition and a new result state. The following verbs require transition:

  (17) a. Kate slid/skied (#in place/without leaving her spot).   (cp. (16a))

  b. Kate climbed (the stairs)/climbed to the top, #but never left her initial spot.

- But they *don't* require a new final state:

  (18) a. Kate slid/skied (around and around), ending up exactly where she started.

  b. Kate climbed (around and around), ending up exactly where she started.

- This is owing to possibility of *circular paths*, something uniquely possible in motion (e.g. you can't go "up" in temperature and double back). On the basis of this, Beavers and Koontz-Garboden (descriptively) distinguish **scalar change** from **scalar result**:

  (19) a. Scalar change: undergoing a transition along a scale in an event.

  b. Scalar result: undergoing a transition along a scale in an event, resulting in having a different degree along the scale at the end of the event than at the beginning.

- Predicates with circular paths as in (17)-(18) entail scalar change but not scalar result.

- Yet accepting the possibility that a scale could circle back on itself, these predicates otherwise (a) describe transition and (b) place no constraints on where the patient ends up. This is *exactly* what **nonquantized change** was meant to account for, albeit with a circular path.

- There are also verbs that allow circular paths, but *do* require a specified end state. In (20) the specified end state happens to be the same as the initial, requiring a circular path:

  (20) The racecar lapped (around) the track, #but only made it halfway.

- Reaching a specific state is *exactly* the idea underlying **quantized change**, suggesting that even in the absence of scalar result (i.e. with a circular path) there can be quantized change.

- Finally, some motion verbs don't even require transition (see Bassa Vanrell 2013), plus are compatible with circular paths, constituting **potential for change** without scalar result:

  (21) Kate danced/floated/ran/jogged in place/without leaving her spot.

- Thus we have all the same degrees of affectedness as in §2 for simple scalar change verbs as we do for scalar result verbs, meaning scalar result vs. scalar change is a crosscutting factor.

- This derives a major revision to the Affectedness Hierarchy, covering more predicates:

(22) **Revised Affectedness Hierarchy**:

	quantized	>	nonquantized	>	potential
scalar result	peel, shatter		cool, cut		hit, punch
scalar change	climb$_{tr}$, lap		slide, climb$_{itr}$		jog, walk

- Just a comment: the affectedness hierarchy is based on weaking truth conditions, but so is the scalar result vs. scalar change distinction. Vaugeness matters a lot in defining the contrasts.

- But this means the original diagnostic of Beavers (2011b) defining (non)quantized change as entailing a new result state is incorrect. The real diagnostic is that a (specific) state be reached after a transition away from the initial state, even if it happens to be the initial state.

> What defines (non)quantized change is transition, *not* a new state.

3.2 Sublexical Modality

- Another factor can bleed entailments of change: sublexical modalities that push the realization of the event into another possible world (Koenig and Davis 2001).

- This occurs in nonculmination, where in some languages results of change-of-state verbs are not entailed (Koenig and Muansuwan 2000, Bar-el et al. 2005, Tatevosov 2008, Altshuler 2014, Martin and Schäfer 2012, 2017, Beavers and Lee 2020, Nadathur and Filip 2021).

- For example, Korean (23) is possible, but only when the agent is trying to break the window:

(23) *ku-ka   changmwun-ul kkay-ss-ta.   haciman changmwun-i*
     he-NOM window-ACC   break-PST-DECL but   window-NOM
     kkay-ci-ci   anh-ass-ta.
     break-PASS-COMP NEG-PST-DECL
     (lit.) 'He broke the window. But it was not broken.'(Beavers and Lee 2020: 149, (3))

- Beavers and Lee (2020) analyze this a necessity modal $\Box_{I_x}$ — introduced by a special active voice morpheme — scoping over the change-of-state, where the modal base of $\Box_{I_x}$ is the set of worlds corresponding to the intentions of the subject x (ignoring tense):

(24) ⟦*ku-ka changmwun-ul kkay-$\emptyset_{\text{active-modal}}$-ss-ta*⟧ =
     $\exists v[\mathit{effector}'(\mathbf{he}', v) \wedge \Box_{I_{\mathbf{he}'}} \exists s \exists d[\mathit{cause}'(v, s) \wedge \mathit{patient}'(\mathbf{window}', s) \wedge \mathit{broken}'(s, d)]]$

- Modality accounts for so-called "zero result" or "failed attempt" nonculmination, i.e. where no change at all occurs (Demirdache and Martin 2015: 194, Tatevosov 2008: 395).

- There are also "partial result" or "partial success" (*ibid.*) readings, where some but not all of the expected change occur, and Korean has this sort of nonculmination as well:

(25) *ku-ka   changmwun-ul yel-ess-ta.   kulayse changmwun-i cokum*
     he-NOM window-ACC   open-PST-DECL so   window-NOM a‗little
     yel-li-ess-ta.
     open-PASS-PST-DECL
     'He opened the window. So it was opened a little bit.'

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- Beavers and Lee suggest that this just reflects a difference between quantized and nonquantized change, as above (the latter of which may be more widespread in Korean than English), one piece of evidence being the difference in telicity diagnostics:

  (26) a. *Jane-i   chayk-ul   sam pwun maney/?tongan wancenhi*
            Jane-NOM book-ACC three minute in/for   completely
            thay-wu-ess-ta
            burn-CAUS-PST-DECL
            'Jane burned the book completely in/?for three minutes.'

        b. *Jane-i   chayk-ul   sam pwun tongan/maney cokum*
            Jane-NOM book-ACC three minute for/in   a_little
            thay-wu-ess-ta.
            burn-CAUS-PST-DECL
            'Jane burned the book a little for/in three minutes.'

- Taken together, these analyses make the prediction that you can get both at the same time, i.e. you can have modalized (zero result) nonquantized change, which is in fact borne out:

  (27) a. [John intended to build only half of the house.]

            John-i   cip-ul   ci-ess-ciman, cip-i   cenhye ci-e
            John-NOM house-ACC build-PST-but house-NOM at all   build-COMP
            ci-ci   anh-ass-ta.
            PASS-COMP NEG-PST-DECL
            (lit.) 'John built a house, but a house was not built at all.'

        b. [John intended to cool the soup, but had no particular final temperature in mind. However, he was unable to achieve this.]

            Jane-i   suphu-lul sik-hi-ess-ta.
            Jane-NOM soup-ACC cool-CAUS-PST-DECL
            'Jane cooled the soup.'

- More work is needed, but if we see sublexical modality applying to two different degrees of affectedness already, maybe it is a fully orthogonal factor to the entire hierarchy:

  (28) **Final Revised Affectedness Hierarchy**:

	quantized$_{(\Box)}$	>	*nonquantized*$_{(\Box)}$	>	*potential*$_{(\Box)}$
scalar result	peel, shatter		cool, cut		hit, punch
scalar change	climb$_{tr}$, lap		slide, climb$_{itr}$		jog, walk

> There are a *lot* of predicates built around affectedness, but only a tiny set — nonmodalized, scalar result predicates entailing (non)quantized change — actually entail change.

- The truth conditional patterns justify this, but what are the consequences of this typology of predicate types for argument realization or lexical aspect?

- I'll start with argument realization, looking at English middles, and then turn to aspect, focusing on telicity in particular.

4 Middles - A Basic Recap

- I suggest that there are argument realization phenomena that are sensitive to the larger space of "affectedness" predicates in (28) (and here I'm drawing a lot on Koenig and Davis 2001).

- I take middle constructions as in (29) as my case study ("dispositional middles", hereafter "middles") (van Oosten 1977, Keyser and Roeper 1984, Jaeggli 1986, Condoravdi 1989, Fagan 1992, Tenny 1992, 1994, Zribi-Hertz 1993, Ackema and Schoorlemmer 1994, 1995, 2017, Cornips and Hulk 1999, Egerland 2000, Lekakou 2002, 2006, *inter alia*):

  (29) a. Mary cut the bread (with a dull knife).
        b. This bread cuts easily (for anyone with even a dull knife).

- Middles are intransitive forms of otherwise transitive verbs that (a) are in active voice, (b) have the logical object as a surface subject, (c) have an implicit logical subject (d) which is expressed by *for* but not *by*, (e) usually have a rate/manner adverb, and (f) are generics:

  (30) a. Crystal wine glasses break easily, ?#but nobody can break them.
        b. Crystal wine glasses break easily (for/*by tipsy customers).   (middle)
  (31) a. The crystal wine glass was easily broken, #but nobody broke it.
        b. The crystal wine glass was easily broken (by/*for a tipsy customer).   (passive)
  (32) a. The crystal wine glass broke, but nobody broke it.
        b. The crystal wine glass broke (*for/*by a tipsy customer).   (inchoative)

- So what verb classes show this? There've been a lot of prior proposals, some rooted in affectedness (Jaeggli 1986) or arguing against it (Ackema and Schoorlemmer 1994).

- What I'll ultimately suggest is that middles are formed from verbs entailing (non)quantized change, regardless of whether there's circularity of the scale or culmination.

- A few caveats, though, about other aspects of what a middle is that are *not* our concern:

  #1 There's debate about the genericity, e.g. is it generic (Condoravdi 1989) or abilitative (Lekakou 2002) or dispositional (Lekakou 2004, 2005)? The details don't matter.

  #2 Condoravdi claims that middles are a notional category — it's any intransitive construction that takes on a dispositional reading, often an inchoative but not necessarily.

  – However, some transitives *only* show up intransitively when a middle:

  (33) [Several people are struggling to tear a piece of bread to share.]
        Does it chew any better than it tears?   (*It chewed.)
        (From *The Man Who Knew Too Much*, a 1956 Alfred Hitchcock picture)

  – We assume middle formation is a separate operation (see Beavers and Udayana 2023).

  #3 It has been claimed that the subject must have "responsibility" for the event, explaining the *buy*/*sell* contrast (van Oosten 1977). This suggests additional thematic conditions placed by middle formation, but which we set aside here:

  (34) This car sells/*buys easily.

  #4 There are likely purely lexical constraints (cf. ??*This city destroys easily*). But this is expected: lexical rules are often restricted to specific verb classes, but it is a lexical fact which of those verbs show the alternation (Dowty 1979: Ch.6, Malchukov 2005).

5 Methodology - Corpus Evidence

- We wanted to cast a wide net on what verbs form a middle, so we turned to corpus evidence.

- We developed a tool using Stanford CoreNLP (Manning et al. 2014) to pull examples out of text corpora with the following syntactic properties indicative of being a middle:

  (35) a. The verb is active, has a subject and an adverb, but no object.
        b. The verb has a transitive variant (drawing on Merriam Webster and the OED).

- We also excluded spatial, temporal, or resultative adverbs (e.g. *nearby*, *earlier*, *into the hall*), and verbs with consistent misparses (e.g. CP-complement *say* was always misparsed).

- We applied this to the Corpus of Contemporary American English (COCA) (Davies 2008), which contains over a billion words, with text equally divided across eight genres (blog, web, TV/movies, spoken, fiction, magazine, newspaper, academic) from 1991 to 2019.

- This yielded 174,284 examples. But not all are middles — very few are. We are manually going through a random half, employing the following criteria (based on (30)-(32)):

  (36) a. The reading must be dispositional in some sense (thus usually in present tense, but we took past if a past generic reading was possible).
        b. Context must permit an agent (explicitly providing one or not ruling it out).
        c. A *for*-phrase is generally possible.
        d. It is not a misparse, *tough*-construction, reduced relative, etc. (our parser sucked at A′-movement), and the transitive in (35) is semantically related to the middle.

- Out of the randomly selected examples, we've annotated ∼31,000 examples so far, but only found 320 potential middles, some of which may not be middles after all.

- In particular, as per Condoravdi, an inchoative interpreted generically is indistinguishable from a middle save the entailment of an agent (e.g. (30a) is possible in some contexts).

- A middle *requires* an agent, but an inchoative doesn't. Context helps, but only a bit:

  (37) a. The liner goes on smoothly, and the **shadow blends well**. (COCA: Magazine, 2007)
        b. In other words, as described in greater detail in the box on page 29, the **system adapts perfectly**. (COCA: Academic, 2012)
        c. B. pertussis-specific Ig titers of wP- and aP-induced serum antibodies were 290,000 and 2,500, respectively wP- and aP-induced **antibodies bind** less **well** to B. parapertussis and confer little protection against B. parapertussis in vivo. (COCA: Academic, 2012)

- The problem is that inchoatives are vague as to whether there's an external agent, so really any generic inchoative could be a middle, but also could not be. We'll never *really* know.

- Nevertheless, as long as whatever our generalization is covers these vague cases as well as the more clear-cut ones, then this wrinkle can largely be ignored.

6 The Classic Affectedness Constraint on Middles

- One of the oldest analyses of middles is that there is an Affectedness Constraint, whereby the promoted object must be affected somehow, i.e. a patient (Anderson 1979, Jaeggli 1986).

(38)   a.   Mary just opened the door.
        b.   This door opens easily.   (change-of-state)

(39)   a.   Bob just avoided the traffic jam.
        b. #Traffic jams avoid easily.   (activity; cf. Tenny 1992: 8–9)

(40)   a.   Bob knows the right answer.
        b. #Right answers know easily.   (state)

- More precisely, anything below nonquantized change on the Affectedness Hierarchy won't form a middle, e.g. *avoid*, plus force recipient verbs, and stative verbs:

(41)   Gala apples peel/cut/*hit/*see easily (for young children).

- This derives a first pass Affectedness Constraint restricted to (non)quantized change:

(42)   *Affectedness Constraint (Initial):* If a transitive predicate entails that its object undergoes nonquantized change, it can form a middle.

- However, there have been apparent counterexamples to the Affectedness Constraint in the literature, which I suggest are mostly accounted for with the analysis of affectedness in (28).

7 Counterexample I: Path Objects

- Tenny (1992, 1994) shows path objects prepose, but are not affected in the traditional sense:

(43)   a.   The settlers crossed the desert.
        b.   The desert crosses easily for settlers with large wagons.

- This data led some researchers away from promoting affected objects as the right analysis.

#1   Tenny hypothesizes that aspectual properties of the object – not affectedness – better explains the data in (43). She argues that paths and patients both "measure out" (i.e. track the progress) and "delimit" (define the endpoint) the event, only the former of which matters here.

- She justifies the measuring out correlation by the *halfway*/*half of* test:

(44)   a.   The Romans destroyed half of the city $\Leftrightarrow$ The Romans destroyed the city halfway.
        b.   John crossed half of the desert $\Leftrightarrow$ John crossed the desert halfway.

- However, the *halfway*/*half of* test doesn't pick out the right set of objects that license middles. It works well with paths, but only works for some patients (mostly existence scale patients):

(45)   a.   I pushed the mower down the hill halfway. $\not\Leftrightarrow$ I pushed half the mower down the hill.
        b.   To my delight, the mower pushes easily, even through long grass.
           (http://www.amazon.com/review/R3655UQ1K8G7HG)

- The problem is that while paths and patients do both measure out and delimit, they do so in different ways (cf. the FPR), and hence this tests does not actually group them together.

#2 An alternative by Ackema and Schoorlemmer (1994) rejects objecthood as relevant at all, suggesting that middles are formed when the (eliminated) subject is an actor.

- However, the scope of this hypothesis is too broad and predicts a number of examples that don't form middles, including potential for change verbs above and verbs like *wander*:

    (46) #The desert wanders easily for settlers with large wagons.   (nonpath)

#3 Beavers (2008b) proposes an affectedness-based alternative that rejects that the demoted or promoted DP's role matters. Rather, it's whether (non)quantized change is entailed *at all*.

- The reason both paths and patients promote is that with change-of-state verbs they *can both be objects*. With agent/patient verbs the patient is the object, but with noncausative motion verbs it's the subject, leaving object position available for something else, here the path:

    (47)   a. The settler broke *the crystal wine glass*.   (The wine glass undergoes change)
           b. *The settler* crossed the desert.   (The settler undergoes change)

- Yet both form middles, so what matters is that change is entailed at all. Thus we have an updated affectedness analysis that doesn't depend solely on the whether the object is affected:

    (48)   *Affectedness Constraint (Final):* If a transitive predicate entails a nonquantized change, it can form a middle.

- Once we have decoupled thematic roles of specific grammatical functions from middle formation, we predict a wider class of middles than the previous analyses.

#1 An interesting extension of (48) is that there are other types of nonpatient objects that allow middles, like instruments or sources of image creation:

    (49)   a. This pipe smokes nicely.   (cf. Fagan 1992: 68, (12))
           b. A person who isn't self-conscious photographs well.   (Fiengo 1980: 50, (89h))

#2 Performance verbs (*play, read*) form middles despite not entailing a change (Tenny 1992):

    (50)   **Words read correctly**. (COCA: Academic, 2013).

- But Tenny (also Jackendoff 1996) has analyzed these as figurative movement, akin to *cross*: the figurative patient is the subject of the transitive, and its object is the figurative path.

∴ Provided (literal or figurative) change is entailed, a range of transitives can form middles. But what about those orthogonal factors to real world affectedness I mentioned above?

8 Counterexample II: Vehicle Objects and Circular Paths

- Consider verbs of vehicle manipulation (JP Koenig, p.c.):

(51)   a.   Overall, though, the test cars were fun, generally satisfying, and reasonably comfy and roomy, and were a nice reminder that attention to the proper details can make mainstream **cars drive** as **nicely** as premium sports sedans. (COCA: News, 2011)

        b.   The **boat handles precisely**, although there was considerable weight aft on the test boat, which I compensated for by lowering the tabs slightly. (COCA: Magazine, 2007)

- Here again we seemingly have a motion verb where the subject is the patient, but the object of the transitive is a sort of vehicle (which also moves, so it is also a patient):

(52)   May drove the car/pedaled the bike/steered the fork lift.

- However, there is no *necessary* change here in terms of result states — the patient could in principle end up exactly where it started, unlike with *cross* and other path object verbs above:

(53)   May drove the car (in circles), ending up exactly where she started.

- Crucially, these are *exactly* circular path verbs. Thus the Affectedness Constraint in (48) still accounts for them forming a middle assuming the Revised Affectedness Hierarchy in (28).

- Thus middle formation is still subject to an affectedness condition, albeit on a weaker notion of affectedness, though one that is still principled and still rooted in scalar change.

9 Counterexample III: *Keep* and Sublexical Modality

- Our corpus also turned up middles with *keep*:

(54)   The **salsa keeps well** in the refrigerator for 3 or 4 days. (COCA: News, 2012)

- What is the lexical semantics of keep? Arguably, it is analyzable as a sublexical modality over *go bad* (e.g. Koenig and Davis's "negative modality"; pp. 89-90): it means, in essence "do not go bad" in a context where we might stereotypically expect the patient to.

- But then once again (48) still accounts for them forming a middle, assuming (28).

- The key, putting it in terms of Koenig and Davis: 113 (see their "Modal Transparency Hypothesis"), is that it is not the entailment of a scalar change that licenses a middle, but the presence of change in the verb's "situational core".

> What matters for middle formation is a situational core of affectedness, not specific inferences of change at the real world, justifying for the grammatical significance of (28).

- That said, I do not expect that to be categorically true. Contra Koenig and Davis, I do not assume the mapping from argument structure to lexical entailments are mediated by representations (e.g. their HPSG-style event structures).

- So it could be that some alternations are constrained to just verbs that truly entail a change (i.e. no orthogonal factors). But the middle is not one of those.

10 Lexical Aspect and Affectedness without Change-of-State

- Argument alternation facts suggests that scalar change (not just scalar result) matters grammatically, and does so due to the situational core, not by virtue of entailments of change. What about lexical aspect, especially telicity? Here my conclusions are only tentative, but...

#1 For at least one case of sublexical modality-based non-culmination I think there's something compelling to say. Almost all English ditransitive verbs show a type of non-culmination (see e.g. Oehrle 1976, Rappaport Hovav and Levin 2008, Beavers 2011a):

    (55)   a. I threw Mary the ball, but she was looking at the birds flying overhead and didn't even notice.

            b. I threw the ball to Mary, but she was looking at the birds flying overhead and didn't even notice.   (Rappaport Hovav and Levin 2008: 147, (41))

- Nonetheless, Jackendoff (1996) notes that all ditransitive verbs *are* nonetheless telic, even those that have this non-culmination effect:

    (56)   a. John gave/sent/threw Mary the ball in/?for five minutes.

            b. John gave/sent/threw the ball to Mary in/?for five minutes.

- Beavers (2011a) analyzes this as due to residual meaning beyond non-culmination: though few ditransitives entail result states of possession or arrival, what they do entail — release in the case of *throw* and *send* — is enough that there's still a realis culmination point.

- Returning to telicity, in the context of nonculmination what *else* is there in the meaning that could give rise to culmination inferences? What if the stages of the event (as per Landman 1992) are such that there are multiple stages at which we could say culmination occurs? *We would get telicity **and** nonculmination together!* Which is exatly what we see.

#2 For circular paths, there's an interesting effect. Quantized change predicates with circular paths show variable telicity, but defaulting (?) to telic (or at least that how it feels to me):

    (57)   The race car lapped (around) the track in/for five minutes.

- The variable telicity makes sense: depending on context you either lapped once or kept going. But the default towards telicity (should it exist), kind of also makes sense: the word provides a very natural endpoint, namely the one you have to reach to have said you completed the event even if you do carry on.

- This is all very much like scalar result non-quantized predicates, specifically like those formed from closed scale, maximal endpoint adjectives, which Kennedy and Levin (2008) suggest are default telic owing to their Principle of Interpretive Economy:

    (58)   Mary straightened the rod in/for five minutes.   (default: maximally straight)

- Similarly, in (57) there's sufficient information to derive default telicity, but not necessarily.

- Conversely, non-quantized predicates with circular paths are strictly atelic (absent some very, very specific context; cp. Dowty's 1979 *John ran in an hour* if John runs x miles every day).

(59)　John climbed (around) for/??in an hour.

- Here again the explanation seems clear: there's no result nor even a natural point to interpret as a result. These are like open scale deadjectictival verbs as per Kennedy and Levin:

(60)　Mary widened the opening for/??in an hour.

> Only a small subset of change predicates are truly, categorically telic. But the ways in which the rest are variably telic or atelic might be predictable based on their meanings.

11 Conclusion

- Affectedness as rooted in scalar change matters for lexical aspect and argument realization, but much of that prior work has hinged on the entailments of change themselves.

- But orthogonal factors can bleed those inferences of change, raising the question of how phenomena rooted in affectedness will pattern in such cases.

- I proposed a revised Affectedness Hierarchy rooted in the original hierarchy of Beavers (2011b) but that takes two crisscrossing factors into account: the scalar change vs. scalar result distinction and the nonmodal vs. modal distinction.

- The argument structural and aspectual facts support this analysis:

#1 Grammatically, while some alternation patterns (e.g. those discussed in Hopper and Thompson 1980 or Beavers 2010) will still be rooted in notions of actual change, middles in English suggest that the larger notion of affectedness is also relevant grammatically.

- This simultaneously justifies its existence on syntactic grounds but also supports the idea that it is the situational core of the event and not (just) lexical entailments of change realized at the real world that matter for argument structure.

#2 Lexical aspectual properties like telicity are more rooted in real world entailments, but sometimes there are *still* real world entailments related to change that matter or else that figure into pragmatic reasoning about the real world, even in the face of factors that bleed inference of final result states.

- There is still more work to be done, but the general analysis presented here hopefully provides a backdrop for more particular analyses of these subcases.

12 Acknowledgments

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