

Lexical Representation, Lexical Semantics, and Syntax

1 Introduction

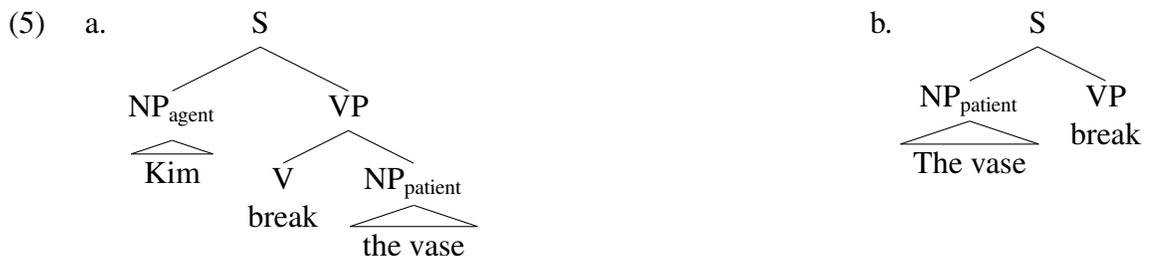
- We had previously discussed some of basic ingredients of a theory of word meaning, all of which are subject to inter- and intra-linguistic variation:
 - Systematic lexical classes defined by broad, general shared meanings (“templates”)
 - Idiosyncrasies distinguishing word within a class (“roots”)
 - Principles linking those things (or at least templates) to morphology and syntax.
- But what is the basis for those linking principles? On one side is some grammatical structure. What’s on the other side? There are three main candidates in the literature:
 - **Lexical Semantic Representation** - Word meaning is represented in some specific, structured way, and aspects of that representation correlate with grammatical structure.
 - **Lexical Semantic Content** - Word meaning is ground out in truth conditions, and aspects of those truth conditions correlate with grammatical structure.
 - **Neither of the Above** - Non-lexical semantic information (e.g. pure grammar, pragmatics, conventional usage) correlate with grammatical structure.
- The (vast) majority of work in theories of word meaning assumes lexical semantic representation is key to describing grammatical facts about words and word classes.
- In my own work, I have long pushed back against this for fear of circularity:
 - Unlike syntax, it’s really hard to justify why semantics is structured one way or another.
 - So are you sure you didn’t fix up the semantic structure to match the syntactic one?
- Thus I long rejected the idea that representations mattered and focused on content ...
- ... *until* I started to work out compositional details I had previously ignored. At that point I realized some things can’t be described without appeal to semantic representation. Oops.
- And then there’s “neither of the above”, long known about but rarely integrated into the larger picture. None of this negated my prior work, it just made it harder. But harder is fun!
- So let’s just say the current status update on the relationship of lexical semantics and grammar is “It’s complicated”. What I hope to do here today is to explain why and illustrate a way to put things together, using a variety of case studies mostly from my own work.
- I’ll start with a recap of what are to my mind the two main ways prior work has relied on lexical semantic representation in describing grammatical facts — thematic roles and event structures — before showing where they fail and why I originally moved on.
- I’ll then talk about some of the complexities that come up when relying on truth conditions, and why the ultimate soup of factors may involve a bit of everything.

2 Lexical Semantic Representations

- Verbs describe events or states in the world involving some set of “participants”.
- There are a *ton* of proposals about what a linguistically-relevant representation of verbal meaning is. Yet it’s also safe to say that most (but not all) theories fall into two broad camps:
 - (1) a. **Event-type theories:** Events and states fall into different types, and thus verbs fall into different types depending on what kind of event or state they describe. The verb’s grammatical properties are conditioned by the type of event or state.
b. **Participant-type theories:** Participants in different events/states fall into different types (“thematic roles”), and thus verbs fall into different types depending on what participants are involved in the event/state they describe. The verb’s grammatical properties are conditioned by the (set of) participant types.
- Thematic roles were what Fillmore (1968, 1970) originally assumed, so let’s start with them.

2.1 Thematic Roles

- Let’s quickly recap Fillmore’s own proposals for *break*, with examples repeated here:
 - (2) *break*: (agent) (instrument) patient
 - a. Mary broke the window (with the hammer).
 - b. The hammer broke the window.
 - c. The window broke.
- The “sliding” nature of who is the subject comes from a ranking of roles for subjecthood.
 - (3) a. Agent > Instrument > Patient (thematic role hierarchy)
b. The argument with the highest thematic role is the subject.
 - (4) a. Of the remaining arguments, the one with the lowest thematic role is object.
b. Anything not the subject or object is a prepositional phrase (PP)
- Yet syntax is itself hierarchical, e.g. on one classic understanding phrase structures creates hierarchies of arguments through height, e.g. subjects are higher than objects:



- Hierarchies define the key notion of lexical semantic representational structure in thematic role theories, and how it relates to syntax: *thematic prominence corresponds to syntactic prominence*, what Levin and Rappaport Hovav (2005) call **prominence preservation**.
- However, many problems arise with thematic roles, as discussed extensively by Dowty (1989), Rappaport and Levin (1988), Wechsler (1995), Levin and Rappaport Hovav (2005), Beavers (2006), and Rissman and Majid (2019), but especially Dowty (1991:553-559).

- **Idiosyncrasy vs. Regularity:** Traditional thematic role were course grained and did not capture the subtle idiosyncrasies, nor were they really clearly defined in a way that connected to the sort of tests Fillmore (1970) and later Cruse (1973) used to identify them.
- Dowty (1989) outlined a framework for thinking of thematic roles that resolved a lot of this. His idea is that a thematic role is a *set of lexical entailments*, i.e. what must be true of something by analytic entailments, from which you can derive Fillmore-style thematic roles:
 - (6) a. An **individual thematic role** is the set of all things that must be true of any argument x of a given verb (regardless of the identity of the rest of the arguments). (This distinguishes a *breaker* from a *jogger*.)
 - b. A **thematic role type** is the intersection of two or more individual thematic roles. (The intersection of *breaker* and *jogger*, i.e. what they have in common. Some of these are traditional, linguistically significant thematic roles.)
- Last week, Craige Roberts asked whether lexical entailments are background or asserted content — are they things we assume to be true to talk about these events, or are they part of what we’re saying about them when we use certain verbs? I set this aside here (as did Dowty), but it’s another point of variation to be considered carefully.
- Either way, though, thematic roles are testable by semantic acceptability (see also Cruse 1973), and the root (individual role) vs. template (role type) distinction is captured via set intersection. But it’s a framework, not a theory — it doesn’t say *what* roles are out there!
- **Definability:** Working out what the actual definitions are proved tricky:
 - Agent has no necessary or sufficient conditions (Cruse 1973, Dowty 1991), though as a kind of prototype it seems robust (Rissman and Majid 2019).
 - Instrument is a sort of agent for some (Schlesinger 1989) or a causer (Croft 1991, Koontz-Garboden 2009), or it’s defined as via causal intermedicacy (Jerro 2017) or as a prototype centered on being an extension of the agent (Rissman et al. 2022).
- **Distinguishability and Fragmentation:** Sometimes roles fracture into increasingly smaller (and more useless) types. Dowty (1991:554, (2)) gives the following to illustrate this point:
 - (7) a. I paid \$5/this amount/?this \$5-bill for the book.
 - b. I paid for the book with ?\$5/#this amount/this \$5-bill.
 - c. The book cost me \$5/?this amount/#this \$5-bill.
 - d. I bought the book for \$5/this amount/#this \$5-bill.
- It’s the “same” role here — “money” — but there are differences how it’s expressed. Do we fragment “money” into a series of slightly different roles? They might not figure into much. Do we want “money” to be so broad it is useless?
- **Combinatorics:** A point brought up by Rappaport and Levin (1988) is that the notion of a thematic role list is just too unstructured to give us any predications about *verb classes*.
- < Agent, Instrument, Patient > makes sense, but what rules out < Instrument, Experiencer, Recipient >? There are semantic relations between roles, but that requires more semantics.

- **Arbitrariness in Thematic Role Hierarchies** Most problematically, the real action is in role hierarchies, yet (building on Ash’s comment) most follow from nothing save what they were meant to explain. In what sense *other* than subjecthood do agents outrank instruments?
- Indeed, as hierarchies were applied to a other phenomena (e.g. case-marking, agreement, control, binding, causativization, passivization) a proliferation of incompatible hierarchies arose (see Levin and Rappaport Hovav 2005:Ch.6 for a beautiful summary of the problem).
- Attempts to ground them out often appeal to basic cognitive notions (“natural prominence scales” — see Fillmore 1977, Levin and Rappaport Hovav 2005). Fillmore’s subject-selection hierarchy might be the cross-product of two scales, but where do these come from?

- (8) a. Causer > Patient (cognitive salience)
 b. Among causers: Agent > Instrument (causal prominence)

- Finally, appealing to thematic hierarchies means there are **no** necessary or sufficient conditions on, say, subject realization. Is this telling us something deeper or more important?
- Dowty (1991) thought so (as did Cruse 1973), and suggested that the basis for subject and object realization should be defined as *prototypes* sets of lexical entailments (see also Primus 1999, Ackerman and Moore 2001, Beavers 2005, 2006, 2010, Grimm 2005, 2011):

- (9) (a) Agent Proto-Role: (b) Patient Proto-Role:
 i. volitional involvement in the event or state i. undergoes change of state
 ii. sentience (and/or perception) ii. incremental theme [whose part/whole structure “measures” the event’s progress; JTB]
 iii. causing an event or change of state in another participant iii. causally affected by another participant
 iv. movement (relative to the position of another participant) iv. stationary relative to movement of another participant
 (v. exists independently of the event named by the verb) (v. does not exist independently of the event, or not at all) (Dowty 1991:(27),(28))

- The participant *most closely matching* each role is assigned a particular realization:

(10) ARGUMENT SELECTION PRINCIPLE: In predicates with a grammatical subject and object, the argument for which the predicate entails the greatest number of Proto-Agent properties will be lexicalized as the subject of the predicate; the argument having the greatest number of Proto-Patient entailments will be lexicalized as the direct object. (Dowty 1991:(31))

- If you follow (10) you can explain sliding subjecthood without a hierarchy since the agent best matches the proto-agent role, followed by the instrument, followed by the patient:

- (11) a. Mary broke the vase with a hammer. (Mary has (9a.ii-v))
 b. The hammer broke the vase. (the hammer has (9a.iii-v))
 c. The vase broke. (the vase has (9a.v))

- (12) John resembled Mary/Mary resembled John. (no winner? free variation!)

- But something’s still lacking: there’s one way to be most prototypical but many ways to be less — is there something more systematic here? I return to this below.

Thematic roles provide verb classes, and role rankings derive syntactically relevant structure. But traditional implementations are often lacking, and alternatives are needed.

2.2 Event Decompositions

- A dominant alternative is that the grammatically relevant bits of verb meaning relate to events and event types (Jackendoff 1976, 1990, Dowty 1979, Pinker 1989, Hale and Keyser 1993, 1997, 2002, Marantz 1997, Wunderlich 1997, Rappaport Hovav and Levin 1998, Harley 2003, 2012, Ramchand 2008, Alexiadou et al. 2015, Beavers and Koontz-Garboden 2020).
- They key insight comes from the fact that verbs are (roughly) paraphrasable as complex clauses that make plain how the event unfolded causally and temporally (Lakoff 1968):

- (13) a. Kim flattened the rug \approx Kim **caused** the rug to **become** flat.
 b. Kim cracked the vase \approx Kim **caused** the vase to **become** cracked.

- Maybe a verb's meaning consists (partly) of an *event structure*, composed of (a) a *template* of basic, universal event types and (b) idiosyncratic *roots* filling in real world meanings:

- (14) **Templatic operators:**
 a. Change-of-state (BECOME): a predicate over some state (over time)
 b. Causation (CAUSE): a relationship between two events (over time)
 c. Action (ACT): a property of n entities and an event

- (15) **Roots:**
 a. Some describe states something can hold: FLAT, SAD, RED, SHATTERED
 b. Some describe basic actions one can do: JOG, SNEEZE, RUN, BLINK, HAMMER

- Some calculus puts these together in a way that captures subevent structure qua temporal or causal flow, producing increasingly complex event types (Dowty 1979):

- (16) a. I hammered the metal. [x ACT_{<HAMMER>} y]
 b. The metal is flat. [y < FLAT >]
 c. The metal flattened. [BECOME [y < FLAT >]]
 d. Erin hammered the metal flat.
[[x ACT_{<HAMMER>} y] CAUSE [BECOME [y < FLAT >]]]

- NB: there are still thematic roles here! The arguments of these operators are associated with sets of entailments by those operators, just as Dowty (1989) defined them.
- On these definitions, several interesting properties emerge immediately.

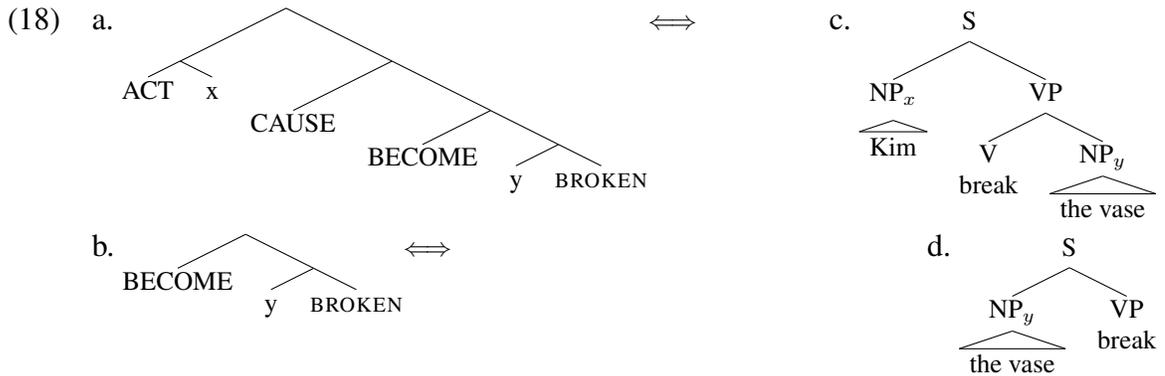
#1 As with thematic roles, there are basic universal classifications, and the root vs. template distinction is captured in the representations directly.

#2 Unlike thematic roles, this theory captures participant combinatorics, e.g. agents and patients go together because caused change of state verbs are built around operators taking both (Rappaport Hovav and Levin 1998), but nothing combines (say) a recipient and a stimulus.

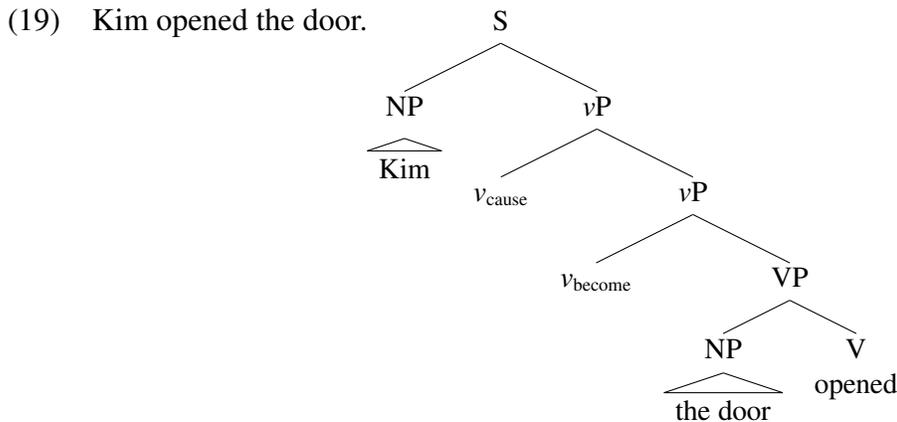
#3 The way events are built on other events in (16) predicts semantic relationships between words, e.g. (16d) entails (16c), which entails (16b). Of course, this *does* depending on CAUSE and BECOME being defined properly, for which we can thank Dowty (1979), e.g.:

(17) [BECOME ϕ] is true at I iff (1) there is an interval J containing the initial bound of I such that $\neg\phi$ is true at J , (2) there is an interval K containing the final bound of I such that ϕ is true at K , and (3) there is no non-empty interval I' such that $I' \subset I$ and conditions (1) and (2) hold for I' as well as I . (Dowty 1979:141,(11'))

- But what's the link to syntax? Well, syntactic prominence seems to follow event structure:



- The “sliding” nature of thematic roles to grammatical functions is captured by depth: whatever argument is the highest in the structure is subject, be it an agent or a patient.
- Indeed, so tight is this correlation that many take the syntax to *be* the event (Hale and Keyser 1993, 1997, 1998, 2002, Pesetsky 1995, Kratzer 1996, Baker 1997, Marantz 1997, Travis 2000, Harley 2003, 2012, Ramchand 2008, Alexiadou et al. 2015, *inter alia*). On this approach, the basic events are introduced by “light verbs” (just as in (13) that build up the event as a constituent, but which surface as a single monomorphemic verb:



- Either way, the event structure *follows the causal or temporal flow*: the deeper you are in the event structure the further in the causal or temporal structure, and the syntax mirrors this, all of which is yet another case of **prominence preservation**.

Causal or temporal prominence in the event determines grammatical prominence, another variant of the idea of prominence preservation.

- This all *feels* more motivated than thematic roles, even with proto-roles! However, there are reasons to doubt this approach as well, which I’ll outline next through two case studies.

3 A Case Study in Argument/Oblique Alternations

- Some things can't be explained by any of the above, but do point to another notion of semantic structure: *structured contrasts in meaning*, such as relative vagueness/specificity (drawing Beavers 2005, 2006, 2010, 2011; see also Ackerman and Moore 2001, Grimm 2005, 2011).
- A key case study are **object/oblique alternations**, where an argument can appear (in English) as an object or PP, like the locative alternation (Fillmore 1968, Anderson 1971, Rappaport and Levin 1988, Dowty 1991, Gropen et al. 1991, Beavers 2005, 2006, 2010, 2017):

- (20) a. Alice loaded **the hay** onto the wagon.
 b. Alice loaded the wagon **with the hay**. (Locative)

- (21) **Core Semantics of Locative Verbs:** Some CAUSER acts first upon some THEME and moves that THEME into some mutual configuration with some static LOCATION.

- With event structures, argument alternations involve one root that occurs in two templates — two distinct “event types” — that in turn correlate with two distinct syntactic structures.
- Indeed, Rappaport and Levin (1988) analyze the alternation as the verb reflecting caused change of state vs. caused change of location (see also Pinker 1989, Gropen et al. 1991):

- (22) Alice_x loaded hay_y onto the wagon_z. (change of location)
 [*x* cause [*y* to come to be at *z*]/LOAD]

- (23) Alice_x loaded the wagon_z with hay_y. (change of state)
 [[*x* cause [*z* to come to be in STATE]] BY MEANS OF [*x* cause [*y* to come to be at *z*]/LOAD]]

- Another way to think about it is that *load* is ambiguous between a *put* and *fill* reading:

(24) a. Alice put hay onto the wagon. (*Alice put the wagon with hay.)
 b. Alice filled the wagon with hay. (*Alice filled the hay into the wagon.)
- They propose (25) linking event types to syntax (basically “things that change are objects”):

- (25) Link the *x* argument in either of these structures to object position:
 a. ...[*x* come to be at LOCATION]...
 b. ...[*x* come to be in STATE]... (Levin and Rappaport 1988:25-26, (21)-(22), (24))

- But in (23) *both y and z* satisfy (25), yet the first one — *z* — is the object. Thus the contrast depends on a *structural* property of the representation: how “deep” something is (an explicit feature of some such approaches; see Van Valin and Wilkins 1996, Wunderlich 1997).
- But depth in the event was *supposed* to be correlated with temporal/causal precedence, and that *doesn't* change. The BY MEANS OF relation basically reflects the same thing as CAUSE, but arbitrary flips the order of the causing and caused events to get the linking right.
- Yet in terms of subevent structure (causation and temporality), the template *should* be:

- (26) [[*x* cause [*y* to come to be at *z*]/LOAD]] CAUSE [*x* cause [*z* to come to be in STATE]]

- But this gets the argument realization wrong — now *y* is more prominent than *z*. Thus relative depth in (23) is seemingly motivated by the syntactic fact it was meant to explain, not independent semantics (BY MEANS OF is a “syntactic diacritic”; Koenig and Davis 2006).

4 Truth Conditional Strength as Semantic Structure

- But there's a way out. An observation dating back Anderson (1971) is that whichever argument is object is interpreted as completely moved/changed (with the caveat that what counts as "completely" is fuzzy and contextually determined; see also Dowty 1991, Beavers 2010):
 - (27) a. Kim loaded *the hay* onto the wagon, #but still needed a truck for all the rest.
 - b. Kim loaded *the wagon* with the hay, #and still had extra room for the grain.
- Conversely, whichever argument is realized as a PP doesn't have to be completely moved/changed — any amount of change is fine:
 - (28) a. Kim loaded the wagon *with the hay*, but still needed a truck for the rest.
 - b. Kim loaded the wagon *with the hay*, leaving none behind.
 - (29) a. Kim loaded the hay *onto the wagon*, and still had extra room for the grain.
 - b. Kim loaded the hay *onto the wagon*, filling it up completely.
- But it does have to be at least *a little bit* moved/changed:
 - (30) a. Kim loaded the hay *onto the wagon*, #but none of the wagon had hay on it.
 - b. Kim loaded the wagon *with the hay*, #but none of the hay moved.
- So while both the objects and the corresponding PPs are affected, the object is completely affected whereas the PPs are vague as to completeness.
- This distinction between relatively complete change vs. vague change has been labeled **quantized** vs. **non-quantized** change (Hay et al. 1999, Beavers 2011, 2012, see also Krifka 1998, Kennedy and Levin 2008), and is a quite general phenomenon:
 - (31) a. **Quantized change:** Changes state in the event and reaches a *specific* result state (e.g. *The chef warmed the soup to 120F*)
 - b. **Non-quantized change:** Changes state in the event (e.g. *The chef warmed the soup (some/a lot)*)
- In the locative alternation the object always undergoes quantized change. So is objecthood somehow tied to indicating quantized change?
- There is reason to doubt this. *Spray/load* verbs are not the only ones that share the properties in (21). There are also verbs of slicing, cutting, scratching in which the causer moves an instrument into contact with a patient (Fillmore 1970, 1977, Dowty 1991; see Gawron 1986):
 - (32) a. Alice cut/sliced/chipped **the window** *with the diamond*. (window affected)
 - b. Alice cut/sliced/chipped *the diamond* **on the window**. (diamond affected)
 - Here the objects can be a little or a lot affected — they undergo non-quantized change.
 - Conversely, the PPs need not be affected in the least: they can literally just sit there and be none the different after the event. Of course, they *could* be affected. This isn't ruled out. Rather, the verb is vague. I'll call this being **unspecified for change**:
 - (33) **Unspecified for change:** Being in the event
 - Thus (32) contrast in undergoing non-quantized change vs. being unspecified for change.

- Beavers (2011, 2012) provided a formal model of these types of notions (plus more, treating change as change along a scale á la Krifka 1998, Kennedy and Levin 2008), but an emergent property is that they form an *implicational hierarchy* defined by increasing specificity:

(34) **Affectedness Hierarchy:** x undergoes quantized change $\rightarrow x$ undergoes non-quantized change $\rightarrow x$ is unspecified for change.

- This is a hierarchy, but it's not stipulated. It's just a fact that as you add more information things get strictly more specific (e.g. a pepperoni pizza is pizza, and pizza is food).
- For locative alternations, a pattern emerges: when an argument can be an object or a PP, its thematic role as an object is *vaguer* when it is a PP, viz. a **minimal specificity contrast**:

(35)

Contrast	:	<i>quantized</i>	\rightarrow	<i>non-quantized</i>	\rightarrow	<i>unspecified</i>
<i>Load</i> locative	:	Object	\Leftrightarrow	PP		
<i>Cut</i> locative	:			Object	\Leftrightarrow	PP

- NB: **Lots** of other direct/oblique alternations show this pattern, too, although along different hierarchies of specificity of semantics (see Beavers 2005, 2006, 2010 on others).
- How do we model the linking for this? We can assume Dowty's ARGUMENT SELECTION PRINCIPLE (ASP), but we need to define *sets* of lexical entailments for it to work on.
- That's easy enough. Assume our proto-patient entailments are those in (34) (but treating unspecified for change as a given). The implicational relationship in (34) restricts the logically possible sets of lexical entailments to derive a subset hierarchy of **possible thematic roles**:

(36) $\left\{ \begin{array}{l} \textit{quantized} \\ \textit{non-quantized} \end{array} \right\} \supset \left\{ \textit{non-quantized} \right\} \supset \left\{ \right\}$ (ruled out: $\left\{ \textit{quantized} \right\}$)

- This is a thematic role hierarchy, but just as (34) is motivated independently, so is this one.
- We also need a principle that ensures that any non-subject, non-object is a PP:

(37) **OBLIQUE SELECTION PRINCIPLE (OSP):** An argument not realized as a direct argument can be realized as a PP.

- The following governs how the ASP and OSP interact when both apply (i.e. alternations):

(38) **MORPHOSYNTACTIC ALIGNMENT PRINCIPLE (MAP):** When an argument may be either an object or PP, it bears role *R* as a object and the next weakest role *Q* as a PP.

- This produces the following, governed by alternate realizations of each participant but with the knock off effect that co-arguments will have greater/lesser proto-patientivity:

(39)

Thematic Roles	:	$\left\{ \begin{array}{l} \textit{quantized} \\ \textit{non-quantized} \end{array} \right\}$	\supset	$\left\{ \textit{non-quantized} \right\}$	\supset	$\left\{ \right\}$
<i>load</i> contrast	:	DO	\Rightarrow	PP		
<i>cut</i> contrast	:			DO	\Rightarrow	PP

- Crucially, (36) is a thematic role hierarchy that is based on relative proto-typicality, but the implicational relationships between the entailments in (34) produces a *motivated* hierarchy based on vagueness. This is semantic structure! But its structure that follows independently.

Contrasts in meanings can be inherently structured in linguistically significant ways.

5 Case-marking in Sinhala: Semantic Generality and Blocking

- A second case study in how meanings are structured without appeal to semantic representations concerns a concept I mentioned last time, namely transitivity, i.e. what semantic patterns correlate with having a “core transitive” morphosyntax (e.g. nominative-accusative).
- Much work on this topic has assumed a prototype approach (Hopper and Thompson 1980, Tsunoda 1981, 1985, Malchukov 2006): if a clause fits a some semantic prototype it’ll show core transitive grammar, else it’ll deviate somehow.
- One factor in transitivity was affectedness (Hopper and Thompson 1980), and the object argument alternations above in some ways reflect exactly this: decreasing affectedness is decreasing prototypicality is deviation from core transitive.
- Another factor Hopper and Thompson identified was volitionality, and a great case study for this is Colloquial Sinhala (an Indo-Aryan language spoken in Sri Lanka).
- Sinhala shows has an obligatory inflection wherein each verb is marked for “volitive” or “involitive” mood, roughly corresponding to subject volitionality, which also triggers an alternation in subject case marking (Gair 1970, Inman 1993, Beavers and Zubair 2010, 2013):¹

- (40) a. *Aruni Nimal-wə gilūwa.*
 Aruni Nimal-ACC drown.VOL.PST
 ‘Aruni drowned Nimal (deliberately).’ (intentional agent, by default)
- b. *Aruni atij Nimal-wə gilūna.*
 Aruni POST Nimal-ACC drown.INV.PST
 ‘Aruni drowned Nimal (accidentally).’ (non-intentional agent, by default)

- So this is a transitivity alternation conditioned on volitionality. But *why* do transitivity effects arise in general, and when they do *what* non-core case marking do you get?
- Sinhala is a great case study, since while volitive verbs overwhelmingly take nominative subjects, subject case with involitives is quite diverse (Gair 1970, Inman 1993, Henadeerage 2002, Beavers and Zubair 2010, 2013, 2014, 2016, Chou and Hettiarachchi 2016).

#1 In general, transitive clauses with causer subjects take *atij* as above, though with an interesting wrinkle that the NP it occurs with can either be nominative (unmarked) or genitive, depending on whether the subject is acting with their hands or not:

¹(In)volitive is indicated by internal stem alternations of the thematic vowel conditioned by (in)volitivity and tense. Present volitive is the “basic form”, and the rest derived by regular rules Inman (1993:24–25, (1), (2)).

(i)	gloss	root	Present Stem Formation		Past Stem Formation	
			volitive stem	involitive stem	volitive stem	involitive stem
	‘wash’	hood-	hood-a-nəwa	heed-e-nəwa	heed-u(w)-a	heed-un-a
	‘suck’	ur-	ur-a-nəwa	ir-e-nəwa	ir-u(w)-a	ir-un-a
	‘make’	had-	had-a-nəwa	hæd-e-nəwa	hæd-u(w)-a	hæd-un-a
	‘open’	ar-	ar-i-nəwa	ær-e-nəwa	ær-i(y)-a	ær-un-a

- (41) a. *Andəree atij/Andəree-ge atij wæli kæwenəwa.*
 Andare POST/Andare-GEN POST sand eat.INV.NPST
 ‘Andare accidentally eats sand.’ (nominative+*atij*)
 ‘Andare accidentally eats sand with his hands.’ (genitive+*atij*)
- b. *Andəree-ge atij/*Andəree atij boll-eka ælluna.*
 Andare-GEN POST/Andare POST ball catch.INV.PST
 ‘Andare accidentally caught the ball with his hands.’
- c. *Andəree atij/*Andəree-ge atij mæsek giluna.*
 Andare POST/Andare-GEN POST fly swallow.INV.PST
 ‘Andare accidentally swallowed a fly.’

- This might seem like a very specialized case system, but historically *atij* is the instrumental form of the word for *atə* ‘hand’. So it’s likely an historical vestige.

#2 Subjects of involitives can also be nominative or accusative when the verb is an inchoative. The difference is that with accusative subjects the reading implies a separate causer, but the nominative does not (though both are grammatically inchoative; Beavers and Zubair 2013):

- (42) a. *Nimal giluna.*
 Nimal drown.INV.PST
 ‘Nimal drowned.’
- b. *Nimal-wə giluna.*
 Nimal-ACC drown.INV.PST
 ‘Nimal was drowned (by someone).’

- Accusative is of course the case for patient direct objects, which are also acted on.

#3 The most diverse case is the dative (-*tə*), which marks involuntary actors as with many action verbs (Henadeage 2002:137-140) and performance verbs, plus experiencers and recipients:

- (43) a. *Amma-tə (#hitəla) nætuna.*
 Mother-DAT (intentionally) dance.INV.PST
 ‘Mother involuntarily danced (#intentionally).’ (involuntary actor)
- b. *Matə potə kiyəwewuna.*
 1SG.DAT book read.INV.PST
 ‘I (accidentally) read the book.’ (involuntary performer)
- c. *Laməya-tə saddəyak əhuna.*
 child-DAT noise hear.INV.PST
 ‘The child hear a noise.’ (experiencer)
- d. *Lamayi-tə tæægi læbuna.*
 child.PL.DAT gift.PL receive.INV.PST
 ‘The children received gifts.’ (recipient)

- The simplest analysis might is to list traditional thematic role types and their realizations:

- (44) a. genitive+*atij* - involuntary causer using their hands
 b. nominative+*atij* - involuntary causer not using their hands
 c. dative - involuntary actors, performers, experiencers, or recipients
 d. accusative - patient acted upon by someone or something else
 e. nominative - patient not acted on by someone or something else
- But these roles are not all distinct from one another, and some arguments may be covered by two rules. Yet that doesn't (always) yield complete variability in case.
 - For example, any causer using their hands is an actor. Yet the following all take genitive+*atij* but not dative, suggesting dative does *not* indicate involuntary actors *in general*:

(45) *athugæhennə* 'sweep', *atəgæhennə* 'touch', *hæhennə* 'rub', *gæhennə* 'hit', *hellennə* 'hurl', *ænennə* 'poke', *allen-kəraa* 'slap', *oluwə-kənnə* 'pester', *wisii-kəraa* 'throw'

- Yet some verbs do allow the alternation, albeit with subtle semantic differences:

(46) *Andəree atij/Andəree-tə wæli kawenəwa.*
 Andare POST/Andare-DAT sand eat.INV.NPST

- a. *atij* = 'Andare is doing something and accidentally eats sand.'
 b. dative = 'Andare accidentally eats sand.'

- The problem is the disjunctive analysis of dative in (44): what do these roles have in common? Beavers and Zubair (2014) suggested it is **not being the ultimate cause of the event** (cf. Butt 2006). When dative is possible for the subject, this is always the reading:

(47) a. *Anu nætuwa, eet kawuruwat eyaa-wə næteuwe nææ.*
 Anu dance.VOL.PST but nobody 3SG-ACC dance.CAUS.VOL.PST.EMPH NEG
 'Anu danced, but nobody made her dance.' (If she liked the song on the radio.)

b. *Anu-tə nætuna, #eet kawuruwat eyaa-wə næteuwe nææ.*
 Anu-DAT dance.INV.PST but nobody 3SG-ACC dance.CAUS.VOL.PST.EMPH NEG
 'Anu danced, but nobody made her dance.' (If she was possessed by a spirit.)

(48) a. *Anu helluwa, eet kawuruwat eyaa-wə helleuwe nææ.*
 Anu shake.VOL.PST but nobody 3SG-ACC shake.CAUS.VOL.PST.EMPH NEG
 'Anu shook, but nobody shook her/made her shake.' (If it was cold outside.)

b. *Anu-tə helluna, #eet kawuruwat eyaa-wə helleuwe nææ.*
 Anu-DAT shake.INV.PST but nobody 3SG-ACC shake.CAUS.VOL.PST.EMPH NEG
 'Anu shook, but nobody shook her.' (If her friend threw cold water on her.)

- The same is true in (46b), which technically means something like "was accidentally fed".
- This is consistent with use of dative outside of subject position, e.g. recipients and experiencers are rarely the ultimate cause of an event. Relatedly, in (46) the reading with dative case is a bit more like the subject was involuntarily fed sand.

#3 But aren't other things also not the ultimate cause of the event, like patients?

- Yes, but accusative is *strictly narrower*: there must be an individual acting directly on that entity (as per Shibatani 1976, Dowty 1979, Kratzer 2004) *and* it undergoes quantized change:

- (49) a. *Aruni Nimal(-wə/*tə) giluwə/mæruwə.*
 Aruni Nimal(-ACC/DAT) drown.VOL.PST/kill.VOL.PAST
 ‘Aruni (deliberately) drowned/killed Nimal.’
- b. *Aliyaa Joon-tə gəhuwə.*
 elephant John-DAT hit.VOL.PST
 ‘The elephant hit John.’

#4 Nominative indicates a patient that’s not clearly the ultimate cause; yet these can’t be dative.

- Why? Some work has suggested that some inchoatives are reflexive — something about the patient led to its change, i.e. there is causation but it is “internal” to the patient (Chierchia 2004, Koontz-Garboden 2009, Beavers and Zubair 2013, Lundquist et al. 2016, Beavers and Udayana 2023; though see Horvath and Siloni 2011, Schäfer and Vivanco 2016). This can be seen mostly clearly in languages that mark anticausatives as reflexive:

- (50) a. *Juan rompió el vaso.*
 Juan broke the cup
 ‘Juan broke the cup.’
- b. *El vaso se rompió.*
 the cup REFL broke
 ‘The cup broke.’ (Spanish; Koontz-Garboden 2009:84, (13a), (14a))

- Beavers and Zubair (2013) extend this analysis to anticausatives in Sinhala as well, and if true it would preclude dative on the analysis above. Now, Sinhala inchoatives are not marked as reflexive, but it turns out that truly marked reflexives *also* resist dative but like nominative:

- (51) *Joon(-*tə) (ibeemə) səhuna/heeduna*
 John(-DAT) by SELF shave.INV.PST/wash.INV.PST
 ‘John accidentally shaved/washed.’

- Since nominative does *all* volitive subjects, it’s really unspecified for meaning, a default.
- Putting the pieces together, what we ultimately have is systematic ranked exclusion: for any argument, the case it gets is the one with the narrowest set of conditions that matches its role:

- (52) **Default Subject Case Hierarchy:** *atiŋ*, acc > dat > nom
- a. i. *atiŋ* - involuntary causer acting on distinct patient
 - A. genitive complement - acting with hands
 - B. nominative complement - elsewhere
 - ii. accusative - highly affected patient acted upon by distinct causer
 - b. dative - anything else entailed to not ultimately be the cause
 - c. nominative - elsewhere

- The hierarchy is again rooted in relative vagueness, but not as a strict ordering. But no appeal is needed to representational thematic hierarchy or event structure.

6 But Wait, is There Still Structure There?

- The two case studies above have suggested that maybe truth conditional semantics — which includes notions of specificity, vagueness, and implication — creates semantic structure without needing to posit it representationally.
- This is arguably better than stipulated thematic role hierarchies or event structures. Does this mean everything about lexical semantics, including semantic structure, can follow from that?
- Unfortunately, as much as I would have liked to have thought that the case, I don't think so. There does seem to be certain phenomena where we need more, and that includes even cases of more arbitrary representational structure. Here I'll walk through several such case studies.

6.1 Subevental Structure Is Down but not Out

- First I'll give two case studies of subevental structure mattering.

#1 One motivation for event structures is that they also package entailments together for purposes of modification (Dowty 1979, von Stechow 1996, Beck and Johnson 2004, Spathas 2017, Beavers and Koontz-Garboden 2020; see also Bale 2007, Jäger and Blutner 2003):

(53) John hammered the metal flat again

a. ... and it had been flat before.

[[x ACT_{<HAMMER>}] CAUSE [y [BECOME < **again**(FLAT) >]]

b. ... and it had flattened before.

[[x ACT_{<HAMMER>}] CAUSE **again**([y [BECOME < FLAT >]])]

c. ... and he had hammered it flat before.

[**again**([x ACT_{<HAMMER>}] CAUSE [y [BECOME < FLAT >]])]

- But some things can't be under *again*, e.g. it can't "dig inside" FLAT to reflect part of what it means to be flat. Having a flat part is part of being flat, but *again* can't "see" just that:

(54) [A sheet of metal was forged partially flat and partially with a curve. Someone dinged up the flat bit so it wasn't flat anymore, and Sandy hammered that part flat.]
 ??Sandy hammered the sheet of metal flat again.

- So we need something to define points at which sets of lexical entailments form units (e.g. lexical event structures as per Dowty 1979, syntactic event structures as per Harley 2012, or just pointers to sets of entailments as per Beavers et al. 2009).

#2 As Davis (2001) notes, causation does seem to have some primacy over everything else, as predicted by decompositions (data drawn from Davis 2001:69-70, (60)-(61)):

(55) [[x ACT] CAUSE α] means *x* always most prominent

Chatasalira a-ku-nám-íts-á mwána
 1-Chatasalira 1S-PR-lie-CAUS-FV child

'Chatasalira made the child lie (tell lies).'

(Chicheŵa)

- As I noted above, it's to some degree a stipulation: why do we assume CAUSE over BY MEANS OF? I'm not sure I can answer that question, but the degree to which causers have some primacy then perhaps there are truly representational constraints.

6.2 Argument Structure Conditioned by Thematic Role Hierarchies After All

- I was down on traditional thematic hierarchies, but I'm not sure we can dismiss them entirely. Everdell (2023) looked at applicatives — morphemes that add objects to verbs — in O'dam (an Uto-Aztecan language spoken in Durango, Mexico) and found an interesting pattern.

#1 For intransitive verbs the applicative adds a causer subject, making the old subject the object:

- (56) a. *Tisdha-* *gu=ñ* *gagoox na=ñ* *pai bopoo*
 go.up-IRR DET=1SG.POSS dog SUB=1SG.SBJ where bed
 'My dog is going to up onto my bed'
- b. *Añ tisa'ñ-dha-* *gu=ñ* *gagoox na=ñ* *pai bopoo*
 1SG.SBJ go.up-APPL-IRR DET=1SG.POSS dog SUB=1SG.SBJ where bed
 'I'm going to put my dog up on my bed'

#3 Conversely, if the verb is transitive *and* it has as part of its meaning an implicit, unexpressed participant, then applicativization adds a new object expressing that participant:

- (57) a. *Maa'n-nim ya'* *tibia* *maa'n gu naabat ja'p mo cham*
 one-time DIR.PROX pass.night.PFV one DET mestizo DIR doubt NEG
bhai'=ch koo~kx-ich na-gu' bix chukaa' tu-sapook
 good=1PL.PO PL~sleep-1PL.SBJ SUB-why all night DUR-tell.story.PRES
 'One time here in the night, there was a mestizo, and we did not sleep well because he was telling stories all night.' (Willett and Willett 2015:155)
- b. *Ea na=ñ maa'n jum-sopki-dha-* *na=ch kapbhai'*
 RET SUB=1SG.SBJ one 2SG.PO-tell.story-APPL-IRR SUB=1PL.SBJ while
ya' pix ka-daraa
 DIR MIR PERF-sit.PL
 'I'm going to tell you a story while we sit here with nothing to do.'
 (Willett and Willett 2015:155)

#3 Failing all of that, the result of the morpheme is to add a new object that is someone who benefits from (in some fashion or another) from the event:

- (58) *Ba-Ø-mu'kda-[-ap]* *[gu baiñdhas] Tiino na=ch*
 CMP-3SG.PO-sharpen-IRR-2SG.SBJ DET axe Faustino SUB=1PL.SBJ
ki'n kua'-m-pu'
 with firewood-DES-MOV
 'Sharpen the axe, Faustino, so we can go collect firewood with it.'
- a. *Diilh jap* *jup ba-Ø-mu'ka'n-da' gu=m baiñdhas Tooño*
 only 2SG.SBJ IT CMP-sharpen-CONT DET=2SG.POSS axe Antonio
na=p-gu' ba-r=gé' moo añ jap
 SUB=2SG.SBJ-why CMP-COP=large doubt 1SG.SBJ IT
jum-mu'kxi'ñ-dha-'=aa gammiji
 2SG.PO-sharpen-APPL-IRR=Q always
 'You should sharpen your axe yourself Antonio, because you are grown now and I will not always sharpen it for you' (Willett and Willett 2015:131)

- The rule for “what an applicative adds” seems to be governed by the following:
 - (59) a. causer > implicit participant > beneficiary
 - b. Add the highest ranked argument not already on the verb’s argument structure
- Given a kind of lack of any motivation for this hierarchy, Everdell’s conclusion is that we must need something like a thematic role hierarchy. I’m not sure I can do better than that.

6.3 Conventionalized Usage and Argument Realization

- Another factor is real world pragmatic expectations and conventions of use, harkening back to questions asked by Craige Roberts and Larry Horn last week. Here I present a case study from Beavers and Udayana (2023) on middle voice in Indonesian. Indonesian has an active/passive distinction that’s not unlike the one found in English:

- (60) a. *Tono men-jual mobil itu.*
Tono AV-sell mobil that
‘Tono sold the car.’
- b. *Mobil itu di-jual (oleh Tono)*
car that PASS-sell by Tono
‘That car was sold (by Tono).’

- But it also has a morphological “middle voice” indicated by voice morpheme *ber-*. Middles convey a range of meanings; I’ll review them here.
- **Dispositional/passive middles** are mostly formed from change-of-state verbs, where the subject is the underlying object and the reading is sort of passive-like (plus there’s often a generic reading; Condoravdi 1989, Fagan 1992, Lekakou 2002):

- (61) *Mobil itu ber-jual (kemarin/dengan mudah) (*oleh Tono).*
car that MV-sell yesterday/with easy by Tono
‘The car sold (yesterday)/sells (easily).’ (episodic/generic)

- **Incorporated object middles** have a subject that corresponds to the subject of the active, and the object is an NP that is “incorporated” — kind of suffixed to the verb:

- (62) *Orang itu ber-cuci=rambut.*
man that MV-wash=hair
‘The man washed his hair.’

- **Marked reflexive middles** take a subject that is the subject of the active, plus a reflexive word *diri* as an object that is also incorporated indicating agent acting on self:

- (63) *Orang itu ber-cuci=diri.*
man that MV-wash=REFL
‘The man washed himself.’

- **Natural reflexives** involve verbs that indicate naturally reflexive actions (Kemmer 1993), and you get an “agent act on self” reading without *diri* (but non-reflexive is OK, too):

(64) *Tono ber-dandan.*

Tono MV-dress

‘Tono dressed.’ (or ‘Tono was dressed (by someone)’)

- **Natural reciprocals** indicate a reciprocal relationship, i.e. a mutual relation between two distinct entities (Ogloblin and Nedjalkov 2007) (but non-reciprocal is OK, too):

(65) *Amir dan Yusuf ber-sahabat.*

Amir and Yusuf MV-friend

‘Amir and Yusuf are friends.’ (or ‘Amir and Yusuf have friends’)

- **Relational noun** middles form from body part, kin term, and clothing nouns (Nichols 1988, Chappell and McGregor 1996, Tsunoda 1996) and produce a possessional reading:

(66) *Tono ber-topi.*

Tono MV-hat

‘Tono had a hat (on).’

- Beavers and Udayana (2023) offer a unified analysis: *ber-* takes a predicate selecting two arguments and produces an intransitive V, taking a subject and no (non-incorporated) object.
- But it doesn’t change the meaning — the output still describes a two participant situation. Since only one participant gets expressed (whichever one is subject) then the one that doesn’t has to be interpreted some other way. Broadly, there are two options:

(67) a. Interpret it as a distinct entity from the subject

(e.g. dispositional/passive and non-reflexive incorporation middles)

b. Interpret it as the same entity as the subject

(e.g. natural reflexive, reflexive incorporation, and reciprocal middles)

- What decides between these options? Sometimes it’s fixed by what is expressed: in (62) and (66) you won’t get a reflexive reading for obvious readings — people aren’t hair or hats!
- In other case, though, it seems to be based on what the root is:

(68) a. Roots naming body care and grooming actions naturally favor a reflexive reading (act on self), just as in other languages (Kemmer 1993, Kaufmann 2007, Spathas et al. 2015). But in Indonesian a non-reflexive reading is also possible.

b. Some roots naturally give rise to a reciprocal reading (a mutual relation), and it’s the same ones you find in other languages (“friend”, “neighbor”, etc.; see Haspelmath 2007). But again, non-reciprocal readings are possible.

c. Everything else *disallows* a reflexive or reciprocal reading *unless* you mark it explicitly by adding reflexive *diri* or a reciprocal pronoun meaning “each other”.

- The case in (68c) is the telling one: there’s nothing *in principle* that rules out any readings, since they *are* possible. But you have go out of your way to indicate them explicitly.
- So, really, any predicate can have any readings if you clarify it. Why then are some readings ruled out when not marked, or dispreferred? The answer has to be something to do with conventional understandings of things:

- As a matter of world knowledge, we typically expect things to be certain ways (you groom yourself, friendship is mutual, things sell other things).
- These expectations result in **default** readings for such predicates in their simple forms.
- If you want to get the non-default reading, well:
 - * Sometimes there’s a simple way to indicate it that becomes the “normal way”, ruling it out for non-marked forms. This isn’t a *semantic* issue, it’s one of *convention*.
 - * In other cases there’s not, so the simple form is ambiguous or vague.
- But this isn’t really about (even fuzzy) truth conditions: it’s about expectations that feed conventional uses of words that may solidify into categorical constraints.

6.4 When All Else Fails, Discourse Pragmatics and Other Things Take Over

- There is also good old fashioned discourse. Locative alternations are *usually* governed by truth conditional contrasts. But not always. Sometimes alternations are synonymous:

- (69) a. Sandy cleared the dishes from the table.
 b. Sandy cleared the table of dishes.

- In other cases, even if there is technically a truth conditional contrast, the two variants are synonymous in contexts that wipe out the distinction.

- (70) [Sandy is applying a coat of sealant to a wooden deck. The sealant came in a can that was designed to be just the right amount to coat the deck.]
 a. Sandy sprayed the sealant on the playscape.
 b. Sandy sprayed the playscape with the sealant.

- In both cases an alternation arises even though the meaning doesn’t matter.
- In some such cases, what determines which variant you get is a host of other factors, e.g. we tend to put older information earlier, shorter phrases tend to occur before longer phrases, etc. (Givón 1984, Wasow 2002, Bresnan and Nikitina 2009).
- So a proper theory of the lexical semantics to syntax mapping will have to take discourse factors into account as well, but in a way that dovetails with the semantics and convention.

I think there are strong reasons that truth conditional strength and blocking are linguistically relevant structures, but the ultimate soup is made up of more things, too.

7 Conclusion

- We saw above that common theories of lexical semantics and its relation to grammar have at least partly assumed that representational structure matters for syntax.
- But in many cases those lexical semantic representations are unmotivated by anything other than the facts they are meant to explain.
- I suggested that some lexical semantic phenomena like argument alternations reflect structured contrasts in meaning like relative vagueness/specificity, which (for example) impose structure on sets of truth conditions qua thematic roles.
- That’s just one type of semantic contrast — maybe there are more. But it gives us some hope that we can avoid circularity that comes with semantic representations.

- But this only gets us so far. Stitching everything above together, I'd say we have something like the following rough story:
 - As much as I hate to admit it, there's still a mystery about why causation seems to have such primacy: by default, causers seem to be privileged for subjecthood.
 - It *could* be that there's an entailment-based explanation for this: the more causally prior something is in the event the more entailments of causal precedence it has.
 - But that doesn't seem to explain everything since a bit of causal precedence trumps other things. So maybe something like CAUSE (but not BY MEANS OF) has arisen in grammars and is active: [X CAUSE Y] makes X and its parts more prominent than Y.
 - This is consistent with Agent and Patient — the two (proto-)roles most commonly found in X and Y respectively — being cognitively rooted (Rissman and Majid 2019).
 - But within X and Y it could be that other factors matter for encoding participants:
 - * Truth conditional strength in its various guises governs some realization choices:

(71)		Semantics	Grammar
	Representation:	Causal/temporal structure	subject/object asymmetry
	MAP:	Relative vagueness	direct/oblique alternations
 - * But failing specific semantic reasons to express things certain ways, what's left?
 - Conventionalized but non-necessary expectations about events may govern other argument realization choices.
 - Absent anything else, connecting the sentence to discourse and processing may govern argument realization choices.
- I can't solve those issues here, but I hope to have demonstrated the array of ingredients we need to be paying attention to and a bit on how they interact.

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