Roots don’t select, categorial heads do: 
lexical-selection of PPs may vary by category

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1 How selection works

(1) Merge(α, β)
For any syntactic objects α, β, where α bears a nonempty selectional list ℓ = <F₁, ..., Fₙ>
of selectional features, and β bears a categorial feature F′ that matches F₁, call α the head and
a. let α = { γ, { α−ℓ, β} } call γ the projection of α, and
b. if n > 1, let ℓ = ⟨F₂, ..., Fₙ⟩, else let ℓ = ∅, and
c. let γ = [CAT [cat(α)] [SEL ℓ]]

(2) Set F of selectional features = { N, V, A, C, on, in, +wh, -Q, +pl, √RELI, ... }
This permits c(ategory)- and l(exical)-selection (Pesetsky 1991)

• A prima facie surprising claim: all arguments are severed from the root

2 Category-invariant l(exical)-selection

(3) a. They rely on oil.
   b. Their reliance on oil is well-known.
   c. They are reliant on oil.
(4) a. The compound reacted to light.
   b. The compound’s reaction to light was expected.
   c. The compound was reactive to light.
(5) a. in de liefde geloven
Dutch (Neeleman 1997)
in the love believe ‘believe in love’
b. het geloof in de liefde
the belief in the love ‘the belief in love’
(6) a. Anna glaubt an die Logik.
   German
Anna believes on the logic ‘Anna believes in logic’:
Anna’s belief on the logic is unshakable.
   ‘Anna’s belief in logic is unshakable.’
b. Annas Glaube an die Logik ist unerschütterlich.
   Anna’s belief on the logic is unshakable.

Selection

<table>
<thead>
<tr>
<th>V</th>
<th>N</th>
<th>A</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>look, name</td>
<td></td>
<td></td>
<td>after</td>
</tr>
<tr>
<td>laugh, laughter</td>
<td></td>
<td></td>
<td>at</td>
</tr>
<tr>
<td>wonder, wonder</td>
<td></td>
<td></td>
<td>at</td>
</tr>
<tr>
<td>work</td>
<td></td>
<td></td>
<td>at</td>
</tr>
<tr>
<td>angle, apology</td>
<td></td>
<td></td>
<td>for</td>
</tr>
<tr>
<td>atone, atonement</td>
<td></td>
<td></td>
<td>for</td>
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<td>blame, blame</td>
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<td></td>
<td>for</td>
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<td>call, call</td>
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<td>for</td>
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<td>for</td>
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<td>for</td>
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<td>long</td>
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<td>wait, wait</td>
<td></td>
<td></td>
<td>for/on</td>
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<td>belief, belief</td>
<td></td>
<td></td>
<td>(cf. credulous of) in</td>
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<td>delight, delight</td>
<td></td>
<td></td>
<td>in</td>
</tr>
<tr>
<td>trust, trusting</td>
<td></td>
<td></td>
<td>in</td>
</tr>
<tr>
<td>look, look</td>
<td></td>
<td></td>
<td>into</td>
</tr>
<tr>
<td>check</td>
<td></td>
<td></td>
<td>on</td>
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<td>depend, dependence</td>
<td></td>
<td></td>
<td>dependent on</td>
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<tr>
<td>rely, reliance</td>
<td></td>
<td></td>
<td>reliant on</td>
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<tr>
<td>appeal, appeal</td>
<td></td>
<td></td>
<td>to</td>
</tr>
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<td>auditor, audibility</td>
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<td>to</td>
</tr>
<tr>
<td>confess, confession</td>
<td></td>
<td></td>
<td>to</td>
</tr>
<tr>
<td>dedicate, dedication</td>
<td></td>
<td></td>
<td>dedicated to</td>
</tr>
<tr>
<td>object, objection</td>
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<td></td>
<td>to</td>
</tr>
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<td>react, reaction</td>
<td></td>
<td></td>
<td>reactive to</td>
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<td>respond, response</td>
<td></td>
<td></td>
<td>to</td>
</tr>
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<td>sensitive, sensitivity</td>
<td></td>
<td></td>
<td>to</td>
</tr>
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<td>submit, submission</td>
<td></td>
<td></td>
<td>to</td>
</tr>
<tr>
<td>tantamount, tantamount</td>
<td></td>
<td></td>
<td>to</td>
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<td>visibility, visible</td>
<td></td>
<td></td>
<td>to</td>
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<tr>
<td>consciousness, conscious</td>
<td></td>
<td></td>
<td>of</td>
</tr>
<tr>
<td>dispose</td>
<td></td>
<td></td>
<td>of</td>
</tr>
<tr>
<td>guilt, guilty</td>
<td></td>
<td></td>
<td>of</td>
</tr>
<tr>
<td>innocence, innocent</td>
<td></td>
<td></td>
<td>of</td>
</tr>
<tr>
<td>tire, tired</td>
<td></td>
<td></td>
<td>of</td>
</tr>
<tr>
<td>comply, compliance</td>
<td></td>
<td></td>
<td>with</td>
</tr>
<tr>
<td>cope, toy</td>
<td></td>
<td></td>
<td>with</td>
</tr>
<tr>
<td>dispense, dispensation</td>
<td></td>
<td></td>
<td>with</td>
</tr>
</tbody>
</table>

• ‘The fact that selectional restrictions remain in force across the nominal/verbal divide (study chemistry/student of chemistry) suggests that whatever low category is sister to the internal

1Thanks to Elizabeth Wood, Omar Agha, and Kate Mooney for help in assembling these.
argument is not specific to the nominal extended projection. The acategorial root meets this description perfectly” (Harley 2014:22–23 fn 22, emphasis added).²

(8) N as categorizer (often written n)

(9) a. √RELI:: [SEL:(on)]
   b. N:: [SEL:{(√RELI, ... }]

(10) N ↔ ance /* √RELI

• “These facts are arbitrary.” (Pesetsky 1991:10)

(11) a. a time-sensitive (*to) matter; the matter’s time-sensitivity (*to)
   b. a drug-dependent (*on) recovery; his drug-dependence (*on)

(12) [of/in/on/at/...] = λx.t[x]

(13) a. She envies his accomplishments.
   b. Her envy of his accomplishments is understandable.
   c. She is envious of his accomplishments.

(14) a. Our appreciation of his help is great.
   b. We appreciate his help.
   c. We are appreciative of his help.

(15) a. Abby fears dark spaces.
   b. Abby’s fear of dark spaces is well known.
   c. Abby is fearful of dark spaces.

(16) V-N-A tuples with verbal direct objects and N/A of-objects

<table>
<thead>
<tr>
<th>V</th>
<th>N</th>
<th>A</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>appreciate x</td>
<td>appreciation</td>
<td>appreciative of</td>
<td>x</td>
</tr>
<tr>
<td>arrest x</td>
<td>arrest</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>choose x</td>
<td>choice</td>
<td>of</td>
<td>x</td>
</tr>
<tr>
<td>confirm x</td>
<td>confirmation</td>
<td>of</td>
<td></td>
</tr>
<tr>
<td>deny x</td>
<td>denial</td>
<td>of</td>
<td></td>
</tr>
<tr>
<td>destroy x</td>
<td>destruction</td>
<td>of destructive</td>
<td></td>
</tr>
<tr>
<td>envy x</td>
<td>envy</td>
<td>envious of</td>
<td>x</td>
</tr>
<tr>
<td>fear x</td>
<td>fear</td>
<td>fearful of</td>
<td></td>
</tr>
<tr>
<td>indicate x</td>
<td>indication</td>
<td>indicative of</td>
<td></td>
</tr>
<tr>
<td>study x</td>
<td>student</td>
<td>of</td>
<td></td>
</tr>
</tbody>
</table>

3 Category-dependent l(lexical)-selection

(17) a. I oppose (*to) lower capital gains taxes.
    b. My opposition to lower capital gains taxes is well known.
    c. I am very opposed to lower capital gains taxes.

²And there isn’t always a verb in the paradigm, pace Alexiadou and Grimshaw 2008; sorry, Artemis!
(32) a. She sympathizes with the refugees/your proposal.
b. She has great sympathy with/to the refugees/your proposal.
c. She is very sympathetic to the refugees/your proposal.

(33) V-N-A tuples with differing selected Ps or direct objects (134 in database)

<table>
<thead>
<tr>
<th>V</th>
<th>N</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>abound in/with</td>
<td>abundance of x</td>
<td>abundant in/with x</td>
</tr>
<tr>
<td>access x</td>
<td>access to x</td>
<td></td>
</tr>
<tr>
<td>account for x</td>
<td>account of x</td>
<td></td>
</tr>
<tr>
<td>answer x</td>
<td>answer to x</td>
<td></td>
</tr>
<tr>
<td>appall x</td>
<td>appalling to x</td>
<td></td>
</tr>
<tr>
<td>assault x</td>
<td>assault on x</td>
<td></td>
</tr>
<tr>
<td>astonish x</td>
<td>astonishing to x</td>
<td></td>
</tr>
<tr>
<td>attack x</td>
<td>attack on x</td>
<td></td>
</tr>
<tr>
<td>attempt x</td>
<td>attempt at/of x</td>
<td></td>
</tr>
<tr>
<td>benefit x</td>
<td>benefit to x</td>
<td></td>
</tr>
<tr>
<td>concern oneself with x</td>
<td>concern with/for/about x</td>
<td>concerned about x</td>
</tr>
<tr>
<td>desire x</td>
<td>desirous of x</td>
<td></td>
</tr>
<tr>
<td>destroy x</td>
<td>destructive to x</td>
<td></td>
</tr>
<tr>
<td>disrupt x</td>
<td>disruptive to/of x</td>
<td></td>
</tr>
<tr>
<td>encounter x</td>
<td>equivalent of x</td>
<td>equivalent to x</td>
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<tr>
<td>help x</td>
<td>helpful to x</td>
<td></td>
</tr>
<tr>
<td>oppose x</td>
<td>opposed to x</td>
<td></td>
</tr>
<tr>
<td>pride x</td>
<td>proud of x</td>
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</tr>
<tr>
<td>resemble oneself on x</td>
<td>resemblance to x</td>
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</tr>
<tr>
<td>support x</td>
<td>supportive of x</td>
<td></td>
</tr>
<tr>
<td>witness x</td>
<td>synonymous with x</td>
<td></td>
</tr>
</tbody>
</table>

(34) The usual geometry cannot be right:

This geometry cannot be saved by analyzing the on, in, of alternation as one of contextually triggered allomorphy (idea: roots like $\sqrt{\text{PRD}}$ c-select for an underspecified P, and DM rules spell P out as on, in, of):

(35) $P \leftrightarrow \text{in/} N \sqrt{\text{PRD}}$

**Problem 1:** Many roots are like $\sqrt{\text{OPPOS}}$ where a verbal direct object alternates with a PP complement to an N or A; the following set of selectional features fails to account for the category-sensitivity:

(36) $\sqrt{\text{OPPOS}}\left[\begin{array}{c} \text{CAT} \\text{SEL} \end{array} \left[\{D, P\}\right] \right]$

**Problem 2:** Allomorphic rules are too late: these alternations feed wh-movement

(37) The legislature passed the proposal to which we were opposed.

3.1 Solution: Categorizing heads may have two selectional features

Categorizing heads select for some roots and not others: these idiosyncrasies are listed as the set of selectional features that a particular category head takes.

(38) $N_{in} \left[\begin{array}{c} \text{CAT} \\text{SEL} \end{array} \left[\{\sqrt{\text{PRD}}, \sqrt{\text{FAITH}}, \ldots\}\right], \text{in}\right]$

(39) $V_{on} \left[\begin{array}{c} \text{CAT} \\text{SEL} \end{array} \left[\{\sqrt{\text{PRD}}, \sqrt{\text{RELT}}, \ldots\}\right], \text{on}\right]$

(40) $A_{of} \left[\begin{array}{c} \text{CAT} \\text{SEL} \end{array} \left[\{\sqrt{\text{PRD}}, \sqrt{\text{DESR}}, \ldots\}\right], \text{of}\right]$

- Merge in (1) applies iteratively: the first selectional feature on the list licenses the construction of the N/V/A + root:

(41) Merge($N_{in}, \sqrt{\text{PRD}}$) = $N_{in}$

- The second selection feature on the list licenses the Merger of the PP:

(42) Merge($N_{in}, \text{in}$) = $N_{in}$

- After merger of additional functional heads in the extended projection of N and head movement (additional operations such as Local Dislocation not represented):

(43)

(44) a. $\sqrt{\text{PRD}} \leftrightarrow \text{pride} / \_ N$

b. $\sqrt{\text{PRD}} \leftrightarrow \text{pride} / \_ V$

c. $\sqrt{\text{PRD}} \leftrightarrow \text{proud} / \_ A$

N node realization is not sensitive to selectional features, only to the list of roots (cf. Alexiadou et al. 2007, Adger 2013):

(45) reliance on, abundance in, resemblance to: $N_{on}, N_{in}, N_{to}$

(46) N $\leftrightarrow$ ane / {\sqrt{\text{RELT}}, \sqrt{\text{ABOUND}}, \sqrt{\text{RESEMBL}}, \ldots}$
3.2 The history of lust

(47) a. They lust for/after chocolate.
b. Their lust for/*after chocolate was insatiable.

(48) Relative frequency of verbal lust for vs lust after:

(49) Relative frequency of nominal lust for vs lust after:

Conclusion: selectional features are stochastic

One implementation of a probabilistic CFG ($G = (N,T,S,R,p)$) with subcategorization: $p$ is a parameter for each rule $A \rightarrow \beta \in R$, such that for each $A \in N$:

$$\sum_{A \rightarrow \beta \in \beta_{i}(A)} p(A \rightarrow \beta) = 1$$

(50) $V_{for}$
    $$\begin{array}{ll}
    \text{CAT} & [V] \\
    \text{SEL} & \{[\sqrt{\text{LUST}^{0.4r}}, \ldots], \text{for}] \end{array}$$

(51) $V_{after}$
    $$\begin{array}{ll}
    \text{CAT} & [V] \\
    \text{SEL} & \{[\sqrt{\text{LUST}^{0.6r}}, \ldots], \text{after}] \end{array}$$

3.3 Inner vs. outer selection

Inner categorizing heads:

(52) ∅, -al, -ance, -ant/ent, -ed, -ful, -ible, -ing, -ive, -(t)ion, -(u)ous

(53) Prediction: Categorizing heads that take already categorized XPs cannot alter the selectional properties.

(54) a. She exhibits great faith in God.
b. She is very faithful to God.
c. She exhibits great faithfulness to/*in God.

(55) a. inP N toP A toP A toP -ful √ FAITH
b. AP toP A toP A toP -ful √ FAITH
c. NP toP A toP -ness √ FAITH

(56) oppose (*to), opposition to, oppositional to, oppositionality to

(57) NP toP A toP A toP -al N toP A toP -ity ⟨A⟩ ⟨N⟩ √ toP to DP

• -er attaches to V; therefore, the verbal selectional feature persists:

(58) a. Sam was the first responder to/*of the accident.
b. Abigail is a firm believer in/*of the power of yoga to improve one’s life.
c. Conscientious objectors to/*of the war were put in prison.

(59) a. Buckley was the attacker of/*on more than a dozen of the victims.
b. Abby is a supporter of/*for equal rights.

dis- in distrust is root-attaching (cf. disgust):

(60) a. They trust me. Their trust *of/in me is not misplaced.
b. They distrust me. Their distrust of/*in me is utterly unfounded.
3.4 Neellemen’s Generalizations (Neellemen 1997)

3.4.1 There can be at most one idiosyncratic PP per root

This follows if such PPs can only be selected by the categorizing head; additional PPs (e.g., aboutP) and DP arguments are introduced by v (or Appl, or vApp') heads.

(62)  a. Abby talked to Ben about the weather.
    b. Abby reported to Ben on the the weather.
    c. The story/book/article/talk/speech/report was about/on the weather. (Grimshaw and Rosen 1990, Adger 2013:82)
    d. The report was to Ben, not to you.
    e. Abby spilled the beans to Ben about the weather.

(63)  a. What blocks *faithful in God to his commands?

b. Semantic failure: \[
\sqrt{\text{FAITH}} N_m \quad \lambda x \lambda s[\text{faith}(s)(x)]: \langle e, vt \rangle
\lambda x \lambda s[\text{faith}(s)(x)][\langle \text{in God} \rangle] \rightarrow \lambda s[\text{faith}(s)(god)] : \langle vt \rangle
\]
No way to compose with an additional type e argument: [to his commands] = his.commands (e)
\[\lambda s[\text{faith}(s)(god)] \circ \text{his.commands} \rightarrow \perp\]

3.4.2 There are no idiosyncratic PP subjects

(64)  a. *In jazz will interest everyone here.
    b. *It would be surprising if on this land abounded (with) high-quality grains.
    c. *It would be surprising for on this land to abound (with) high-quality grains.

2. Agree is blocked by PP? (But both *It was worked on many alternatives and *There were worked on many alternatives are bad.)
3. Only category heads can l-select; v, etc. (the neo-Davidsonian menagerie of argument-introducing heads) cannot select PP without imposing a \( \theta \)-requirement on them (e.g., \( \lambda e \in \text{They embroidered stars on the jacket} \) \( \lambda e \in \text{Locative Relations} \in \langle \text{oun} \rangle \langle \text{r} \rangle \)

3.5 Psych predicates (32 in database)

In case you thought psych predicates (experiencer object verbs) weren’t already a big enough problem for the U(T)AH:

(65)  a. I anger him. (*He angers at me.)
    b. His anger at me is baffling.
    c. He is angry at me.
(66)  a. Jazz interests me. (*I interest in jazz.) (They interested me in jazz.)
    b. My interest in jazz has never flagged.

3.6 Uniform (category-insensitive) selection

(71)  rely on, reliance on, reliant on

- Possibilities:

1. Some selectional features go on the ‘root’ after all? (Some nouns come categorized?)

(72)  \[
\begin{array}{c}
\text{N} \\
\text{toP}
\end{array}
\]
\[
\begin{array}{c}
\text{N} \\
\text{toP}
\end{array}
\]
\[
\begin{array}{c}
\sqrt{\text{OBJECT}} N_m \quad \lambda r \in \text{Locative Relations} \in \langle \text{oun} \rangle \langle \text{r} \rangle
\end{array}
\]

Worst of all possible worlds? Loses the parallel of \( \text{objection:opposition} \).

2. There is ‘joint selection’, with selectional features activated on roots by higher category nodes (cf. V-movement feature on T activated by matrix C in Scandinavian; Case feature on p/P activated by Voice[act] in pseudopassivizing languages)

3. These cases all involve layered categorizers: additional affixes on low (presumably verbal) categorized stems (so reliance and resemblance have differing amounts of structure; cf. Bruening 2014, Alexiadou et al. 2015 on adjectival passives):

(73)  \[
\begin{array}{c}
\text{NP} \\
\text{onP}
\end{array}
\]
\[
\begin{array}{c}
\sqrt{\text{RESEMBLE}} N_m \quad \lambda r \in \text{Locative Relations} \in \langle \text{oun} \rangle \langle \text{r} \rangle
\end{array}
\]

4. The generalizations (and predictive power) are over larger chunks of structure: spanning (Merchant 2015), fragment grammars (O’Donnell 2015).
(74) \[ \begin{array}{c}
\sqrt{\text{RELI}} \quad V_{on} \\
\end{array} \begin{array}{c}
onP \\
\end{array} \begin{array}{c}
\sqrt{\text{RELI}} \\
\end{array} \begin{array}{c}
N_{on} \\
\end{array} \begin{array}{c}
onP \\
\end{array} \begin{array}{c}
\sqrt{\text{RELI}} \\
\end{array} \begin{array}{c}
A_{on} \\
\end{array} \begin{array}{c}
onP \\
\end{array} \begin{array}{c}
\end{array} \]

5. In a traditional lexicalist theory, “Regularities involving only selectional features might in principle be stated as redundancy rules of the lexicon” (Chomsky 1970:213)

(75) a. V[...X...] ↔ A[...X...]
b. V[...X...] ↔ N[...X...]
c. N[...X...] ↔ A[...X...]

(76) Elsewhere case:
\[ [...X...]_n \leftrightarrow [...X...] \]
\[ \text{SEL} \langle F_1, ..., F_n > \] \[ \text{SEL} \langle F_1, ..., F_n > \]

(77) \[ V_{on} \begin{array}{c}
\text{CAT} [V] \\
\text{SEL} \langle \sqrt{\text{RELI}}, on \rangle \\
\end{array} \begin{array}{c}
A_{on} \\
\text{CAT} [A] \\
\text{SEL} \langle \sqrt{\text{RELI}}, on \rangle \\
\end{array} \]

3.7 L-selection and ‘one’-anaphora

Payne et al. 2013 is wrong: The resolution/inheritance mechanism for one-anaphora must have access to the selectional features of (complex) N antecedent:

(78) a. Vicious attacks on Bernie are more frequent than tongue-in-cheek ones on Trump.
b. Her first objection to the draft was more effective than her second one to the law itself.

4 Conclusions

1. There is category-sensitive selection: the lexical category can determine the idiosyncratic, non-semantically predicable preposition that a complement PP is headed by

2. This can be modeled by letting the categorizing heads have selectional features

References