

The logical form of lexical semantics

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Section 1

Recap

- Computational approaches
- Experimental approaches
- Some of my work in progress

- A tasting menu of additional empirical phenomena
- Each has its own analytical consequences
- Parallels with other modules of the grammar

But first

- What have you gotten out of this course?
- How does it complement, or contradict, other courses you took here?

- 1 Recap
- 2 Internal/external causation
- 3 Body parts and possession
- 4 Factivity
- 5 Further reading
- 6 Summary of summaries

Section 2

Internal/external causation

What grammatical information gets encoded on the verb?

Root	English	Hebrew
fall	Sam fell down	<i>stav nafal</i>
cook	Sam cooked (something)	<i>stav bifel</i>
shave	Sam shaved (him/her/themself)	<i>stav hitgaleax</i>

- There might be agreement, tense, etc.
- English doesn't always encode transitivity.
- Hebrew does - how?

Reflexives in Dutch

- Dutch has two reflexive pronouns, *zich* and *zichzelf*, and three classes of reflexive verbs (Kemmer 1993; Alexiadou 2014).
- What sets them apart from each other?
 - (Lexical semantic differences and grammatical correlates)

- (1) Zij haat ??zich/zichzelf/Peter
she hates REFL/REFL-self/Peter
'She hates herself/Peter'
- (2) Jan schaamt zich/*zichzelf/*Marie
Jan shames REFL/REFL-self/Marie
'Jan is ashamed.'
- (3) Jan waste/scheerde zich/??zichzelf/Peter
Jan washed/shaved REFL/REFL-self/Peter
'Jan washed/shaved himself/Peter'

Three kinds of verbs

Naturally disjoint:

- (4) Zij haat ??zich/zichzelf/Peter
she hates REFL/REFL-self/Peter
'She hates herself/Peter'

Inherently reflexive:

- (5) Jan schaamt zich/*zichzelf/*Marie
Jan shames REFL/REFL-self/Marie
'Jan is ashamed.'

Naturally reflexive (pronouns is preferred unless there's context):

- (6) Jan waste/scheerde zich/??zichzelf/Peter
Jan washed/shaved REFL/REFL-self/Peter
'Jan washed/shaved himself/Peter'

See other Germanic reflexives, and also Japanese *zi* and *zibun*.

- Now to Greek (Alexiadou 2014; Spathas, Alexiadou, and Schäfer 2015), where we'll focus on the **non-active suffix** (and then add another prefix).
- In Greek we get differences in reflexivization (and also differences in reading).

Reflexives in Greek

Standard (naturally disjoint) verbs:

- (7) a. o giannis diava-se to vivlio
the Giannis read-ACT the book
'Giannis read the book.' (active)
- b. to vivlio diavas-tike apo to gianni
the book read-NACT by the Giannis
'The book was read by Giannis.' (passive)

Inherently reflexive:

- (8) i maria drepete
the Maria shames-NACT
'Maria is ashamed of herself.'

Naturally reflexive (can also comb someone else with active marking):

- (9) i maria htenistike
the Maria combs-NACT
'Maria combs (herself).'

Greek doesn't have *zichzelf*, so how do you accuse your-self?

You auto-accuse:

- (10) a. o giannis katigorith-ike
the Giannis accused-NACT
'Giannis was accused.'
- b. o giannis afto katigorith-ike
the Giannis self accused-NACT
'Giannis accused himself.'

Similar to many Romance languages which require *se/si* together with *auto-*.

What roots can you *afto*-verb?

- (11) a. o giannis drepete
the Giannis shames-NACT

'Giannis is ashamed of himself.'
- b. *o giannis drepi ti maria
the Giannis shames the Maria
- c. *o giannis afto-drepete
the Giannis self-shamed-NACT

Not inherently reflexive roots.

- (12) a. o giannis plenti ti maria
the Giannis washes Maria
‘Giannis washes Maria.’
- b. o giannis plenete
the Giannis washes-NACT
‘Giannis washes (himself).’
- c. *o giannis afto-plenete
the Giannis self-washes-NACT

Not naturally reflexive roots.

afto-eskorizome ‘self-exile-NACT’
afto-anerume ‘self-refute-NACT’
afto-diorizome ‘self-appoint-NACT’
afto-diafimizome
‘self-advertise-NACT’

afto-katigorume ‘self-blame-NACT’
afto-sikofandume
‘self-defame-NACT’
afto-katadikazome
‘self-sentence-NACT’
afto-penevome ‘self-praise-NACT’

Naturally disjoint roots!

Puzzles

We won't solve these now:

- What are the exact syntactic and semantic restrictions (there are a few others)?
- What are the relevant syntactic assumptions for reflexivization?
- How do we formalize the semantic restriction?

See Alexiadou (2014) and Spathas, Alexiadou, and Schäfer (2015).

Reflexives in Hebrew

Two verbal templates in Hebrew which show a number of alternations:

(13) Anticausative

- a. josi **bifel** marak
Yossi cooked.INTNS soup
'Yossi cooked some soup.'
- b. ha-marak **hitbafel** ba-šemef
the-soup got.cooked.INTNS.MID in.the-sun
'The soup cooked in the sun.'

(14) Reflexive

- a. jitsxak **iper** et tomi
Yitzhak made.up.INTNS ACC Tommy
'Yitzhak applied make-up to Tommy.'
- b. tomi **hitaper**
Tommy made.up.INTNS.MID
'Tommy put on make-up' (*'Tommy got make-up applied')

Two verbal templates in Hebrew which show a number of alternations:

- (And reciprocals too)
- Which verbs in this template are reflexive and which are anticausative?
 - *hitgaleax* ‘shaved himself,’ *hitraxets* ‘washed himself,’ *hitnagev* ‘toweled himself down,’ *hitaper* ‘applied makeup to himself,’ *hitnadev* ‘volunteered himself.’
 - They are all inherently/naturally reflexive, or simply **self-oriented**.
- How to derive the behavior of self-oriented roots in a specific template?

Excursus: Suppletion

Suppletion: *go - went, person-people, good-better-best.*

Embick (2010)

(15) a. Korean nominative: “optimizing”

Allomorph	Environment	Example	Gloss
-i	/ C ___	pap-i	‘cooked rice’
-ka	/ V ___	ai-ka	‘child’

b. Haitian Creole definite: “non-optimizing”

Allomorph	Environment	Example	Gloss
-la	/ C ___	liv-la	‘book’
-a	/ V ___	tu-a	‘hole’

What does suppletion teach us about the architecture of the grammar?

- *Go/went* aren't like *dog-cat*: one set of syn-sem info is associated with two different forms.
- How do you know which form to choose? Depending on the syn and phono information around you.
 - If what we had was:
 - $S \rightarrow VP NP$
 - $VP \rightarrow V N$
 - And then you plug in V and N.
- But when do you know? You can only do that once you have that information.
- Lexicalist theories assume that the syntax combines full words. Would that work?
 - No, because how would you know what word to put at the base of your tree if you don't have the rest of it with the conditioning information yet!
 - So we need a node to be a bundle of syntax, and only pick the form once you have other nodes with the relevant info around it.

The root $\sqrt{\text{DOG}}$ doesn't do anything in the syntax. Neither does $\sqrt{\text{BREAK}}$.

We've been lowkey assuming that all the syntax-lexicon magic happens in the semantic interpretation.

Semantic filters: (Yu 2020; Ausensi, Yu, and Smith 2021)

(16) $\llbracket \text{Voice} \rrbracket \rightarrow \lambda F.F / \text{--- } \sqrt{\text{MURDER-type}}$

Back to reflexives in Hebrew

- The generalization (Kastner 2017): In the “reflexive template,”
 - Self-oriented root \Rightarrow reflexive verb.
 - Other-oriented root \Rightarrow anticausative verb.
 - But see Ahdout (2021) for empirical challenges.

The active template, $XiYeZ$, is strongly agentive

- (17) a. { \checkmark ~ha-jeladim / \checkmark ~ha-tiltulim ba-argaz} fayr-u
the-children the-shaking in.the-box **broke.SMPL-PL**
et ha-kosot
ACC the-glasses
{‘The children / Shaking around in the box} broke the glasses.’
- b. { \checkmark ~ha-jeladim / \times ~ha-tiltulim ba-argaz} fibr-u
the-children the-shaking in.the-box **broke.INTNS-PL**
et ha-kosot
ACC the-glasses
{‘The children / *Shaking around in the box} shattered the glasses.’ (Doron 2003: 20)

The analysis of Kastner (2017)

(18) Regular Voice, and the agentive modifier:

- a. $[[\text{Voice}]] \leftrightarrow \lambda e \lambda x. \text{Agent}(x,e) / \text{---} \sqrt{\text{ACTION}}$
- b. $[[\text{Voice}]] \leftrightarrow \lambda e \lambda x. \text{Cause}(x,e) \text{ or } \lambda e \lambda x. \text{Agent}(x,e)$

(19) The non-active Voice:

- a. $[[\text{Voice}_{[-D]}]] \leftrightarrow \lambda e \lambda x. \text{Agent}(x,e) / \text{---} \sqrt{\text{ACTION}}$
- b. $[[\text{Voice}_{[-D]}]] \leftrightarrow \lambda P_{\langle s,t \rangle}. P$

(20) $[[\sqrt{\text{ACTION}}]] \rightarrow \emptyset / \text{Voice}_{[-D]} \text{---} \{ \sqrt{\text{XYZ}} \mid \sqrt{\text{XYZ}} \in \sqrt{\text{PRK}} \text{ 'DISMANTLE'} \sqrt{\text{B}\sqrt{\text{L}}} \text{ 'COOK'} \sqrt{\text{PTSTS}} \text{ 'EXPLODE'} \dots \}$

- This is a **post-syntactic filter**.
- It's like suppletion, except in the semantics.
- Note also that the rule makes things less marked (rather than adding information), which I think is nice.

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Section 3

Body parts and possession

Irwin (2019): Where does the boy end up?

(21) a. The little boy danced into the room.

b. The little boy danced in.

(22) a. #The little boy smiled into the room.

b. #The little boy smiled in.

There's nothing separating these two verbs/roots along the lines of what we've discussed so far.

Two activity verbs

Neither *dance* nor *smile* require a direct object:

- (23) a. The child danced happily.
b. The child smiled happily.

Both allow additional unselected objects

(24) Cognate object:

- a. The child danced a little dance.
b. The child smiled a little smile.

(25) The *way*-construction:

- a. The child danced its way into auntie's arms.
b. The child smiled its way to a second cup of juice.

Entailments:

- (26) a. The little boy danced into the room, #but he didn't go in.
b. The little boy smiled into the room, but he didn't go in.

Change of location can only apply to a whole body.

- (27) The boy walked/stumbled/squirmed/wiggled/moved into the room.
(28) #The boy grinned/glared/scowled into the room.
(29) Finn squinted/?winked/??blinked into the room.

Existential unaccusatives (Irwin 2018) show that extra context can help:

(30) A little boy danced in. He bowed to the parents who were seated in the audience.

(31) a. ??A little boy smiled in. He bowed to the parents who were seated in the audience.

b. One time we were sitting by the window at a cafe. We glanced out the window. A little boy smiled in. He bowed and then walked away.

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- b. One time we were sitting by the window at a cafe. We glanced out the window. A little boy smiled in. He bowed and then walked away.

Summary

- Difference depending on whether the event refers to the entire body (*dance*) or part of it (*smile*).
- Leads to different entailments.
- Next: similar kind of contrast with more grammatical consequences.

Barker (1995); Myler (2016)

Alienable and inalienable in general

What's going on in Nanti (Arawakan)? (Michael 2012)

- (32) a. No-gito
1SG-head
'my head'
- b. No-biha-ne
1SG-bow-POSS
'my bow'

What do you think I'm going to show you next?

Barker (1995); Myler (2016)

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What do you think I'm going to show you next?

First, one more set of examples so we have a feel for the data.

Alienator

Matsigenka (sister dialect to Nanti): (Michael 2012)

- (33) a. No-gito
1SG-head
'my head'
- b. *gito
head
(int.~'a head')
- (34) gito-tsi
head-ALIENATOR
'a head'

Now let's consider Icelandic: (Myler, Sigursson, and Wood 2014; Myler 2016)

- Syntax: five ways of expressing possession.
 - Two verbs 'have.'
 - Three forms of DP-internal possession (think possessive pronouns vs *of*).
- Semantics: four kinds of possession relations.
 - *Concrete, kinship, body part, and abstract.*

First off, there are two verbs ‘have’:

(35) Þeir hafa augu
they.NOM have1 eyes.ACC
‘They have eyes.’

(36) Þeir eiga stóra bók
they.NOM have2 big book.ACC
‘They have a big book.’

Possession in Icelandic

The possession relation determines which ‘have’ you can have:

- (37) a. Concrete
Peir {~~h~~afa / ✓eiga} stóra bók.
they.nom {have1 have2} big book.acc
‘They have (i.e.~own) a big book.’
- b. Kinship
Peir {~~h~~afa / ✓eiga} systur.
they.nom {have1 have2} sister.acc
‘They have a sister.’
- (38) a. Body part
Peir {✓hafa / ~~e~~iga} augu.
they.nom {have1 have2} eyes.acc
‘They have eyes.’
- b. Abstract
Peir {✓hafa / ~~e~~iga} ekki hugmynd.
they.nom {have1 have2} not idea.acc
‘They have no idea.’

Possession in Icelandic

There are also three different ways of showing DP-internal possession:

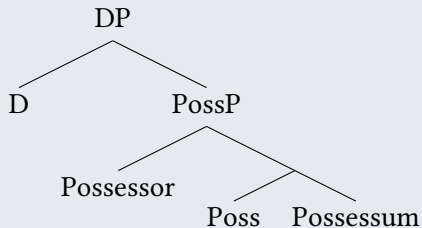
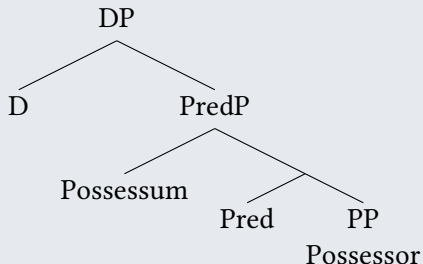
	A: NP - POSS.PRON	B: NP-DEF poss.pron	C: NP-DEF - PREP - PRON
Concrete 'my book'	# bók mín book my	bók-in mín book-def my	* bók-in hjá mér book-def at me
Kinship 'my sister'	systir mín sister my	* systir-in mín sister-def my	* systir-in hjá mér sister-def at me
Body part 'my eyes'	# augu mín eyes my	% augu-n mín eyes-def my	augu-n í mér eyes-def in me
Abstract 'my idea'	hugmynd mín idea my	* hugmynd-in mín idea-def my	hugmynd-in hjá mér idea-def at me

Figure 1: Attributive possession in Icelandic (Myler, Sigursson, and Wood 2014; Myler 2016)

Column C: You get the PP possessor iff you have *hafa* 'have2.'

The analysis

- Myler, Sigursson, and Wood (2014) solve this in the syntax.
- Assume two kinds of possessor options:



- And what we think of as *have* is a complex configuration: Voice (external argument) plus PredP/PossP.

The analysis

So for Icelandic:

- Eyes and ideas require the predicational head Pred, which mediates compatible with PPs.
- Books and siblings require the possessive head Poss, which is incompatible with PPs.
- Voice + Pred = have1, Voice + Poss = have2.

What question does this analysis leave open?

- How do we encode the difference between the two (or four) kinds of possessive relations in the grammar in the first place?
- In other words, how do we encode that two kinds need Pred and two kinds need Poss?

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Summary: Possession

- 1 Body parts vs entire body in English:
 - Different syntactic frames.
- 2 Alienable vs inalienable possession crosslinguistically:
 - Different morphology
- 3 Kinds of possession in Icelandic:
 - A range of syntactic differences.

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Section 4

Factivity

- (39) a. I **thought/claimed/suggested** that the building collapsed, but it didn't.
- b. # {I **regretted/remembered/knew** that the building collapsed, but it didn't.}

If you've learned about presupposition projection, there's another environment in which we see a difference.

- (40) a. Do you think that the building collapsed? (# It didn't.)
- b. Do you remember that the building collapsed? (# It didn't.)

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Not factivity but presuppositionality

It's not just factive verbs that do this, though:

- (41) a. John said [that the moon was made of kale]. (No one had claimed that before.)
- b. Bill remembers [that the moon is made of kale]. (# No one had told him that before.)
- c. Bill **denied** [that he stole the cookies]. (# No one claimed that he had stolen them.)

Kastner (2015) adopts the classification of Cattell (1978) and Hegarty (1990):

- (42) a. NON-STANCE (factive): *regret, know, remember, realize, notice, etc.*
- b. RESPONSE STANCE: *deny, accept, agree, admit, confirm, verify, etc.*
- c. VOLUNTEERED STANCE: *think, suppose, assume, claim, suspect, etc.*

Differences with extraction

- Presuppositional and non-presuppositional verbs pattern differently with respect to movement.
- Non-presuppositional verbs allow extraction.
- Presuppositional verbs are weak islands: only complements can be extracted.

(43) Non-presuppositional (non-factive):

- | | | |
|----|---|------------|
| a. | <i>What do you think that John stole ___?</i> | COMPLEMENT |
| b. | <i>Who do you think ___ stole the cookies?</i> | SUBJECT |
| c. | <i>Why do you think John stole the cookies ___?</i> | ADJUNCT |

(44) Presuppositional:

- | | | |
|----|--|------------|
| a. | <i>What do you remember/deny that John stole ___?</i> | COMPLEMENT |
| b. | <i>* Who do you remember/deny ___ stole the cookies?</i> | SUBJECT |
| c. | <i># Why do you remember/deny that John stole the cookies ___?</i> | ADJUNCT |

Kastner (2015) assumes the following:

- 1 Non-presuppositional verbs like *think* simply take a CP complement:
[_{VP} V CP].
 - They introduce a new claim into the discourse.
- 2 Presuppositional verbs like *deny* and *remember* take a DP complement:
[_{VP} V [_{DP} D CP]].
 - They refer to an existing claim in the discourse.
 - It's a definite DP: think of it as an existing file card (Heim 1983).
- 3 This explains the entailments.
- 4 To get the extraction facts, he relies on the late Martin Honcoop's dynamic semantics analysis of weak islands which relies on a difference in definiteness (Honcoop 1998).
- 5 Tested on English, Greek and Hebrew.
- 6 There are some other predictions too; let's look at just one next.

Differences in interpretation

Different complements (CP vs DP) to the same polysemous verb, *explain*:

CP = proposition

CP complements **introduce a new topic** to the discourse.

(45) I explained [_{CP} that the minister resigned] but in fact he was fired.

DP = entity

Definite DP complements are presupposed.

(46) #I explained [_{DP} the minister's resignation] but in fact he was fired.

Entailments aside, what's the difference in meaning between the two?

Differences in interpretation

In a small class of verbs, different meanings arise depending on whether the complement is a DP or a CP. (Pietroski 2000; Halpert and Schueler 2013)

Explain

- (47) a. I explained [_{CP} that the Wall fell].
(so people are free to cross the city)
- b. ≠I explained [_{DP} the fall of the Wall].
(with a brief history lesson)

Differences in interpretation

Not just *explain*:

- (48) a. The guests **observed** [_{CP} that the owl was bored].
(they noted what they saw)
- b. The guests **observed** [_{CP} that it was getting late].
(they noted what they saw)
- c. ≠ The owl **observed** [_{DP} the mouse] with interest.
(he watched it intently)
- d. ≠ The guests **observed** [_{DP} kosher dietary laws].
(they obeyed restrictions)
- (49) a. Lestrade **guessed** [_{CP} that Moriarty is the killer].
(he hazarded a guess)
- b. ≠ Lestrade **guessed** [_{DP} the killer].
(correctly guessed his identity)

- What are the lexical components we've seen and where in the grammar are they relevant?
- Syntactic difference between non-presuppositional verbs (non-stance) and presuppositional response verbs (response stance or factive).
- No syntactic difference between factive verbs and response verbs: only a lexical semantic one.
 - This distinction doesn't translate to a syntactic one; it's too granular for the syntax to care about (extraction, selection), though the semantics (factivity entailments) cares.
- Plus there are many other analyses of factivity and embedding out there, for a variety of languages.

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Section 5

Further reading

Further reading

- Causation
 - Some of the classics are Haspelmath (1993), Levin and Rappaport Hovav (1995) and Marantz (1997).
 - A recent rethinking of internal vs external causation is given by Rappaport Hovav (2020).
 - The most exciting recent work on types of causers (I think) is the theoretical-experimental studies by Fabienne Martin and colleagues.
- Possession
 - Myler (2016) for the state of the art, and check out Tsoulas and Woods (2019) too.
 - Levin (2017)
- Factivity and embedding:
 - Moulton (2009), Bogal-Allbritten and Moulton (2017), Elliott (2016), Bondarenko (2020), and many others.
 - See for example the presentations at BCGL 13:
<https://www.crissp.be/bcgl-13-the-syntax-and-semantics-of-clausal-complementation/>
- Pross (2018) on nominalizations.

Section 6

Summary of summaries

- ① What are the most robust crosslinguistic generalizations regarding the interaction between lexicon and grammar?
- ② What formal tools can account for these?
- ③ Is it possible to reach a constrained inventory of lexical semantic primitives?
- ④ How can these claims be tested experimentally and modeled computationally?

Thank you!



- Thanks to members of EdinMorph for discussion and feedback.
- Thank you and keep in touch!
- Info on post-doc grants in Edinburgh (and in the UK):
<https://ppls.ed.ac.uk/shared/postdoctoral-fellowships/>

Section 7

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