Movement of properties and properties of movement

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1 Introduction

✳ ***The big question***
What are the kinds of semantic representations (i.e. LFs) that a movement dependency can map onto?

✳ ***Claims made in this talk***
This talk investigates movement that targets DPs with property denotations (semantic type $\langle e,t\rangle$). I make two specific claims towards answering the big question above:

➤ Movement cannot map onto λ-abstractions over properties:

(1) $^{*}[\ \mathrm{DP}_1\ \lambda f_{\langle e,t\rangle}\ \ldots\ [\ \ldots\ [\ f_{\langle e,t\rangle}\ ]_1\ \ldots\ ]\ ]$

➤ Variables created by movement cannot be type shifted into property-type meanings (contra Partee 1986).

(2) $^{*}[\ \mathrm{DP}_1\ \lambda x_e\ \ldots\ [\ \ldots\ \textsc{shift}([\ x_e\ ]_1)_{\langle e,t\rangle}\ \ldots\ ]\ ]$

- These claims provide a novel argument for the following economy hypothesis:

(3) **No Higher-Type Variables Constraint**
Variables in the LFs of natural languages are only of individual types, e.g. entities (e), situations/worlds (s), and degrees (d).
[Landman 2006; Chierchia 1984; Romero 1998; Fox 1999]

⇒ ***Empirical window: Π-positions***
The empirical motivation for these claims comes from a detailed investigation of an $\overline{\text{A}}$-movement asymmetry in English discovered by Postal (1994), which has received little systematic attention in the literature:

(4) a. There is **a potato** in the pantry. **Baseline**
b. ✓**What**$_1$ is there ___$_1$ in the pantry? ***Wh*-movement**
c. *[**A potato**]$_1$, there is ___$_1$ in the pantry. **Topicalization**

- This asymmetry comprises a diverse set of syntactic environments, which I will refer to as **Π-positions**. It also extends to other $\overline{\text{A}}$-movement types.

- ***Two novel generalizations***
I advance two novel generalizations about the Π-position asymmetry:

❶ ***Property generalization***
DPs in Π-positions denote properties (semantic type $\langle e,t\rangle$).

❷ ***Scope generalization***
Scope-shifting movement cannot target a Π-position.
⇝ Movement targeting a Π-position must **reconstruct**.

⇒ ***Analysis in a nutshell***

– Movement that shifts scope leaves a trace of type e, which is incompatible with the property-requirement of a Π-position:

(5) $^{*}[\ \mathrm{DP}_1\ \lambda x_e\ \ldots\ [\ \ldots\ [\ x_e\ ]_{\Pi\text{-pos}}\ \ldots\ ]\ ]$ **Scope shifting ⇏ Π-positions**
type e trace

– Movement that does not shift scope instead reconstructs. Therefore, if a DP would not ordinarily violate the property-type requirement of a Π-position, then it will not do so under reconstruction either:

(6) ✓$[$ ___$_1$ $\ldots$ $[$ $\ldots$ $[$ DP_1 $]_{\Pi\text{-pos}}$ $\ldots$ $]$ $]$ **Reconstruction ⇒ Π-positions**
reconstruct

- Some movement types, e.g. topicalization, are unable to target a Π-position because they cannot reconstruct, a property that can crucially be observed independently of Π-positions.
- I will argue that the ungrammaticality of scope-shifting movement targeting a Π-position entails that movement cannot create λ-abstractions over properties (1) nor can traces be type shifted into properties (2), because either one of these would salvage scope-shifting movement if they were available.

- ***Structure of this talk***
  1. I start by introducing Π-positions and the Π-position asymmetry.
  2. I then advance the property and scope generalizations, which characterize the moving pieces involved in the Π-position asymmetry.
  3. From these two generalizations, an analysis of the Π-position asymmetry naturally emerges in terms of reconstruction.
  4. This analysis raises the question of why seemingly type-*e* elements can occur in Π-positions in nonmovement contexts.
     - I observe that Π-positions also prohibit anaphoric definite descriptions.
     - I argue that this ban and the ban on scope-shifting movement are one and the same under the hypothesis of Trace Conversion.
     - Anaphoric definites cannot be type shifted, but other elements can be.
  5. I conclude by discussing the ramifications of the Π-position asymmetry for the syntax–semantics interface, in particular **why** movement can only map onto λ-abstractions over individual types.

2 Π-positions

- ***Terminology***
  - **Π-position**:
    A syntactic position exhibiting Postal's $\overline{\text{A}}$-movement asymmetry.
  - **W-movement**:
    Movement that can target a Π-position, e.g. *wh*-movement.
  - **T-movement**:
    Movement that cannot target a Π-position, e.g. topicalization.
- ***Section outline***
  1. Introduce Postal's main observations about the Π-position asymmetry:
     - ***Four Π-positions***: Existential constructions, change-of-color verbs, naming verbs, and predicate nominals
     - ***W-movement types***: *Wh*-movement and restrictive RCs
     - ***T-movement types***: Topicalization and appositive RCs
  2. Briefly discuss controlling for topicalization over similar movement types.
  3. Show that QR cannot target a Π-position (novel observation).
  4. Review Postal's (1994) analysis and discuss its shortcomings.

2.1 Existential constructions

- W-movements can target the postverbal position in an existential construction—called the PIVOT—, but T-movements cannot:

(7) a. **Baseline**
There is **a potato** in the pantry.

b. ***Wh*-movement**
✓**What**$_1$ is there ___$_1$ in the pantry?

c. **Topicalization**
*[**A potato**]$_1$, there is ___$_1$ in the pantry.

d. **Restrictive RC**
✓Gloria saw the **potatoes**$_1$ [that there were ___$_1$ in the pantry].

e. **Appositive RC**
*Gloria saw the **potatoes**$_1$, [which there were ___$_1$ in the pantry].

2.2 Change-of-color verbs

- W-movements can target the COLOR TERM of a change-of-color verb, e.g. *paint*, *turn*, and *dye*, but T-movements cannot:

(8) a. **Baseline**
Megan painted the house **magenta**.

b. ***Wh*-movement**
✓[**What color**]$_1$ did Megan paint the house ___$_1$?

c. **Topicalization**
*__Magenta__$_1$, Megan painted the house ___$_1$.

d. **Restrictive RC**
✓Jyoti liked the **color**$_1$ [that Megan had painted the house ___$_1$].

e. **Appositive RC**
*Jyoti liked that **color**$_1$, [which Megan had painted the house ___$_1$].

- T-movements can target color terms outside of change-of-color verbs:

(9) a. **Topicalization** [Postal 1994:164]
{**Green / that color**}$_1$, he never discussed ___$_1$ with me.

b. **Appositive RC**
He never discussed {**green / that color**}$_1$ with me,
[$_{RC}$ which ___$_1$ is his favorite color].

⇒ The prohibition on T-movements targeting color terms applies exclusively to those color terms that are arguments of change-of-color verbs.

2.3 Naming verbs

- W-movements can target the NAME ARGUMENT of a naming verb, e.g. *name*, *call*, and *baptize*, but T-movements cannot:

(10) a. **Baseline**
Irene called the cat **Snowflake**.

b. ***Wh*-movement**
✓[**What name**]$_1$ did Irene call the cat ___$_1$?

c. **Topicalization**
*__Snowflake__$_1$, Irene called the cat ___$_1$.

d. **Restrictive RC**
✓Helen disliked the **nickname**$_1$ [that Irene called the cat ___$_1$].

e. **Appositive RC**
*Helen disliked that **nickname**$_1$, [which Irene called the cat ___$_1$].

- As with color terms, there is no general prohibition against T-movements targeting names:

(11) a. **Topicalization** [Postal 1994:164]
__Raphael__$_1$, we never discussed ___$_1$ as a possible name for him.

b. **Appositive RC**
We never discussed **Raphael**$_1$ as a possible name for him,
[$_{RC}$ which ___$_1$ is my favorite name].

2.4 Predicate nominals

- W-movements can target PREDICATE NOMINALS, but T-movements cannot:

(12) a. **Baseline**
Erika became **a teacher**.

b. ***Wh*-movement**
✓[**What (kind of teacher)**]$_1$ did Erika become ___$_1$?

c. **Topicalization**
*[**A math teacher**]$_1$, Erika became ___$_1$.

d. **Restrictive RC**
✓Sue liked the **kind of teacher**$_1$ [that Erika had become ___$_1$].

e. **Appositive RC**
*Sue liked that **kind of teacher**$_1$, [which Erika had become ___$_1$].

2.5 An aside on topicalization

⇒ ***Perils of topicalization***
The linear order achieved by topicalization is usually string-compatible with two other information-structure movements:

– ***Focus movement***
Focus movement (also called "focus topicalization") involves focus intonation and has a fairly limited distribution:

(13) [**Macadamia nuts**]$_1$ they're called ___$_1$. [Prince 1981:249]

– ***Y(iddish)-movement***
Y-movement is dialectal, indicated with '%', but some uses have entered mainstream American English:

(14) a. %[**A finger**]$_1$ I wouldn't lift ___$_1$ for him! [Prince 1981:249]

b. A: How's your son?
B: %Don't ask! [**A sportscar**]$_1$ he wants ___$_1$! [Prince 1981:260]

- One mainstream use of Y-movement is so-called "contrastive topicalization" (mostly) with predicate nominals:[1]

  (15) Donald may be a good golfer, but [**a good politician**]$_1$ he is not ___$_1$.

∗ ***Controlling for topicalization***

- Topicalization, focus movement, and Y-movement differ in their prosody and their pragmatics (Gundel 1974; Prince 1981).
- Therefore, the puzzle as concerns Π-positions is genuinely about **movement types** and not about linear order.
- Luckily, we can control for these factors using question-answer scenarios that elicit partial answers. These are perfect environments for topicalization, but disallow focus movement and Y-movement.
- Doing so here would take us too far afield, but see the appendix. What the appendix confirms using these controlled environments is that topicalization indeed cannot target Π-positions.

2.6 QR is a T-movement

⇒ ***Existential constructions***
It is well-known that QR cannot target the pivot of an existential construction (Williams 1984). The pivot always takes lowest scope:

(16) a. There *must* be **someone** in his house. ✓must ≫ ∃; *∃ ≫ must

b. **Someone** *must* be in his house. ✓must ≫ ∃; ✓∃ ≫ must

. . . . . .

- ***A quick note on different***
  - In the examples below, I use the adjective *different* to bias towards the inverse-scope reading of the universal quantifier.
  - The #-mark indicates that *different* is infelicitous if the sentence were uttered out-of-the-blue, because it lacks the distributed reading that QR could achieve.
  - There is still a felicitous reading of *different* in which *different* is interpreted as different with respect to something previously mentioned in the discourse. This reading is not relevant for our purposes.

[1] This example is modelled after a quotation from Mitt Romney.

⇒ ***Other Π-positions prohibit QR***
I make the novel observation that QR cannot target any Π-positions. Thus, the following examples all lack an inverse-scope reading:

(17) a. **Change-of-color verbs** ✓a ≫ every; *every ≫ a
A (#different) contractor painted the house **every color**.

b. **Naming verbs** ✓a ≫ every; *every ≫ a
A (#different) child called the cat **every nickname**.

c. **Predicate nominals** ✓a ≫ every; *every ≫ a
A (#different) student became **every kind of teacher**.

- For example, (17a) is true iff there is a single contractor, who incidentally did lots of painting, but not if there is a different contractor for each color.
- With change-of-color and naming verbs, QR of the DP in the Π-position can be contrasted with QR of the object, which is indeed possible:

(18) a. **Change-of-color verbs** ✓a ≫ every; ✓every ≫ a
A (different) contractor painted **every house** that ugly green.

b. **Naming verbs** ✓a ≫ every; ✓every ≫ a
A (different) child called **every cat** Garfield.

∗ ***Generalization***
QR is a T-movement, like topicalization and appositive RCs.

- ***Qualification***
  We are only interested in the **scope-shifting functionality of QR**.
  - This functionality ordinarily coalesces with QR for interpreting quantifiers, but (17) shows that even though quantificational DPs can occur in Π-positions, they do not enjoy the scopal mobility that QR would afford.
  - I assume that some non-QR mechanism is available to Π-positions for interpreting quantifiers in situ, though I do not take up this issue here.

2.7 Postal's (1994) analysis

- ***Antipronominality***
  Postal (1994) observes that one common property of Π-positions is that they reject pronouns like *it*, a property that he labels ANTIPRONOMINALITY:

  (19) *There is **it** in the pantry.

✳ ***Postal's proposal***
He proposes that W-movements and T-movements differ in what they leave behind in the launching site of movement:

– W-movements leave a **trace**:

(20) ✓**What**$_1$ is there t_1 in the pantry?
W-mvt

– T-movements leave a **covert resumptive pronoun**:

(21) *[**A potato**]$_1$, there is ~~**it**~~$_1$ in the pantry.
T-mvt

⇒ According to this analysis, T-movements cannot target a Π-position because what they leave behind, viz. a pronoun, violates antipronominality.[2]

❶ ***Problem #1: Why are Π-positions antipronominal?***

– There is no explanation for **why** Π-positions are antipronominal.

– This in turn calls into question accounting for the W/T-movement distinction in terms of pronouns when antipronominality lacks an explanation.

– Under Postal's analysis, the set of Π-positions and the division of movement types are arbitrary and amount to little more than two lists.

❷ ***Problem #2: Some pronouns are allowed***
Antipronominality in Π-positions does not extend to strong pronouns like *that* (excluding existential constructions because of the Definiteness Restriction):

(22) a. Megan liked *the color magenta*, so she painted the house {***it** / ✓**that**}.
b. Irene liked *the name Snowflake*, and she called the cat {***it** / ✓**that**}.
c. Erika wanted to become *a teacher*, and she became {***it** / ✓**that**}.

⇒ Thus, antipronominality is not as simple as a ban on pronouns.

❸ ***Problem #3: Antipronominality does not entail being a Π-position***
Postal himself observes that there are syntactic environments that block pronouns, but nevertheless allow both W-movements and T-movements:

(23) a. **Baseline**
*Thuy attended the U of M, but Rodica did not attend **it**.
b. ***Wh*-movement**
✓[**What university**]$_1$ did Thuy attend ___$_1$?
c. **Topicalization**
✓[**The University of Minnesota**]$_1$, Thuy attended ___$_1$.

- If the reason that T-movements cannot target Π-positions is that they violate antipronominality, then (23c) should be ungrammatical.[3]

- ***Looking ahead...***
  – The next two sections argue that Π-positions host property-type DPs and that movement cannot target Π-positions if it shifts scope.
  – I argue that Π-positions require movement to reconstruct. T-movements cannot reconstruct and hence can never target a Π-position. Thus, the Π-position asymmetry has nothing to do with pronouns.
  – Antipronominality is the result of weak pronouns not being able to denote properties. We will see that strong pronouns do not face this problem.

3 Property generalization

- This section argues that the common denominator unifying Π-positions is that they host DPs that denote properties:[4]

(24) **Property generalization**
DPs in Π-positions denote properties (semantic type $\langle e, t \rangle$).

- The arguments for this generalization come from the respective literatures on each of the Π-positions introduced above. Therefore, the arguments are **independent** from the Π-position asymmetry.

[2] Stanton (2016) analyzes a similar set of facts in terms of antipronominality. She looks at temporal and locative PPs, where extraction stranding the preposition displays the W/T-distinction. Her analysis in terms of Wholesale Late Merger of NP does not extend to Postal's (1994)'s observations. The analysis developed here, however, can extend to her cases if we assume that the DP complements of temporal and locative prepositions denote properties, e.g. sets of times or spatial coordinates.

[3] Postal proposes that antipronominality is specifically a prohibition on covert resumptives and that this asymmetrically entails prohibiting overt pronouns. Robbing his analysis of its independent support, this amounts to little more than restating that T-movements cannot target Π-positions.

[4] For simplicity, I treat properties in purely extensional terms, which reduces them to sets of entities.

- ***Shortcuts***
  In the interest of time, I will take it for granted that:
  - The color term of a change-of-color verb denotes a property because these verbs are textbook examples of resultative constructions (e.g. Kratzer 2005).
  - Predicate nominals denote properties, as this is standard (e.g. Montague 1973; Williams 1983; Partee 1986).

3.1 Existential constructions

- ***Definiteness Restriction***
  The pivot of an existential construction is famously subject to the Definiteness Restriction (DR) (Milsark 1974, 1977):

  (25) a. **Acceptable pivots**
  There is/are {**a** / **two** / **many** / **no**} **potato(es)** in the pantry.

  b. **No quantificational DPs**
  *There is/are {**every** / **most** / **both**} **potato(es)** in the pantry.

  c. **No definite descriptions**
  *There is { **the potato** / **it** / **Mr. Potato Head**} in the pantry.

- DPs that can occur as the pivot are WEAK, while DPs that cannot are STRONG.

- The standard approach to the DR to attribute the weak–strong distinction to a semantic property of determiners (e.g Barwise & Cooper 1981; Keenan 1987).

- ***Problems with standard approaches***
  1. They never explain **why** existential constructions care about a particular semantic property of determiners.
  2. There are well-documented counterexamples to an analysis of the DR in terms of determiner semantics, which I review below (McNally 1997, 1998).

❶ ***Quantifying over nonparticulars***
A necessarily quantificational DP headed by a strong determiner can be the pivot if it quantifies over nonparticulars:

(26) a. There was **every kind of doctor** at the convention.

b. *There was **every doctor** at the convention. [McNally 1998:358]

❷ ***List existentials***
Definite descriptions can also be the pivot in so-called "list existentials":

(27) A: What shall we dig up this year?
B: Well, there are **the peonies**. [McNally 1998:366]

⇒ Any analysis that outright bans certain determiners like *every* and *the* will undergenerate in (26)–(27).

. . . . . .

⇒ ***McNally's analysis of existentials***
McNally (1997, 1998) develops an analysis that solves these two problems:
- She argues that the DR is about the meaning of the DP as a whole, not just the determiner. For her, the DR is part semantic and part pragmatic.
- ***Semantic restriction***
  The pivot must have a licit **property-type** denotation. An existential construction means that the property denoted by the pivot is INSTANTIATED:

  (28) For all models $\mathcal{M}$, $[\![\text{NP}]\!]^{\mathcal{M},g} \in [\![\text{There be}]\!]^{\mathcal{M},g}$ iff $[\![\text{NP}]\!]^{\mathcal{M},g}$ is nonempty. [McNally 1998:376]

- ***Pragmatic restriction***
  The pivot must introduce a new discourse referent.

- The pragmatic restriction prohibits definite descriptions. McNally argues that it is reasonable for a pragmatic requirement to be relaxed under special circumstances, e.g. in list existentials.

✳ ***Existential constructions → Property-denoting DP***
The semantics of existentials requires that the pivot denote a property, which in turn restricts the kinds of quantificational DPs that can occur as the pivot because not every quantificational DP has a licit property-type denotation.

- Achieving a property denotation via type shifting will be discussed below. For now, we can focus on its ramifications for the DR:

  (29) a. *some NP* $\Rightarrow_{\text{shift}}$ ✓property denotation $\Rightarrow_{(28)}$ ✓pivot

  b. *every NP* $\not\Rightarrow_{\text{shift}}$ ✗property denotation $\not\Rightarrow_{(28)}$ ✗pivot

  c. *the NP* $\Rightarrow_{\text{shift}}$ ✓property denotation $\Rightarrow_{(28)}$ ✓pivot

- Under type shifting, weak determiners like *some* can head the pivot and strong determiners like *every* cannot, because *some NP* has a valid property denotation, but *every NP* does not.

3.2 Naming verbs

- While there has been a substantial amount of work on proper names, the empirical scope has been predominately limited to proper names in **argument positions**. However, proper names behave differently with **naming verbs**:

(30) a. Irene **called** the cat *Snowball*.
b. Helen **nicknamed** the dog *Odie*.
c. The priest **baptized** the child *Brigid*.
d. I am **named** *Ethan*.

- The italicized proper names in (30) do not refer to individuals with those names, but rather to the names themselves.

∗ ***Name argument → Property-denoting DP***
Matushansky (2008) argues that the name argument of a naming verb denotes a **property**. I give two of her arguments below.

❶ ***Non-entity marking***
First, in languages where proper names can appear with a definite article, they cannot do so with naming verbs:

(31) a. Ich habe **den Karl** gesehen. [German]
I have the Karl seen
'I have seen Karl'

b. Ich habe ihn **(*den)** Karl genannt.
I have him the Karl called
'I called him Karl' [Matushansky 2008:580]

❷ ***Predicative marking***
Second, in some languages, the name argument is overtly marked as a predicate, either with special predicate markings or a dedicated case:

(32) a. Me maalasi-mme seinä-n **keltaise-ksi** [Finnish]
we painted-1PL wall-ACC yellow-TRANS
'We painted a/the wall yellow'

b. Me kutsu-mme William Gatesi-a **Billi-ksi**
we call-1PL William Gates-PTV Billy-TRANS
'We call William Gates Billy' [Matushansky 2008:584]

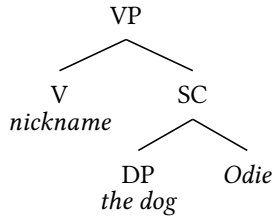
⇒ ***Matushansky's analysis of naming verbs***

– Proper names are two-place functions that take an individual x and a NAMING CONVENTION R as its arguments:

(33) $[\![\text{Odie}]\!] = \lambda x_e\, \lambda \mathrm{R}_{\langle e,\langle n,t\rangle\rangle}\, .\, \mathrm{R}(x)([\text{owdij}])$

– Ordinarily, the naming convention is supplied contextually. However, with a naming verb, the naming convention is supplied by the verb itself:

(34) **Derivation of a naming verb**
Helen nicknamed the dog Odie.



a. $[\![\text{nickname}]\!] = \lambda f_{\langle\langle e,\langle n,t\rangle\rangle,t\rangle}\, \lambda w\, .\, \exists \mathrm{R}[\textsc{nickname}(w)(\mathrm{R}) \wedge f(\mathrm{R})]$

b. $[\![\text{SC}]\!] = [\![\text{Odie}]\!]([\![\text{the dog}]\!]) = \lambda \mathrm{R}_{\langle e,\langle n,t\rangle\rangle}\, .\, \mathrm{R}(\text{the dog})([\text{owdij}])$

c. $[\![\text{VP}]\!] = [\![\text{nickname}]\!]([\![\text{SC}]\!])$
$= \lambda w\, .\, \exists \mathrm{R}[\textsc{nickname}(w)(\mathrm{R}) \wedge \mathrm{R}(\text{the dog})([\text{owdij}])]$
. . . . . .

⇒ In sum, the pivot of an existential construction and the name argument of a naming verb denote properties:

(35) **PROPERTY GENERALIZATION**
DPs in Π-positions denote properties (semantic type $\langle e,t\rangle$).

4 Scope generalization

- This section argues that a given step of movement cannot target a Π-position if it shifts the scope of the moved DP:

(36) **SCOPE GENERALIZATION**
Scope-shifting movement cannot target a Π-position.
⇝ Movement targeting a Π-position must reconstruct.

- ***What does it mean for movement to shift scope?***
  - For movement to shift scope means that, at LF, the moved DP takes scope in the position achieved by movement, which, for all overt forms of movement, will be the DP's surface syntactic position.

    (37) **Movement that shifts scope**
    [✓$_1$ . . . [. . . ___$_1$ . . .]] ⇝ Cannot target Π-positions

  - A check mark will be used to indicate where a DP takes scope at LF.
  - If movement does not shift scope, the scope of the moved DP at LF mismatches its surface position in that it takes scope in its position prior to movement, i.e. its base-generated position.

    (38) **Movement that does not shift scope**
    [___$_1$ . . . [. . . ✓$_1$ . . .]] ⇝ Can target Π-positions

- In the interest of time, I limit the discussion to topicalization and *wh*-movement. The relevant facts also hold for relative clauses, but the judgements are more complex and involve scope-bearing adjectival modifiers like *first* and *only* (à la Bhatt 2002); see the appendix.

4.1 Topicalization

∗ ***Generalization***
Topicalization obligatorily shifts the scope of the moved DP.

- ***Baseline***
  Consider the possible interpretations of the baseline sentence below, which has narrow-scope and wide-scope readings of *a student* w.r.t to *every teacher*:

  (39) *Every teacher* likes **a (different) student** in the first week.

  a. **Narrow-scope reading** every ≫ a
  For every teacher x, there is a student y such that x likes y.

  b. **Wide-scope reading** a ≫ every
  There is a single student y such that for every teacher x, x likes y.

- Crucially, in a scenario where the student is a different student for each teacher, only the narrow-scope reading is true.

- ***Target sentence***
  Topicalizing *a student* in (39) bleeds the narrow-scope reading:

  (40) [**A (#different) student**]$_1$, *every teacher* likes ___$_1$ in the first week.
  *every ≫ a; ✓a ≫ every

- The only interpretation of (40) is the wide-scope reading. Consequently, (40) is true iff there is a single student that every teacher likes. It is false if the student is a different student for each teacher.

⇒ In sum, topicalization obligatorily shifts scope. According to the scope generalization, this is the reason why it cannot target a Π-position:

(41) **Topicalization**
[$_{\text{TopicP}}$ ✓$_1$ Topic^0 [. . . [. . . *$_1$ . . .]]] ⇝ Cannot target Π-positions
topic

4.2 *Wh*-movement

∗ ***Generalization***
Wh-movement optionally shifts the scope of the moved DP.

- ***How many-questions***
  In order to probe scope in constituent questions, we will use *how many*-questions. In addition to the *wh*-meaning component, *how many* independently carries its own existential quantification that can vary in scope (Kroch 1989; Cinque 1990; Cresti 1995; Rullmann 1995; Frampton 1999):

  (42) [**How many books**]$_1$ should Nina read ___$_1$ this summer?

  a. **Wide-scope reading** how many ≫ should
    i. For what number n: There are n-many particular books x such that Nina should read x this summer.
    ii. Possible answer: 'Three books, namely The Prisoner of Azkaban, Slaughterhouse Five, and The Eye of the World.'

  b. **Narrow-scope reading** should ≫ how many
    i. For what number n: It is necessary for there to be n-many books x such that Nina reads x this summer.
    ii. Possible answer: 'Three books, any three.'

- The scope ambiguity in (42) is the result of the fact that *wh*-movement only optionally shifts scope.

⇒ ***Wh-movement from a Π-position cannot shift scope***
Even though *wh*-movement can ordinarily shift scope, when it targets a Π-position, scope shifting is rendered impossible:

(43) a. **Existential constructions** *h.m. ≫ should; ✓should ≫ h.m.
[**How many books**]$_1$ *should* there be ___$_1$ on the table?

b. **Change-of-color verbs** *h.m. ≫ should; ✓should ≫ h.m.
[**How many colors**]$_1$ *should* Nina paint the house ___$_1$?

c. **Naming verbs** *h.m. ≫ should; ✓should ≫ h.m.
[**How many nicknames**]$_1$ *should* Nina call the cat ___$_1$?

d. **Predicate nominals** *h.m. ≫ should; ✓should ≫ h.m.
[**How many kinds of teacher**]$_1$ *should* Nina become ___$_1$?

- To appreciate this fact, let us take a closer look at existential constructions, which we can contrast with a corresponding copula construction:

(44) **Copula equivalent of (43a)** ✓h.m. ≫ should; ✓should ≫ h.m.
[**How many books**]$_1$ should ___$_1$ be on the table?

- The difference in the available scopes for *how many* between (43a) and (44) is reflected in the felicitous answers to the respective questions:

(45) a. **Narrow-scope answer** ✓existential (43a); ✓copula (44)
Three, any three.

b. **Wide-scope answer** *existential (43a); ✓copula (44)
Three, namely *The Prisoner of Azkaban*, *Slaughterhouse Five*, and *The Eye of the World*.

⇒ In sum, *wh*-movement can successfully target a Π-position only when it does not shift scope. When *wh*-movement does shift scope, it patterns as a T-movement in that such extraction from a Π-position is ungrammatical:[5]

[5] *Wh*-islands have the special property that they force elements extracted out of them to take wide scope (Longobardi 1987; Kroch 1989; Cinque 1990; Rullmann 1995; Cresti 1995). Since Π-positions force narrow scope and *wh*-islands force wide scope, the two should be mutually exclusive. This prediction is borne out: **How many books do you wonder whether there are on the table?*.

(46) ***Wh*-movement**

a. **Reconstructed derivation**
[Q ___$_1$ . . . [. . . ✓$_1$ . . .]] ⇝ Can target Π-positions
wh

b. **Scope-shifted derivation**
[Q ✓$_1$ . . . [. . . ___$_1$ . . .]] ⇝ Cannot target Π-positions
wh

5 Analysis

- Against the backdrop of these two novel generalizations, we are now in a position to account for the Π-position asymmetry.

(47) **Π-position Generalizations**

a. ***Property generalization***
Π-positions host DPs that denote properties $\langle e, t \rangle$.

b. ***Scope generalization***
Π-positions cannot be targeted by movement that shifts scope.

- ***Interpreting movement***
Let us first consider the standard interpretation of movement:
  - Replace the launching site with a variable and insert a λ-abstraction binding this variable immediately below the landing site (e.g. Beck 1996; Heim & Kratzer 1998; Sauerland 1998):

(48) [**every book** [λx_e [some student read x_e]]] every ≫ some

  - The λ-abstraction will force the moved element to take scope in the landing site, e.g., for variable binding.
  - As the variable left behind by movement is type *e*, if the moving element is a generalized quantifier, the λ-abstraction binding the type-*e* variable will force the quantification to have scope in the landing site of movement.

- ***Reconstruction***
Movement that does not shift scope instead RECONSTRUCTS.
  - Reconstruction means that the moved element behaves as if that movement has been undone at LF.

– I will assume the copy-theoretic approach to reconstruction wherein reconstruction means that the lower copy but not the higher copy is interpreted at LF (Chomsky 1993, 1995):

(49) [[**every book**] [some student read [**every book**]]]

a. **Interpret higher copy ⇒ Scope-shifted meaning**
[**every book** [λx_e [some student read x_e]]] $\forall \gg \exists$

b. **Interpret lower copy ⇒ Reconstructed meaning**
[~~every book~~ [some student read **every book**]] $\exists \gg \forall$

- ***Scope shifting ⇏ Π-positions***
Turning to Π-positions, the type-*e* trace required for scope-shifting movement is incompatible with Π-positions because it does not provide the expected property meaning ($\langle e, t \rangle$).

- This semantic-type mismatch in turn yields ungrammaticality, thereby preventing scope-shifting movement from targeting a Π-position:

(50) *[DP_1 λx_e … [… [x_e]$_{\Pi\text{-pos}}$ …]]
type *e* trace

- ***Reconstruction ⇒ Π-positions***
On the other hand, because movement that does not shift scope reconstructs, if a DP would not ordinarily violate the property-requirement of a Π-position, then it will not do so under reconstruction either:

(51) ✓[___$_1$ … [… [DP_1]$_{\Pi\text{-pos}}$ …]]
reconstruct

⁕ According to this analysis, Π-positions are an instance where movement must reconstruct in order to avoid a semantic-type mismatch that would occur if the moved DP were not interpreted in its base-generated position.

– T-movements are thus unable to target a Π-position at all because they cannot reconstruct:

(52) **Topicalization**
*[$_{\text{TopicP}}$ DP_1 λx_e [Topic^0 … [… [x_e]$_{\Pi\text{-pos}}$ …]]]

– W-movements, on the other hand, can target a Π-position, but only when they reconstruct into that Π-position:

(53) ***Wh*-movement**

a. ✓[Q ___$_1$ … [… [DP_1]$_{\Pi\text{-pos}}$ …]]
reconstruct

b. *[Q DP_1 λx_e … [… [x_e]$_{\Pi\text{-pos}}$ …]]

⇒ ***We can have our cake and eat it too***
Unlike Postal's (1994) analysis of Π-positions, this analysis does not appeal to separate primitive movement operations.

– Rather, the Π-position asymmetry follows from the property-type requirement of Π-positions being incompatible with the type-*e* variable that a step of scope-shifting movement leaves in the Π-position at LF.

– More importantly, **reconstruction crosscuts movement types**.

– Assigning separate primitive operations to T-movements and W-movements cannot capture this pattern, in particular that W-movements cannot target Π-positions when they do not reconstruct.

- ***A simpler generalization***

– The property and scope generalizations are in fact interconnected: It is precisely because Π-positions host property-type DPs that they cannot be targeted by scope-shifting movement.

– That is, the property generalization **implies** the scope generalization.

– Therefore, the restriction on Π-positions can be stated more generally as the constraint below:

(54) **Π-position Restriction**
*[x]$_{\Pi\text{-pos}}$, where x is an element of type e

- ***Antipronominality is also about propertyhood***
(54) has the advantage of being more general than a constraint on movement and thus also captures why Π-positions are antipronominal:

– Weak pronouns like *it* cannot denote a property and hence violate (54).

– Strong pronouns like *that*, on the other hand, face no such problem because they can denote a property.

– This fact can be observed independently using the verb *consider*, whose second argument must denote a property. While a weak pronoun is ungrammatical with *consider*, a strong pronoun is not:

(55) **Weak pronouns cannot denote a property**
Donald Trump thinks that he is a success, but no one else considers him { ✓**that** / ***it** }.

. . . . . .

✳ ***Implications***
The ungrammaticality of scope-shifting movement targeting a Π-position indicates that movement cannot map onto a λ-abstraction–variable relation ranging over properties, where the moved DP denotes either a property or a generalized quantifier over properties:

(56) **Property traces are ungrammatical**

a. *[$\text{DP}_{\langle e,t\rangle}$ λf_{et} [… f …]]

b. *[$\text{DP}_{\langle\langle et,t\rangle,t\rangle}$ λf_{et} [… f …]]

- We know that (56b) is unavailable because even in instances that involve quantification over properties, these quantifiers over properties cannot take scope over other scope-bearing elements in the sentence:

(57) a. There was*n't* **every kind of doctor** at the convention.
✓not ≫ every; *every ≫ not

b. There was*n't* **only one kind of doctor** at the convention.
✓not ≫ only one; *only one ≫ not

- This unavailability of wide-scope is expected if (56b), where a generalized quantifier over properties has undergone QR, is unavailable:

(58) *[**every kind of doctor**]$_{\langle\langle et,t\rangle,t\rangle}$ $\lambda f_{\langle e,t\rangle}$ [there be $f_{\langle e,t\rangle}$ at the convention]
(QR)

- Moreover, if a λ-abstraction over properties is unavailable in (56b), then we can generalize that it is also unavailable in (56a).

⇒ **The syntax–semantics mapping does not permit movement to map onto a λ-abstraction over properties.**

6 Type shifting

- ***Wait a minute!***
At first glance, the Π-position Restriction appears to undergenerate because it is possible for seemingly type-*e* elements to occur in Π-positions:

(59) a. **Color verbs**
Megan painted the house **that hideous shade of purple**.

b. **Naming verbs**
Irene called the cat **that dumb nickname**.

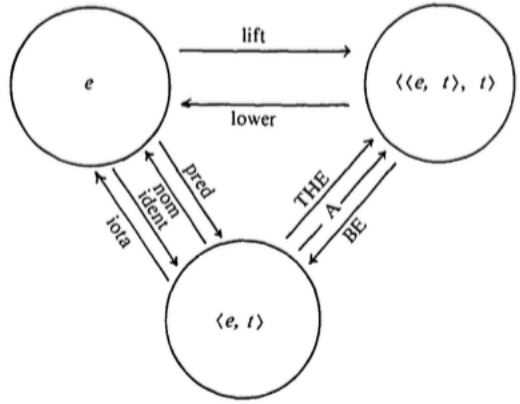
c. **Predicate nominals**
Erika became **that kind of teacher**.

- Answering why this is possible requires being more explicit about what it means for a DP to have a property-type denotation and in turn understanding how this process interacts with movement.

6.1 Type shifting to property

✳ ***Answer in a nutshell***
DPs can obtain a property denotation via nominal type shifting.

- ***Partee Triangle***
– Partee (1986) argues that DPs have three types of denotations: entities (e), properties ($\langle e,t\rangle$), and generalized quantifiers ($\langle et,t\rangle$).
– She proposes a set of semantic type shifters that allow DPs to flexibly shift from one type to another:



- The type shifters that are important for our purposes are PRED and $\mathcal{BE}$.

⇒ ***Entity → Property***
PRED maps the entity-correlate of a property onto the corresponding property, e.g. *green* the noun into *green* the adjective (Chierchia 1984).

  – Not every property has an entity correlate, and not every entity corresponds to a property, so PRED is of limited use.

⇒ ***Generalized quantifier → Property***
$\mathcal{BE}$ is a homomorphism between $\langle et, t\rangle$ and $\langle e, t\rangle$. It applies to a generalized quantifier, finds all of the singleton sets therein, and collects the elements of these singleton sets into a set:

(60) $\mathcal{BE} = \lambda\mathcal{P}_{\langle et,t\rangle}\,\lambda x_e\,.\,\mathcal{P}([\lambda y\,.\,y = x])$
$= \lambda\mathcal{P}_{\langle et,t\rangle}\,\lambda x_e\,.\,\{x\} \in \mathcal{P}$

- Crucially, not every generalized quantifier has singleton sets in its domain. For such DPs, $\mathcal{BE}$ returns the empty set, a result which is degenerate.[6]

- To illustrate, consider the model in (61):

(61) a. $\mathcal{E} = \{\text{Snowball}\ (s), \text{Mittens}\ (m), \text{Nekochan}\ (n), \text{Odie}\ (o)\}$

b. $[\![\text{cat}]\!] = \{s, m, n\}$
$[\![\text{dog}]\!] = \{o\}$

- Against the model in (61), the extensions of some quantificational DPs are given below, where the singleton sets are boxed.

(62) a. $[\![\text{every cat}]\!] = \big\{\{s, m, n, o\}, \{s, m, n\}\big\}$

b. $[\![\text{every dog}]\!] = \big\{\boxed{\{o\}}, \ldots\big\}$

c. $[\![\text{the dog}]\!] = \big\{\boxed{\{o\}}, \ldots\big\}$

d. $[\![\text{some cat}]\!] = \big\{\{s, m, n, o\}, \{s, m, n\}, \{s, m\}, \boxed{\{s\}, \{m\}, \{n\}}, \ldots\big\}$

e. $[\![\text{two cats}]\!] = \big\{\{s, m, n, o\}, \{s, m, n\}, \{s, m\}, \boxed{\{s \oplus m\}, \{m \oplus n\}}, \ldots\big\}$

f. $[\![\text{most cats}]\!] = \big\{\{s, m, n, o\}, \{s, m, n\}, \{s, m\}, \{s, n\}, \{m, n\}, \ldots\big\}$

[6] $\mathcal{BE}$ yields nontrivial results for DPs denoting proper principal filters (i.e. definite descriptions) and DPs classified by Keenan (1987) as EXISTENTIAL.

- ***Weak DPs***
  – *some cat* and *two cats* have singletons in their domains and hence have licit property-type denotations under $\mathcal{BE}$.
  – Definite descriptions also have a singleton in their domain, i.e. their singleton generator, and thus have licit property-type denotations under $\mathcal{BE}$.

- ***Strong DPs***
every cat and *most cats* never have singletons in their domains and hence do not have licit property-type denotations under $\mathcal{BE}$.

- An exception to this fact for strong DPs is when the domain of entities only contains one entity of the restrictor set:
  – In this case, *every NP* and *most NPs* will have a singleton in their domain.
  – However, in such a situation, there is something illformed about using *every NP* and *most NPs* instead of *the NP* (see Partee 1986:127).
  – Whatever principle results in this illformedness presumably also rules out these DPs having a valid property-type denotation under $\mathcal{BE}$.

- Recall that *every NP* is allowed in Π-positions if it quantifies over properties, e.g. *every kind of doctor*, but why this is possible is set aside in this talk.

. . . . . .

✳ ***Proposal***
DPs never start out denoting properties. A property-type denotation is always achieved by nominal type shifting from an individual denotation (e) or a generalized quantifier denotation ($\langle et, t\rangle$):

(63) a. **Existential constructions**
There is [$\mathcal{BE}$(**a potato**)] in the pantry.

b. **Color verbs**
Megan painted the house [PRED(**magenta**)].

c. **Naming verbs**
Irene called the cat [$\mathcal{BE}$(**Snowflake**)].

d. **Predicate nominals**
Erika became [$\mathcal{BE}$(**a teacher**)].

⇒ A Π-position requires a type shifter for the structure to semantically compose.

- ***Taking stock and looking ahead…***
  - We now have an explanation for why seemingly type-*e* elements can occur in Π-positions: they are type shifted into property meanings.
  - However, thus far, nothing prevents these same type shifters from applying to traces. There is precedent for this idea in Partee (1986).
  - The next subsection introduces a third generalization about Π-positions: they prohibit anaphoric definite descriptions.
  - I argue that the ban on anaphoric definites and the ban on scope-shifting movement are one and the same under the hypothesis of Trace Conversion, wherein traces are in fact anaphoric definites.
  - I then propose a syntactic account of the complementarity of type shifting and the anaphoric definite determiner.

6.2 Π-positions prohibit anaphoric definites

∗ It is not the case that Π-positions allow all type-*e* elements (via type shifting). They only allow a proper subset of them. In particular, they prohibit definite descriptions that are anaphoric in nature:

(64) Definite Generalization
Π-positions prohibit anaphoric definite descriptions.

- ***Reference to an indefinite***
For example, a definite description in a Π-position cannot refer to a previously mentioned indefinite:

(65) John picked out *a shade of red* for the living room.

a. #And Mary painted the room [**the shade**]$_{\text{Π-pos}}$.

b. But Mary thought that **the shade** was too dark.

⇒ ***Covariance with a quantifier***
More convincingly, a definite description in a Π-position cannot covary with an indefinite in a quantificational context:

(66) **Existential constructions**
In every hotel room with *an ugly lamp*, . . .

a. #there is [**the lamp**]$_{\text{Π-pos}}$ on the dresser.

b. ✓**the lamp** is on the dresser.

(67) **Change-of-color verbs**
Every time Irene picks out *a new color* for the bathroom, . . .

a. #Helen has to paint the room [**the color**]$_{\text{Π-pos}}$.

b. ✓Helen complains that **the color** is too bright.

(68) **Naming verbs**
Every time that my mom found *a new puppy name*, . . .

a. #she nicknamed the family dog [**the name**]$_{\text{Π-pos}}$.

b. ✓my dad vetoed **the name**.

- While anaphoric definites are prohibited in Π-positions, ordinary definites satisfied purely by uniqueness are okay:

(69) A: What did you like about the fridge?
B: Well, there was [**the spacious vegetable crisper**]$_{\text{Π-pos}}$.

. . . . . .

- ***Two generalizations***
We now have two generalizations about what is not allowed in a Π-position:

(70) a. ***Scope generalization***
Π-positions cannot be targeted by movement that shifts scope.

b. ***Definiteness generalization***
Π-positions prohibit anaphoric definite descriptions.

∗ ***Proposal***
These two generalizations are one and the same because "traces" are in fact anaphoric definite descriptions.

- The idea that traces are related to anaphoric definite descriptions is quite old; see Engdahl's (1980, 1986) early work on the semantics of questions.

- ***Trace Conversion***
  - However, the idea is probably best known now as the independently motivated copy-theoretic hypothesis of Trace Conversion (Sauerland 1998, 2004; Fox 1999, 2002, 2003).
  - In the interest of time, I will not review any of the independent evidence for Trace Conversion.

– Trace Conversion is an LF rule that renders the lower copies of a movement chain interpretable by inserting a variable, which is bound by the λ-abstraction created by movement, and replacing the determiner with a definite determiner.

(71) Trace Conversion

a. **Variable Insertion**
(Det) Pred → (Det) [Pred [λy . $y = g(n)$]]

b. **Determiner Replacement**
(Det) [Pred [λy . $y = g(n)$]] → the [Pred [λy . $y = g(n)$]]
[Fox 1999, 2002, 2003]

⇒ The result of Trace Conversion is that traces are anaphoric definite descriptions, which allows the scope generalization to be subsumed under the definite generalization.

6.3 Complementarity of type shifting and anaphoric definites

- ***Question***
Why can anaphoric definite descriptions not be type shifted into property-type denotations so that they can occur in Π-positions?

⁕ ***Proposal in a nutshell***
Nominal type shifters and the (strong) definite determiner used in anaphoric definite descriptions are in **complementary distribution** such that a derivation can either apply Trace Conversion or apply a type shifter.

- ***Weak vs. strong definites***
  - Anaphoric definites live under another name: strong definites.
  - Schwarz's (2009) argues that there are two definite determiners:

(72) **Schwarz's (2009) weak and strong definite determiners**

a. $[\![\text{the}_{\text{WEAK}}]\!] = \lambda s\, \lambda \text{P}\, .\, \iota x[\text{P}(x)(s)]$

b. $[\![\text{the}_{\text{STRONG}}]\!] = \lambda s\, \lambda \text{P}\, \lambda y\, .\, \iota x[\text{P}(x)(s) \wedge x = y]$ [Schwarz 2009]

  - The strong definite determiner is anaphoric because it has access to an index which can be bound or valued contextually.

- In some languages, the weak and strong definite determiners have unique realizations. For example, in German, the weak definite determiner contracts with prepositions, but the strong one does not:

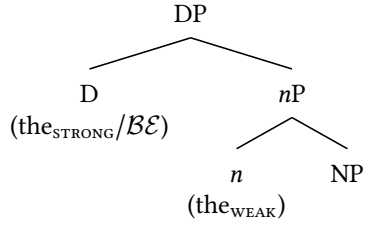
(73) **Weak and strong definites in German**
In jeder Bibliothek, die ein Buch über Topinambur hat, sehe
in every library that a book about topinambur has look
ich {**#im** / **✓in dem**} Buch nach, ob man
I in.the$_{\text{WEAK}}$ in the$_{\text{STRONG}}$ book PART whether one
Topinambur grillen kann.
topinambur grill can
'In every library that has a book about topinambur I check in the book whether one can grill topinambur.' [Schwarz 2009:33]

⇒ ***Trace Conversion → Strong definite***
Crucially, Trace Conversion requires the strong definite determiner in order to establish a connection between the upstairs moved DP and the downstairs definite description.

⁕ ***Proposed nominal structure***
I propose that the strong definite determiner and nominal type shifters are in complementary distribution because they compete for the same syntactic slot in the functional structure of a nominal:[7]

  - *the*$_{\text{STRONG}}$ occupies D^0.
  - Nominal type shifters occupy D^0 as well.
  - *the*$_{\text{WEAK}}$ occupies some lower functional head, say n^0.

(74)



- For one stipulation, this complementarity derives both the definite generalization and the scope generalization.[8]

[7] (74) might fit into a more articulated nominal structure like that of Zamparelli (2000).

[8] Patel-Grosz & Grosz (to appear) argue that the personal–demonstrative pronoun distinction and the weak–strong definite distinction (in German) are one and the same. Their analysis might extend to English, but it is not immediately obvious how the English weak–strong **pronoun** distinction, which is based on being able to bear stress, fits into the weak–strong **definite** distinction.

⇒ ***Type-shifted definite → Weak definite***
First, a definite that has been type shifted is necessarily a weak definite:

(75) a. $[_{\text{DP}}\ (\mathcal{BE})\qquad [_{n\text{P}}\ \text{the}_{\text{WEAK}}\ \text{NP}\ ]]$ ⇝ Weak def.; ✓type shifting

b. $[_{\text{DP}}\ \text{the}_{\text{STRONG}}\ [_{n\text{P}}\ n^0\qquad \text{NP}\ ]]$ ⇝ Strong def.; ✗type shifting

⇒ ***No Trace Conversion and type shifting***
Second, Trace Conversion and type shifting cannot apply to one and the same DP. Thus, in a Π-position, it is a lose-lose situation: either there is no binding (vacuous quantification) or there is no property-type denotation:

(76) $^*\text{DP}_1\ \lambda x\ \ldots\ [\ [_{\text{DP}}\ \mathcal{BE}\ [_{n\text{P}}\ \text{the}_{\text{WEAK}}\ \text{NP}\ ]]_1\ ]_{\Pi\text{-pos}}$ ✓Property ✗Quantification

?? *no variable to bind*

(77) $^*\text{DP}_1\ \lambda x\ \ldots\ [\ [_{\text{DP}}\ \text{the}^{\text{STRONG}}_x\ [_{n\text{P}}\ n^0\ \text{NP}\ ]]_1\ ]_{\Pi\text{-pos}}$ ✗Property ✓Quantification

- ***But why are they in complementary distribution?***
  An idea that floats around in the literature is that *the* is an overt type shifter, i.e. an overt ι-operator (e.g Partee 1986; Chierchia 1998).
  - Imagine that this holds for the strong definite determiner. Then, it would compete for D^0 because it is itself a type shifter.
  - This analysis might further render the weak definite determiner more like a Russellian definite that maps any singleton to itself and any nonsingleton to the empty set.
  - I leave exploring these ideas for future research.

7 Conclusion

- I have shown that a given step of movement cannot target a property-type DP if that movement shifts the scope of the moved DP.
  ⇝ In other words, movement that targets a property-type DP must reconstruct.
- A important consequence of this restriction is that some movement types are categorically precluded from targeting property-type DPs because they can never reconstruct.
  ⇝ This is what gives rise to the Π-position asymmetry.
- I argued that we can account for this reconstruction asymmetry using only the tools that are already independently needed for interpreting movement and reconstruction.
- The upshot of this theoretical austerity is that it shows that we can account for a complex set of facts with minimal theoretical acrobatics. Unlike Postal (1994), I accounted for Π-positions without appealing to separate syntactic primitives for movement types.
- Moreover, the analysis developed here raised interesting questions about nominal type shifting and how this semantic process interacts with movement. I argued that traces belong to the class of strong definites and that it is strong definites that cannot be type shifted.

⁎ ***What did we learn?***
This investigation of movement targeting property-type DPs revealed that the syntax–semantics mapping lacks a way of interpreting moved properties as "semantically displaced", either via abstracting over properties or via type shifting a type-*e* trace:

(78) $^*[\ \text{DP}_1\ \lambda f_{\langle e,t\rangle}\ \ldots\ [\ \ldots\ [\ f_{\langle e,t\rangle}\ ]_1\ \ldots\ ]\ ]$

(79) $^*[\ \text{DP}_1\ \lambda x_e\ \ldots\ [\ \ldots\ \textsc{shift}([\ x_e\ ]_1)_{\langle e,t\rangle}\ \ldots\ ]\ ]$

- What Π-positions impart is a novel argument that movement can only map onto λ-abstractions over individual types, e.g. entities (*e*), situations/worlds (*s*), and degrees (*d*) (Chierchia 1984; Romero 1998; Fox 1999; Landman 2006).[9]
- But why should such a restriction hold, especially given that our semantic machinery can generate such LFs?
  - I would like to (briefly) speculate that this restriction is a manifestation of a more general interconnection between 'virtual conceptual necessity' and economy (Chomsky 1993, *et seq*):
  - Namely, the mapping between syntax (the generative component) and semantics (the interpretive component) that arises out of virtual conceptual necessity also happens to be the most economical mapping possible.
  - Put more plainly, restricting λ-abstractions to be only over individual types is the most economical mapping that natural language **could** manifest to link together syntax with semantics.

[9] *cf.* Lechner (1998); Ruys (2015)

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Appendix: Controlling for topicalization

⇒ ***Differences between topicalization, focus movement, and Y-movement***

- ***Prosody***
  All three have different intonational profiles. An easy way to distinguish topicalization prosodically is that it has two prosodic prominences, while both focus movement and Y-movement have only one (Gundel 1974; Prince 1981; Constant 2014).

- ***Pragmatics***
  In topicalization, the moved element is **given**, while in focus movement and Y-movement, the moved element is **new** (Gundel 1974; Prince 1981).

- To control for topicalization, we can utilize question-answer scenarios, where topicalization is natural in the answer, but focus movement (and Y-movement) are not (scenarios based on Constant 2014):

(80) What do you want on the hotdog and the hamburger?

a. ✓I'll take THE HOTDOG with MUSTARD. **Baseline**

b. ✓THE HOTDOG . . . I'll take with MUSTARD. **Topicalization (given)**

c. #MUSTARD . . . I'll take with THE HOTDOG. **Topicalization (new)**
   ⇝ Fronted element not given

d. #MUSTARD, I'll take with the hotdog. **Focus movement**
   ⇝ Given element not stressed

- There is a preference to stress both *the hotdog* and *mustard* because *the hotdog* is given information signaling a partial answer and *mustard* is new information answering the question.

⇒ Thus, the only licit information-structure movement in these scenarios is topicalization, which requires that the moved element be given.

∗ We can use these scenarios to confirm that topicalization indeed cannot target Π-positions, in particular by contrasting it with topicalizing another constituent in the construction:

(81) Context: Gloria is making a salad for lunch at her friend's house, but does not know where everything is located in the kitchen.

A: What about a knife and a cutting board?
Where can I find *those*?

B: *[A CUTTING BOARD] . . . there is [ON THE TABLE].

(82) Context: Gloria is helping her friend reorganize their kitchen. Before entering the messy kitchen, she wants to start by taking an inventory of what is on all of the surfaces.

A: What about on the table and on the counter?
What is there on *those*?

B: ✓[ON THE TABLE] . . . there is [A CUTTING BOARD].

Appendix: Relative clauses and scope

- Restrictive RCs allow the nominal head to reconstruct, but appositive RCs do not (examples based on Bianchi 1999):

(83) **Restrictive RCs** ✓two ≫ every; ✓every ≫ two
I called the **two patients**$_1$ [$_{RC}$ that *every doctor* will examine ___$_1$].

(84) **Appositive RCs** ✓two ≫ every; *every ≫ two
I called the **two patients**$_1$, [$_{RC}$ which *every doctor* will examine ___$_1$].

- To create distinct low and high readings in restrictive RCs, we must turn to adjectival modifiers like *first* and *only* (Bhatt 2002):

(85) the **only book**$_1$ [$_{RC}$ that John said that Tolstoy had written ___$_1$]

a. **Low reading (reconstructed)** say ≫ only
the *x* such that John said that '*x* is the only book that Tolstoy wrote'

b. **High reading (scope-shifted)** only ≫ say
the only book about which John said that Tolstoy had written it
[Bhatt 2002:57]

- Crucially, when a restrictive RC is formed on a Π-position, only the low reading of the adjectival modifier survives:

(86) the **only books**$_1$ [$_{RC}$ that John said (that) there were ___$_1$ on the table]

a. **Low reading (reconstructed)** say ≫ only
✓the *x* such that John said that '*x* are the only books that there are on the table'

b. **High reading (scope-shifted)** only ≫ say
*the only books about which John said that there were on the table

∗ Thus, relative clauses conform to the scope generalization.