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The Semantic Contribution of Idiosyncratic Roots in Ditransitive Verbs

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1. Introduction

In much modern work in lexical semantics it is now typically assumed that a verb's meaning consists of an "event structure" constraining the type of events described by the verb (Dowty 1979; Pinker 1989; Levin & Rappaport Hovav 1995; Pesetsky 1995; Marantz 1997; Rappaport Hovav & Levin 1998; Folli & Harley 2004; Harley 2003; Ramchand 2008, *inter alia*). An event structure typically consists of (a) a skeletal event template built from basic event-denoting predicates with meanings like those of Dowty's (1979:109, (131), 141, (11')) CAUSE and BECOME operators that defines the overall temporal and causal contours of the event and (b) some idiosyncratic lexical semantic "root" that fills in the real world details of the verb's event template on a verb-by-verb basis (e.g. a specific manner or state involved; Rappaport Hovav & Levin 1998). On one modern implementation the event structure is a phrase structural object built up of functional heads (e.g. ν heads) entailing the basic eventive predicates, with the morphological root contributing the idiosyncratic content, as in (1) analyzing causative *flatten* as built from the same root that underlies the adjective *flat*.

(1) John flattened the rug $\approx [{}_{\nu P} \text{ John } [{}_{\nu'} \nu_{\text{CAUSE}} [{}_{\nu P} \text{ the rug } [-en_{\nu_{\text{BECOME}}} \sqrt{\text{flat}}]]]]$

The template derives the verb's lexical aspectual properties (by defining its temporal and subevental structure), argument structure (by determining where the verb's arguments are realized and how many there are), and derivational morphology (e.g. the ν introducing BECOME-type meaning determines *-en* morphology). Conversely, the root just determines the verb's idiosyncratic morphology.¹

While much work has examined the properties of event templates, there are many open questions regarding the semantic contributions of the root. One underexplored question (though see Dowty 1979; Goldberg 1995; Wechsler 2005; Ramchand 2008, for some discussion) is whether there is a clean division between the meanings contributed by roots and templates. For example, are CAUSE and BECOME-type meanings *only* introduced templatically, or can roots also contribute the same meanings? The assumption in much event structural work is that this is not possible, Embick's (2009) "Bifurcation Thesis for Roots" and Arad's (2005) "Root Hypothesis" (see also Borer 2005; Dunbar & Wellwood 2016). This assumption seemingly explains cases wherein a single root can show up in various grammatical contexts with consistent templatic semantic correlates, e.g. *The rug is flat* entails neither change nor causation, *The rug flattened* entails change but not causation, and *John flattened the rug* entails both, consistent with the addition of ν heads introducing arguments and verbal morphology along with the semantics (though Koontz-Garboden & Beavers 2016 argue against extending this analysis to all change-of-state verbs).

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¹ An alternative would be to assume that the verb's event structure is a separate level of representation, e.g. associated with each verb lexically but still composed of templatic and idiosyncratic root elements of some kind (e.g. Dowty 1979), and then linked to the syntax by linking rules that derive the same generalizations (e.g. Levin & Rappaport Hovav 1995). For expository purposes we assume event templates are constructions qua phrase structural objects as in (1) rather than separate, lexicalized representations. But the construction/lexical debate is technically orthogonal to our concerns here, and our conclusions apply just as well to lexicalist event structures.

However, it is an open question whether this assumption scales up to other root and template combinations. Fortunately, event structural approaches give us ways to test bifurcation. In particular, if we can identify a well-delineated construction that correlates with a specific event template, we can determine the template's meaning through what is invariant across roots that occur in that template. Any other meaning in any specific root+template pair must come from the root, even if the meaning is templatic. Presenting work being developed in Beavers & Koontz-Garboden (in prep), we examine ditransitive verbs of caused possession and argue that in those cases some such roots *can* entail templatic meaning. Thus there is no bifurcation. We propose instead that the root/template distinction is best analyzed not as an ontological distinction in meaning types, but as specificity of lexical entailments à la Dowty (1991) and Beavers (2010). "Template meanings" consist of general eventive entailments, while "root meanings" include idiosyncratic entailments. But, crucially, the former may be entailed by the latter by virtue of the latter's specific idiosyncratic content, and thus will also be included in the meaning of the root. While in some cases the classic situation in (1) will arise, where the root entails no templatic information, in other cases both templates and roots will entail templatic information that must be integrated together, and in extreme cases the root will wholly subsume the meaning of its template.

In §2 we outline our first argument that roots may entail templatic information, namely that the meaning of the template is sometimes contingent on root (the "verb sensitivity" of Rappaport Hovav & Levin 2008, here dubbed "root sensitivity"). In §3 we demonstrate that roots can determine telicity in ways orthogonal to the template they occur in ("root telicity"), suggesting that roots can entail change, a templatic notion. In §§4-5 we outline a compositional analysis of ditransitive event structures and define a series of root classes that explain these facts. In §6 we discuss why these roots have these meanings, and in §7 we discuss why the root vs. template distinction is nonetheless still needed. We conclude in §8.

2. Root Sensitivity In Ditransitive Verbs of Caused Possession

Ditransitives show two syntactically and semantically distinct variants in the "dative alternation" (Green 1974; Pinker 1989; Gropen et al. 1989; Goldberg 1995; Beck & Johnson 2004; Krifka 2004; Rappaport Hovav & Levin 2008; Beavers 2011). In the indirect object (IO) frame (2a) the theme is the direct object and the recipient an indirect object, and in the *to* frame (2b) the theme is the direct object and the recipient a *to* PP. Semantically, IOs have a requirement of possessorhood, and thus inanimate DPs are not possible except on an anthropomorphic reading, e.g. *London* is only acceptable in (2c) if it is the "London Office". Inanimate *to* PPs are acceptable, on a goal or London Office reading.

- (2) a. John sent Mary a ball. c. #John sent London a ball.
b. John sent a ball to Mary. d. John sent a ball to London.

These properties are assumed to derive from two distinct event templates underlying each variant of the dative alternation as in (3), drawing on the well-cited analysis of Harley (2003). In each case a causal head takes a causer DP and a PP complement defining either a HAVE-denoting relation in the IO frame or arrival/co-location-denoting state in the *to* frame between the theme and recipient/goal. In both cases the root simply defines the manner by which the result came about, modifying the causal *v*.

- (3) a. [_{vP} John [_{v'} [_v *v_{cause}* $\sqrt{\text{send}}$] [_{PP} Mary [_{P'} P_{HAVE} a ball]]]]
b. [_{vP} John [_{v'} [_v *v_{cause}* $\sqrt{\text{send}}$] [_{PP} the ball [_{P'} P_{LOC} to Mary]]]]

The templates determine the argument realization and London Office effects in (2) (plus other facts we return to in §7). However, we argue first that the templates actually *underdetermine* templatic meaning, which the root fills in, i.e. "root sensitivity" (Rappaport Hovav & Levin 2008; Beavers 2011; contra Beck & Johnson 2004). The relevant ditransitives are drawn from the subclasses outlined by Gropen et al. (1989:243-244) and Pinker (1989:210-219) (building on Green 1974), in particular these:

- (4) a. **Verbs that inherently signify acts of giving:** *give, pass, hand, sell, pay, trade, lend, loan, serve, feed*
b. **Verbs of sending:** *send, mail, ship*
c. **Verbs of instantaneous causation of ballistic motion (Verbs of throwing):** *throw, toss, flip, slap, kick, poke, fling, shoot, blast*

- d. **Verbs of continuous causation of accompanied motion in a deictically specified direction:** *bring, take*
- e. **Verbs of future having:** *offer, promise, bequeath, leave, refer, forward, allocate, guarantee, allot, assign, allow, advance, award, reserve, grant*
- f. **Verbs of continuous causation of accompanied motion in some manner:** *carry, pull, push, schlep, lift, lower, haul*

Starting with the IO frame, the prediction of (3a) is that all IOs must be possessors. But in reality, only giving verbs in (4a) actually *require* possession with IOs, as in (5a). For all verbs in (4b-g) actual possession is cancelable, as in (5b,c) (and verbs in (4f) do not usually show IO frames). However, crucially, *prospective* possession is required even if actual possession is cancelable (Gropen et al. 1989:207, Beavers 2011:8-12), evidenced by the persistence of the London Office effect even in these cases, as also illustrated in (5b,c).

- (5) a. #John gave/loaned Mary the salt, but she never got it.
- b. John sent/threw Mary/#London the ball, but it flew off course before she got it.
- c. John brought/promised Mary/#London the ball, but she never ended up receiving it.

However, for at least the verbs in (4b-d,f) prospective possession does not obtain in the corresponding *to* variants (e.g. no London Office effect in *John sent/threw/brought/hailed a ball to London*), meaning that prospective possession in (5b,c) must be contributed by the IO template itself. In sum, the actual meaning of the IO template in (3a) is not caused actual possession but rather caused prospective possession.

Turning to the *to* frame, (3b) predicts that arrival should be entailed. But while it is sometimes entailed, as with accompanied motion verbs in (4d,f) as in (6a), most often it is not, as with roots in (4b,c) as in (6b).

- (6) a. #John carried/brought the treaty to the security council, but it did not arrive.
- b. Kim threw/tossed/sent the ball to Sandy, but the wind blew it into the bushes/it did not arrive.

If arrival is impossible (but intended by the agent) the *to* frame is illicit:

- (7) [Kim and Sandy are separated by an unbreakable glass wall Kim is aware of.]
#Kim threw/tossed the ball to Sandy.

So perhaps the meaning of the *to* frame is prospective arrival?

This is not in fact the case. Crucially, *to* frames with giving verbs (4a) and future having verbs (4e) lack motion meanings altogether, and instead entail simply caused (prospective) possession, evidenced by the London Office effect obtaining despite the fact that these are not IO frames:

- (8) John gave/bequeathed/credited the money to Mary/#London.

This means these verbs show no semantic contrast in the dative alternation; both variants mean the same thing, viz. caused prospective possession. So the result of the *to* frame must be some dyadic relation *R'* which covers both receiving and arriving. Crucially, the fact that for some roots (e.g. *bequeath*) but not for others (e.g. *throw*) the meaning of *P_{LOC}* is specified as exactly the prospective receiving contributed by *P_{HAVE}* in the IO frame means that (a) it is the root that contributes this meaning when it is present in the *to* frame and thus (b) roots can contribute exactly the meaning argued to exist in a template (namely in the IO template), i.e. there is no bifurcation. To put it another way, in some cases a root can make the *to* template mean the IO template and for other roots the *to* and IO templates mean different things, i.e. there is root sensitivity in the meanings of the templates:

- (9) a. John sent a book to Mary/London. \neq John sent Mary/#London a book.
- b. John willed his fortune to Mary/#London. $=$ John willed Mary/#London his fortune.

Thus roots entail templatic notions like receiving and arriving, violating the Bifurcation Thesis. We next show that roots have additional templatic effects.²

² Note that it also follows from these observations that notions like possession and arrival more simply can be entailed by roots. If those notions are supposedly independently templatic in nature (as often assumed) then by merely entailing them roots also already entail templatic information.

3. Aspectual Properties: Root Determined Telicity

A property often assumed to be contingent on the verbal predicate's event template is telicity, i.e. the property of naming a specific culmination point for the event, probed for by temporal *for/in* tests (Dowty, 1979:56-58), where telic predicates tend to prefer *in* modifiers and atelic predicates *for* modifiers:

- (10) a. John hammered the metal flat in/?for an hour. (telic)
b. John jogged for/?in an hour. (atelic)

On many event structural approaches, telicity is mediated by a templatic result head which determines that there is a result state that can define the end of the event. The role of the root is just to give that state a name (e.g. Folli & Harley 2004). Thus the template for (10a) determines an endpoint-defining result state that *flat* names, whereas in (10b) the activity template for *jog* determines no specific result, and the root just names an action. Thus a precondition for telicity is having the right template.³

Interestingly, ditransitives are uniformly telic, as noted first by Jackendoff (1996:330):

- (11) a. John gave/sent/threw/willed/brought/carried Mary the ball in/?for five minutes.
b. John gave/sent/threw/willed/brought/carried the ball to Mary in/?for five minutes.

Yet, as noted in §2, the result of the IO/to templates need not actually obtain — they are merely prospective. Thus all else being equal ditransitive predicates *should* be atelic. The telicity therefore must be due to semantic information coming from the root itself, and below we suggest in fact that all ditransitive roots determine some non-prospective result state above and beyond the prospective one entailed by the template that is sufficiently specific to determine telicity. But this once again means that change (a templatic notion) must be coming from the root, again against the Bifurcation Thesis.

4. Defining and Composing Template and Root Meanings

Beavers (2011) motivates a formal analysis of ditransitive verbs as verbs of scalar change, differing from standard scalar change-of-state verbs like *cool* or *break* as involving a dyadic result state representing a state on a scale that relates two entities together (the theme and recipient/goal). Beavers (2011:24-44) also defines a new classification of ditransitive verbs based on more specific idiosyncratic differences. Here we outline a simplified non-scalar version of his analysis, but also give it a compositional treatment that captures explicitly how root contributions can derive root sensitivity and root-telicity. We assume ditransitive verbs fundamentally relate an event *e*, a causer *x*, a theme *y*, and a recipient/goal *z*. The core result states that underlie ditransitive templates are arrival and receiving, defined as follows:

- (12) a. $arrive'(y, z, e)$ (“*y* arrives at *z* in event *e*”) is true iff the final state of *y* in *e* is $at'(y, z)$, and at all preceding times $\neg at'(y, z)$, though at every moment $\exists l[at'(y, l)]$ holds and at temporally adjacent moments in *e* the corresponding at' states relate *y* to spatially adjacent locations (i.e. all locations in the event form a path).
b. $receive'(y, z, e)$ (“*z* receives *y* in *e*”) is true iff the final state on *y* in *e* is $have'(y, z)$ and at all prior points in *e* the state $\neg have'(y, z)$ holds.

In addition, it will also prove important to analogously define leaving and losing:

- (13) a. $leave'(y, z, e)$ (“*y* leaves *z* in event *e*”) is true iff the final state of *y* in *e* is $\neg at'(y, z)$, and at all preceding times $at'(y, z)$, though at every moment $\exists l[at'(y, l)]$ holds and at temporally adjacent moments in *e* the corresponding at' states relate *y* to spatially adjacent locations.
b. $lose'(y, z, e)$ (“*z* loses *y* in *e*”) is true iff the final state on *y* in *e* is $\neg have'(y, z)$ and at all prior points in *e* the state $have'(y, z)$ holds.

We can further define a basic dyadic relation that disjunctively generalizes over receiving and arriving:

³ Nonetheless, other factors can also figure into whether the predicate is actually telic, including referential properties of the theme DP and boundedness properties of any scales of change (Beavers 2012).

(14) $R'(y, z, e)$ is true iff $receive'(y, z, e)$ is true or $arrive'(y, z, e)$ is true.

Following Beavers (2011:10-11) (in turn building on Koenig & Davis 2001), we represent prospectivity by a sublexical modality \Diamond scoping over the result state: the result obtains at some accessible possible world, including possibly the real world w_o , where the modal base is defined either by possible continuations qua inertia worlds (as per Beck & Johnson 2004:116, building on Dowty 1979:134-135), and/or agent intentions (as per Koenig & Davis 2001:86-89). Putting the pieces together, the denotations of the functional heads in the two variants of the dative alternation are the following:

- (15) a. $\llbracket P_{have} \rrbracket = \lambda y \lambda z \lambda e [\Diamond receive'(y, z, e)]$ b. $\llbracket P_{loc} \rrbracket = \lambda z \lambda y \lambda e [\Diamond R'(y, z, e)]$
c. $\llbracket v_{cause} \rrbracket = \lambda P \lambda x \lambda e [causer'(x, e) \wedge P(e)]$

Composing (15c) with a projection of (15a,b) derives a basic event of x causing z to possibly have y or y to possibly arrive at z respectively. The question now is what the contribution of a root is in each case.

We assume that ditransitive roots define not just a manner M' for causer x , but also possibly information Q' about the templatic result PP's theme y and recipient/goal z in e . Since it will be important that the root have access to y and z even in manner-adjoined position, we define two functions that take a dyadic result state P and event e and return e 's theme and recipient/goal respectively according to P :⁴

- (16) a. $th'(P, e)$ returns the theme of e for P (i.e. $th'(P, e) = \iota y [P(e) \rightarrow \exists z [\Diamond R'(y, z, e)]]$)
b. $rg'(P, e)$ returns the recipient/goal of e for P (i.e. $rg'(P, e) = \iota z [P(e) \rightarrow \exists y [\Diamond R'(y, z, e)]]$)

On the basis of this, a ditransitive root will have the following basic format:

- (17) $\llbracket \sqrt{\text{root}} \rrbracket = \lambda P \lambda x \lambda e [M'(x, e) \wedge Q'(th'(P, e), rg'(P, e), e)]$

Such roots combine with v_{cause} in (15c) via the head-adjunction rule in (18) (cp. Kratzer's 1996:122 Event Identification) to produce a modified causal head meaning (here and below the root contribution is underlined for ease of exposition; the underlining has no formal significance):

- (18) $\llbracket v_{cause} \sqrt{\text{root}} \rrbracket = \lambda P \lambda x \lambda e [\llbracket v_{cause} \rrbracket(P, x, e) \wedge \llbracket \sqrt{\text{root}} \rrbracket(P, x, e)]$
 $= \lambda P \lambda x \lambda e [causer'(x, e) \wedge P(e) \wedge \underline{M'(x, e)} \wedge \underline{Q'(th'(P, e), rg'(P, e), e)}]$

Applying (18) to predicates projected by (15a,b) derives the following schematized meanings for the overall vPs in (3) for any specific causer x , theme y , and recipient/goal z :

- (19) a. $\lambda e [causer'(x, e) \wedge \Diamond receive'(y, z, e) \wedge \underline{M'(x, e)}]$
 $\wedge \underline{Q'(th'(\lambda e [\Diamond receive'(y, z, e)], e), rg'(\lambda e [\Diamond receive'(y, z, e)], e), e)]}$
b. $\lambda e [causer'(x, e) \wedge \Diamond R'(y, z, e) \wedge \underline{M'(x, e)}]$
 $\wedge \underline{Q'(th'(\lambda e [\Diamond R'(y, z, e)], e), rg'(\lambda e [\Diamond R'(y, z, e)], e), e)]}$

Thus the two skeletal event structures in (19) define events of x causing by some manner M' the result denoted by the result PP to obtain for theme y and recipient/goal z — possible receiving in (19a) and possible R' in (19b) — plus also additional information Q' about y and z . Note that with (19b) strictly more general than (19a), anything expressible in (19a) is expressible in (19b), but not conversely (Pesetsky 1995; Beavers 2010, contra Harley 2003), a fact that will be important later. We next outline various root classes and the information Q' each fills in that derives root sensitivity and root telicity, ultimately rederiving compositionally most of the ditransitive verb classes in Beavers (2011:24-44).

5. Root Classes

We first outline three root classes that require actual possession of the theme by the recipient at the end of the event. The first are “pure caused possession” roots that entail solely that and not much else. *Give* is the canonical example (and perhaps the only one with such a bleached semantics). As noted above it entails actual possession in both frames:

⁴ We assume Quantifier Raising applies obligatorily to projections of P_{have} and P_{loc} , ensuring that at the point at which the causal head applies its two arguments are either individual denoting DPs or DP-traces, which we assume denote individual variables. We also assume Uniqueness of Participants à la Krifka (1998), so that any event has one theme and one recipient/goal (assuming plural entities form unique mereological sums).

- (20) a. John gave Mary the book, #but she never got it.
b. John gave the book to Mary, #but she never got it.

As argued above, the semantics of actual possession must be coming from the root. We thus propose that the root $\sqrt{\text{give}}$ has the denotation in (21) (assuming some “giving” manner, though this may be empty).

$$(21) \quad \llbracket \sqrt{\text{give}} \rrbracket = \lambda P \lambda x \lambda e [\text{manner}'(x, \text{giving}, e) \wedge \text{receive}'(th'(P, e), rg'(P, e), e)]$$

Substituting this into the IO frame in (19a) and substituting specific individual constants for the relevant DPs derives the following denotation for *John gave Mary a book*:

$$(22) \quad \llbracket \text{John gave Mary a book} \rrbracket = \exists e [\text{causer}'(\mathbf{j}, e) \wedge \Diamond \text{receive}'(\mathbf{b}, \mathbf{m}, e) \wedge \text{manner}'(\mathbf{j}, \text{giving}, e) \wedge \text{receive}'(th'(\lambda e [\Diamond \text{receive}'(\mathbf{b}, \mathbf{m}, e)], e), rg'(\lambda e [\Diamond \text{receive}'(\mathbf{b}, \mathbf{m}, e)], e), e)]$$

Substituting the outputs of th' and rg' in this context, (22) is equivalent to:

$$(23) \quad \exists e [\text{causer}'(\mathbf{j}, e) \wedge \Diamond \text{receive}'(\mathbf{b}, \mathbf{m}, e) \wedge \text{manner}'(\mathbf{j}, \text{giving}, e) \wedge \text{receive}'(\mathbf{b}, \mathbf{m}, e)]$$

Since actual receiving entails possible receiving, then by modus ponens (23) is equivalent to:

$$(24) \quad \exists e [\text{causer}'(\mathbf{j}, e) \wedge \text{manner}'(\mathbf{j}, \text{giving}, e) \wedge \text{receive}'(\mathbf{b}, \mathbf{m}, e)]$$

In other words, the result entailed by the root is strictly stronger than that of the IO template, and thus the root monotonically strengthens what would otherwise be entailed by the template to actual receiving.

Furthermore, the result entailed by the root also subsumes that of the *to* template as well, since for any y, z, e , $\text{receive}'(y, z, e) \rightarrow \Diamond \text{receive}'(y, z, e) \rightarrow \Diamond R'(y, z, e)$. Thus analogously to above, the meaning of *John gave a book to Mary* will ultimately resolve to the same meaning as in (24):

$$(25) \quad \begin{aligned} \llbracket \text{John gave a book to Mary} \rrbracket &= \exists e [\text{causer}'(\mathbf{j}, e) \wedge \Diamond R'(\mathbf{b}, \mathbf{m}, e) \wedge \text{manner}'(\mathbf{j}, \text{giving}, e) \\ &\wedge \text{receive}'(th'(\lambda e [\Diamond R'(\mathbf{b}, \mathbf{m}, e)], e), rg'(\lambda e [\Diamond R'(\mathbf{b}, \mathbf{m}, e)], e), e)] \\ &= \exists e [\text{causer}'(\mathbf{j}, e) \wedge \Diamond R'(\mathbf{b}, \mathbf{m}, e) \wedge \text{manner}'(\mathbf{j}, \text{giving}, e) \wedge \text{receive}'(\mathbf{b}, \mathbf{m}, e)] \\ &= \exists e [\text{causer}'(\mathbf{j}, e) \wedge \text{manner}'(\mathbf{j}, \text{giving}, e) \wedge \text{receive}'(\mathbf{b}, \mathbf{m}, e)] \end{aligned}$$

Thus root sensitivity is captured since $\sqrt{\text{give}}$ subsumes the results entailed by both templates, nullifying the semantic difference between the templates. Crucially, the result entailed by the root is also sufficient to define the event’s endpoint (see Beavers 2011), predicting root telicity as well.

Next, “transfer of possession” roots (e.g. *sell*, *loan*) entail the same result as *give*, but also loss of the theme by the agent, as in (26a,b), plus a different manner. The denotation for the root of *sell* given in (26c) will then derive (26d) as the final meaning of both (26a,b) (skipping compositional details).

- (26) a. John sold Mary the book, #but she never owned it/he never ceased to own it.
b. John sold the book to Mary, #but she never owned it/he never ceased to own it.
c. $\llbracket \sqrt{\text{sell}} \rrbracket = \lambda P \lambda x \lambda e [\text{manner}'(x, \text{selling}, e) \wedge \text{lose}'(th'(P, e), x, e) \wedge \text{receive}'(th'(P, e), rg'(P, e), e)]$
d. $\exists e [\text{causer}'(\mathbf{j}, e) \wedge \text{manner}'(\mathbf{j}, \text{selling}, e) \wedge \text{lose}'(\mathbf{b}, \mathbf{j}, e) \wedge \text{receive}'(\mathbf{b}, \mathbf{m}, e)]$

Telicity is assured by the non-prospective result, and again there is no contrast in the alternation. Finally, “transfer of possession by motion” roots (e.g. *hand*, *pass*) entail the same as transfer of possession roots plus also that motion occurs and that there is an arriving that obtains as well, as evidenced in (27a,b). The root for *hand* in (27c) derives the meanings in (27d) (skipping compositional details).

- (27) a. John handed Mary the book, #but she never received it/he never lost it.
b. John handed the book to Mary, #but she never received it/he never lost it.
c. $\llbracket \sqrt{\text{hand}} \rrbracket = \lambda P \lambda x \lambda e [\text{manner}'(x, \text{handing}, e) \wedge \text{lose}'(th'(P, e), x, e) \wedge \text{leave}'(th'(P, e), x, e) \wedge \text{arrive}'(th'(P, e), rg'(P, e), e) \wedge \text{receive}'(th'(P, e), rg'(P, e), e)]$
d. $\exists e [\text{causer}'(\mathbf{j}, e) \wedge \text{manner}'(\mathbf{j}, \text{handing}, e) \wedge \text{leave}'(\mathbf{b}, \mathbf{j}, e) \wedge \text{lose}'(\mathbf{b}, \mathbf{j}, e) \wedge \text{arrive}'(\mathbf{b}, \mathbf{m}, e) \wedge \text{receive}'(\mathbf{b}, \mathbf{m}, e)]$

In sum, all of the roots so far (a) entail a non-prospective result that yields telicity and (b) subsume the result of both frames, meaning no contrast in the alternation, one type of root sensitivity effect.

A very different class of roots is represented by ballistic motion roots (e.g. *throw*, *toss*) and sending roots (e.g. *send*), in which both possession and arrival are cancelable:

- (28) a. John sent/lobbed Mary the ball, but the heavy downpour stopped her getting it/it arriving.
b. John sent/lobbed the ball to Mary, but the heavy downpour stopped her getting it/it arriving.

So why are these predicates telic? Following Beavers (2011:31-37) the relevant result is that the agent loses the theme and/or the theme leaves the agent, something non-cancelable in both variants:

- (29) a. John sent/tossed Mary the ball, #but it never left/he never gave it up.
b. John sent/tossed the ball to Mary, #but it never left/he never gave it up.

Thus these are “release” roots, encoding a punctual transition of loss or leaving sufficient to ensure telicity. These roots also entail prospective arrival due to ballisticness and the nature of sending, thus subsuming the result of the *to* frame. Putting the pieces together, then, something like (30) in the *to* frame will have the following meaning (treating the relevant result state as leaving). (Here and below we just give final meanings without also giving root meanings or compositional details.)

- (30) John threw the ball to Mary.
 $\exists e[\text{causer}'(\mathbf{j}, e) \wedge \text{manner}'(\mathbf{j}, \text{throwing}, e) \wedge \text{leave}'(\mathbf{b}, \mathbf{j}, e) \wedge \Diamond \text{arrive}'(\mathbf{b}, \mathbf{m}, e)]$

Crucially, the IO result is *not* entailed by the root, so that the IO template will contribute prospective receiving, and thus the two variants mean two different things, evidenced again by London Office effects:

- (31) John threw Mary the ball. (cp. John threw the ball to London/#John threw London the ball)
 $\exists e[\text{causer}'(\mathbf{j}, e) \wedge \Diamond \text{receive}'(\mathbf{b}, \mathbf{m}, e) \wedge \text{manner}'(\mathbf{j}, \text{throwing}, e) \wedge \text{leave}'(\mathbf{b}, \mathbf{j}, e) \wedge \Diamond \text{arrive}'(\mathbf{b}, \mathbf{m}, e)]$

This again explains root sensitivity, and root telicity follows from the root’s leaving state. Interestingly, this state is not an augmentation of what the template entails: it is a wholly distinct state, suggesting that roots can contribute results relevant for telicity not contingent upon the template they occur in.

Another broad class of roots consists of accompanied motion (e.g. *bring*, *take*) and continuous application of force (e.g. *carry*, *haul*, *drag*) roots, which lexically entail arrival (and leaving from some contextually supplied source \mathbf{b}_C), but crucially again not caused possession. Thus again there is a result sufficient to derive telicity, yet the two variants of the dative alternation will mean different things:

- (32) John brought the dossier to the council, but never gave it up/#it never arrived.
 $\exists e[\text{causer}'(\mathbf{j}, e) \wedge \text{manner}'(\mathbf{j}, \text{bringing}, e) \wedge \text{leave}'(\mathbf{j}, \mathbf{b}_C, e) \wedge \text{arrive}'(\mathbf{j}, \mathbf{c}, e) \wedge \text{leave}'(\mathbf{d}, \mathbf{b}_C, e) \wedge \text{arrive}'(\mathbf{d}, \mathbf{c}, e)]$
(33) John brought the council the dossier, but never gave it up/#it never arrived.
 $\exists e[\text{causer}'(\mathbf{j}, e) \wedge \Diamond \text{receive}'(\mathbf{d}, \mathbf{c}, e) \wedge \text{manner}'(\mathbf{j}, \text{bringing}, e) \wedge \text{leave}'(\mathbf{j}, \mathbf{b}_C, e) \wedge \text{arrive}'(\mathbf{j}, \mathbf{c}, e) \wedge \text{leave}'(\mathbf{d}, \mathbf{b}_C, e) \wedge \text{arrive}'(\mathbf{d}, \mathbf{c}, e)]$

The root-determined result is again wholly distinct from that of the template (at least in the IO frame).

The final root class are “future having” roots (e.g. *bequeath*, *leave*, *will*). These are a bit more complex, as loss, leaving, arrival, and possession are all cancelable, though prospective possession is entailed (i.e. the London Office effect obtains in both variants):

- (34) a. John bequeathed Bill/#London his fortune, but Bill died before he could take it.
b. John bequeathed Bill/#London his fortune, but John blew it all before he died.
(35) a. John bequeathed his fortune to Bill/#London, but Bill died before he could get it.
b. John bequeathed his fortune to Bill/#London, but John blew it all before he died.

However, there is an intuitive reason these predicates are telic: they are performative, i.e. they entail the creation of an obligation to give at a later date. This in turn ensures that these roots also entail prospective possession, subsuming the results of the IO and *to* templates, meaning there is no contrast in the alternation, explaining root sensitivity. It is not our goal to give a theory of performativity here, so we do not give formal representations, though it should be clear how representations analogous to those above would capture the facts. Here the result that derives telicity is truly distinct from the results of the templates, again suggesting that roots can determine telicity independent of the template they occur in.

6. Root vs. Template Meanings

Roots can determine templatic meaning — they give the template thematic interpretation (root sensitivity) and define aspectually relevant results (root telicity) — and the analysis above suggests a way this may come about in terms of roots determining information about the theme and recipient of the templatic result head. But a deeper question is *why* these roots have these meanings. This was largely stipulated in the representations given above, but such representations are just working characterizations of the truth conditions that ultimately comprise the meanings of the roots, where we can understand truth conditions as sets of lexical entailments following Dowty (1991) and Beavers (2010). We suggest that the relevant result entailments for each root may in many (if not all cases) actually follow from other lexical entailments in the meaning of the root. In particular, we define two types of lexical entailments:

- (36) a. *Template lexical entailments* - general eventive lexical entailments (e.g. about change)
 b. *Root lexical entailments* - idiosyncratic lexical entailments (e.g. names of states)

IO and *to* templates entail possible receiving and dyadicity (receiving or arriving) respectively. But possible receiving entails possible dyadicity. Assuming sets of lexical entailments are closed under entailment, then possible dyadicity is also a lexical entailment of IO templates. We notate this as in (37), where $\llbracket \cdot \rrbracket$ maps to a set of entailments, and an arrow indicates that one entailment entails the other.

- (37) a. $\llbracket P_{loc} \rrbracket := \{ \dots, \Diamond R', \dots \}$
 b. $\llbracket P_{have} \rrbracket := \{ \dots, \Diamond receive', \rightarrow \Diamond R', \dots \}$

This already suggests that sets of lexical entailments may not be unstructured, but that there may be entailment relationships between them (as independently argued by Beavers 2010).

Root meanings in turn contain highly specific idiosyncratic entailments. However, the specificity of these entailments may be such that they necessarily entail more general entailments, which thus must also be part of the entailments that define the root meaning by closure under entailment. For example, $\sqrt{\text{toss}}$ entails a type of overhand ballistics, but the very definition of ballistics necessarily entails the more general releasing semantics that defined the larger class of release roots above. Similarly, $\sqrt{\text{granny}}$ indicates a certain type of underhand ballistics, which again entails releasing.⁵ But releasing was the entailment that gave rise to root telicity. Ballistics also entails possible arrival, the entailment that linked these roots to the *to* template but not the IO template, predicting root sensitivity. Thus the set of lexical entailments that define a root's meaning is not unstructured, but forms a complex network, exemplified in (38) for $\sqrt{\text{toss}}$, deriving entailments ensuring root sensitivity and root telicity from the more idiosyncratic meanings, without stipulation.

- (38) $\llbracket \sqrt{\text{toss}} \rrbracket := \left\{ \dots, \text{overhand ballistics, } \begin{array}{l} \rightarrow \text{physical releasing, } \rightarrow \text{leaving} \\ \rightarrow \Diamond \text{arriving, } \rightarrow \Diamond R' \end{array} \right\}$

To put it another way, one cannot spell out certain kinds of idiosyncratic meanings without ultimately referencing by virtue of those meanings the more basic templatic notions such as change that figured into root sensitivity and root telicity. For ditransitives we ultimately have four major types of roots:

(39)

Specificity of Lexical Entailments per Root					
Root Entailments		Root Class Entailments		Templatic Entailments	
Types of giving	⊃	actual receiving	⊃	$\Diamond receive'$	⊃ $\Diamond R'$
Types of obliging to give	⊃	possible receiving	⊃	$\Diamond receive'$	⊃ $\Diamond R'$
Types of accomp. motion	⊃	actual arrival			⊃ $\Diamond R'$
Types of releasing	⊃	possible arrival			⊃ $\Diamond R'$

Of course, $\sqrt{\text{flat}}$ in (1) does *not* entail template entailments; its simple stative meaning does not entail cause and change, and the template is what brings these to bear. Ditransitive simply name a larger chunk of template's meaning (see also e.g. Levin & Rapoport 1988; Goldberg 1995:Ch.2). In sum, the overlap in root and template meaning is not just attested but expected if roots entail such specific information.

⁵ In the dialect of the first author of this paper, *Coach Jester grannied the ball into the net* means to release the ball using an underhand motion from between one's legs; in other dialects this might be *taking a granny shot*.

7. Template Structure vs. Lexical Entailments

But if roots can contribute templatic information, what evidence is left that there even are templates? The answer is that templates still have an ontologically different status in terms of defining structured meaning representations that have grammatical consequences in ways roots do not. For example, recall Harley's event structures qua syntactic structures in (3), repeated here:

- (40) a. $[_{vP} \text{ John } [_{v'} [_{v \text{ cause } \sqrt{\text{send}}}] [_{PP} \text{ Mary } [_{P'} P_{\text{HAVE}} \text{ a ball }]]]]]$
 b. $[_{vP} \text{ John } [_{v'} [_{v \text{ cause } \sqrt{\text{send}}}] [_{PP} \text{ the ball } [_{P'} P_{\text{LOC}} \text{ to Mary }]]]]]$

These event structures not only capture London Office and argument realization facts, they also capture the well-known binding asymmetries of Barss & Lasnik (1986), whereby the first complement can bind into the second and thus can (say) bind a bound variable, while the reverse is not possible.

- (41) a. I sent [every employee]_i his_i check. c. I sent [each check]_i to its_i recipient.
 b. *I sent its_i recipient [every check]_i. d. *I sent his_i check to [every employee]_i.

This follows because the P heads define different asymmetric c-command relations between their arguments. However, recall that some roots such as $\sqrt{\text{bequeath}}$ carry the same meaning as P_{HAVE} , which thus surfaces even in *to* frame. Since the meaning is the same as P_{HAVE} does this mean that we should expect the same asymmetric binding facts as found with P_{HAVE} ? This is not the case: in the *to* frame the c-command facts are the opposite of the IO frame and in line with all other *to* frames:

- (42) a. I bequeathed [each account]_i to its_i associated heir.
 b. *I bequeathed his_i account to [every associated heir]_i.

Thus while possessorhood can be introduced by the root or template, it seems that only template-introduced possession has an effect on relative argument prominence.

Furthermore, as Beck & Johnson (2004:108-110) argue, both variants of the dative alternation allow restitutive *again* — the result state but not necessarily anything else held before — something expected from event templates that separate out result states as separate constituents *again* can attach to (here PPs):

- (43) a. I threw [[Sandy the ball] again], and she had had it before.
 b. I threw [[the ball to third base] again], and it been there before.

But release roots like $\sqrt{\text{throw}}$ also entails a result state, namely “release”. Yet crucially for any position of *again* there is no reading where just the release happened before and not the entire event (see also Beavers & Koontz-Garboden 2012 for additional discussion):

- (44) a. (Again) I (again) threw Sandy the ball (again).
 b. (Again) I (again) threw the ball to third base (again). (not just “released again”)

Thus roots do not define decomposed semantic constituents accessible to sublexical scopal modification.

Both of these facts follow from (40): the root modifies the causal head and entails possession and release and other results as a matter of lexical semantic content, but does not introduce constituents that *again* can modify nor structure arguments. Templates may entail the same things, but additionally define semantically well-defined constituents of the appropriate sort and take arguments in ways that determine asymmetric c-command. Thus the root/template distinction is motivated even in the absence of an ontological distinction in the kinds of meanings they may bring to the larger event structure.

8. Concluding Remarks

Template and root meanings differ not ontologically (contra Arad 2005; Embick 2009) but in specificity, with roots sometimes entailing template meaning. (See Koontz-Garboden & Beavers 2016 for a similar discussion of change-of-state roots.) For roots this overlap follows because they already entail such specific information that entailing more general information is inevitable. But can templates

ever entail root entailments? The answer is almost certainly that they cannot: templatic entailments never entail more specific ones, since specificity runs only one direction. Thus the expected pattern is that roots will entail idiosyncratic lexical semantic information, and in some cases therefore more general lexical entailments defining classes of roots and ultimately templates, but a given templatic head will only entail more general lexical entailments and rarely much else (though a given head may be more specific than another on a case-by-case basis). But this does not mean though that the root/template distinction does not exist. The key difference is that templates define a grammatically significant level of representation and roots do not, even when entailing the same meanings.

References

- Arad, Maya (2005). *Roots and Patterns*. Springer, Dordrecht.
- Barss, Andrew & Howard Lasnik (1986). A note on anaphora and double objects. *Linguistic Inquiry* 17, 347–354.
- Beavers, John (2010). The structure of lexical meaning: Why semantics really matters. *Language* 86, 821–864.
- Beavers, John (2011). An aspectual analysis of ditransitive verbs of caused possession in English. *Journal of Semantics* 28, 1–54.
- Beavers, John (2012). Lexical aspect and multiple incremental themes. Demonte, Violeta & Louise McNalley (eds.), *Telicity, Change, and State*, Oxford University Press, Oxford, 23–59.
- Beavers, John & Andrew Koontz-Garboden (2012). Manner and result in the roots of verbal meaning. *Linguistic Inquiry* 43, 331–369.
- Beavers, John & Andrew Koontz-Garboden (In prep). *The Meaning of Verbal Roots and the Roots of Verbal Meaning*. Unpublished Ms., The University of Texas at Austin and The University of Manchester.
- Beck, Sigrid & Kyle Johnson (2004). Double objects again. *Linguistic Inquiry* 35, 97–124.
- Borer, Hagit (2005). *Structuring Sense, Vol. I and II*. Oxford University Press, Oxford.
- Dowty, David (1979). *Word Meaning and Montague Grammar*. Reidel, Dordrecht.
- Dowty, David (1991). Thematic proto-roles and argument selection. *Language* 67, 547–619.
- Dunbar, Ewan & Alexis Wellwood (2016). Addressing the “two interface” problem: Comparatives and superlatives. *Glossa* 1:1, 1–29.
- Embick, David (2009). Roots, states, and stative passives. Talk given at the 2009 Roots Workshop, Stuttgart.
- Folli, Raffaella & Heidi Harley (2004). Consuming results: Flavors of little-v. Kempchinsky, Paula & Roumyana Slabakova (eds.), *Aspectual Enquiries*, Kluwer, Dordrecht, 1–25.
- Goldberg, Adele E. (1995). *Constructions*. University of Chicago Press, Chicago, IL.
- Green, Georgia (1974). *Semantic and Syntactic Regularity*. Indiana University Press, Bloomington.
- Gropen, Jess, Steven Pinker, Michelle Hollander, Richard Goldberg & Ronald Wilson (1989). The learnability and acquisition of the dative alternation in English. *Language* 65, 203–257.
- Harley, Heidi (2003). Possession and the double object construction. Pica, Pierre & Johan Rooryck (eds.), *Linguistic Variation Yearbook* 2, John Benjamins, Amsterdam, 31–70.
- Jackendoff, Ray (1996). The proper treatment of measuring out, telicity, and perhaps even quantification in English. *Natural Language and Linguistic Theory* 14, 305–354.
- Koenig, Jean-Pierre & Anthony R. Davis (2001). Sublexical modality and the structure of lexical semantic representations. *Linguistics and Philosophy* 24, 71–124.
- Koontz-Garboden, Andrew & Beavers, John (2016). Change of state verbs and the semantics of roots. Brendel, Cole, Aaron Kaplan, Abby Kaplan, Miranda McCarvel, Jeff Pynes, and Ed Rubin (eds.), *Proceedings of the 34th West Coast Conference on Formal Linguistics*, Cascadia Proceedings Project, Somerville, MA, this volume.
- Kratzer, Angelika (1996). Severing the external argument from its verb. Rooryck, Johan & Laurie Zaring (eds.), *Phrase Structure and the Lexicon*, Kluwer, Dordrecht, 109–137.
- Krifka, Manfred (1998). The origins of telicity. Rothstein, Susan (ed.), *Events and Grammar*, Kluwer, Dordrecht, 197–235.
- Krifka, Manfred (2004). Semantic and pragmatic conditions for the dative alternation. *Korean Journal of English Language and Linguistics* 4, 1–32.
- Levin, Beth & Tova Rapoport (1988). Lexical subordination. *CLS* 24, 275–289.
- Levin, Beth & Malka Rappaport Hovav (1995). *Unaccusativity*. MIT Press, Cambridge, MA.
- Marantz, Alec (1997). No escape from syntax: Don’t try morphological analysis in the privacy of your own lexicon. *Proceedings of the 21st Annual Penn Linguistics Colloquium*, vol. 4.2 of *University of Pennsylvania Working Papers in Linguistics*, 201–225.
- Pesetsky, David (1995). *Zero Syntax*. MIT Press, Cambridge, MA.
- Pinker, Stephen (1989). *Learnability and Cognition*. MIT Press, Cambridge, MA.
- Ramchand, Gillian (2008). *Verb Meaning and the Lexicon*. Cambridge University Press, Cambridge.
- Rappaport Hovav, Malka & Beth Levin (1998). Building verb meanings. Butt, Miriam & Wilhelm Geuder (eds.), *The Projection of Arguments*, CSLI Publications, Stanford, 97–133.
- Rappaport Hovav, Malka & Beth Levin (2008). The English dative alternation: A case for verb sensitivity. *Journal of Linguistics* 44, 129–167.
- Wechsler, Stephen (2005). What is right and wrong about little-v. Vulchanova, Mila & Tor A. Åfarli (eds.), *Grammar and Beyond — Essays in Honour of Lars Hellan*, Novus Press, Oslo, 179–195.