VARIATION, AMBIGUITY, AND NOUN CLASSES IN ENGLISH

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(2) VARIATION and AMBIGUITY in English genitive constructions:
   a. my parents’ house ~ the house of my parents (‘the house owned by my parents’)
   b. the performance of Aida (‘A performed something’ / ‘Someone performed A’)

(3) One meaning, one form

<table>
<thead>
<tr>
<th></th>
<th>Variation</th>
<th>Ambiguity</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>M</td>
<td>M1 M2</td>
</tr>
<tr>
<td>F</td>
<td>F1 F2</td>
<td>F</td>
</tr>
</tbody>
</table>

(4) Why is this interesting?
   • Variation/ambiguity in English genitives is extremely common.
   • Systematic, but rarely studied PREFERENCES, both in expression and interpretation.

(5) Goals:
   • Show how variation, ambiguity, preferences in expression and interpretation, can be derived from ranked and violable constraints (Prince and Smolensky, 1993).
   • Show that the same theory generalizes to an apparently unrelated domain: the typology of argument linking patterns in nouns.

1. The phenomena

1.1 Variation

(6) a. But the earth came to the help of the woman, and the earth opened its mouth and swallowed the river which the dragon had poured from his mouth. (Revelations 12: 16, Revised Standard Version)
   b. But the earth came to the woman’s help: it opened its mouth and drank up the river which the Dragon had poured from his mouth. (Weymouth New Testament)

(7) the land of the dead man ~ the dead man’s land
the son of a Scottish man ~ a Scottish man’s son
the ear of Mrs. Coolidge ~ Mrs. Coolidge’s ear
the explosion of the rifle ~ the rifle’s explosion

   (Garretson, Skarabela and O’Connor 2002)
(8)  
a. Boston’s Mr. and Mrs. Frank Stearns unique couple  
Mr. and Mrs. Frank Stearns of Boston non-unique couple
b. his thought subjective reading  
the thought of him objective reading
c. We’ll meet at the house of Ann Smith new information  
We’ll meet at Ann Smith’s house old information (Deane, 1987)

(9)  
a. Transactions of the Philological Society title page  
Philological Society’s Transactions back cover (Jespersen, 1949: 314)
b. someone’s head ?  
the head of someone ?

“You cannot shave the head of someone when he is not there,” he added. (Google)  
It’s not beyond science’s reach to put someone’s head on a new body. (Google)

(10)  
a. The English of the king varied widely at times from the king’s English  
b. The Lord’s Day ‘Sunday’ vs. the Day of the Lord ‘Judgment Day’ (Jespersen, 1949:314, 318)

1.2 Ambiguity

(11)  
An attorney, not celebrated for his probity, was robbed one night on his way from Wicklow to Dublin. His father, meeting Baron O’Grady the next day, said: “My Lord, have you heard of my son’s robbery?” “No indeed”, replied the Baron, “pray whom did he rob?” (Hodgson, Errors in the Use of English 91, cited in Jespersen, 1940: 67)

(12)  
Ambiguity, Type 1: Deverbal nouns have SUBJECTIVE vs. OBJECTIVE readings (s-genitive, of-genitive):  
a. We also have the duty to appraise realistically and honestly their performance.  
b. President Kennedy has expressed his dissatisfaction with its performance.  
c. Splendid, too, is the performance of Yuri Tolubeyev.  
d. The play was to be a benefit performance of the Octoroon.

(13)  
Ambiguity, Type 2: Relational nouns (Barker and Dowty 1993) have EXTRINSIC vs. LEXICAL readings (s-genitive):  
a. His pictures were roundly denounced as the most disgusting things one has ever seen in Vienna.  
b. She doesn’t want a complete wardrobe from any one designer any more than she wants all of her pictures by one painter.

(14)  
Terminology: objective/lexical = INTERNAL, subjective/extrinsic = EXTERNAL

(15)  
a. My sister is getting married next week.  
b. She is having problems with her PhD student.
1.3 Preferences in expression, preferences in interpretation

(16) No obvious difference in meaning, but one variant sounds better than the other:
   a. its removal  ~  ?the removal of it
   b. ?the tree’s removal  ~  the removal of the tree  (Grimshaw 1990:87)

(17) Several readings are possible, but some are more easily accessible than others:
   Aida’s performance  a. ‘the performance by Aida’ (external reading)
      b. ‘a performance by Aida’ (external reading)
      c. ‘the performance of Aida’ (internal reading)
      d. ‘a performance of Aida’ (internal reading)

1.4 No variation, no ambiguity

(18)   a. *the hospitals of us  our hospitals
   b. the destruction of cities  *cities’ destruction
   c. a ring of gold  *gold’s ring
   d. most of the time  *the time’s most

(19)   a. I appreciate your contribution to the performance of it. (internal only, cf. (12))
   b. Shakespeare gives us a vivid picture of Shylock. (internal only, cf. (13))
   c. This is a picture of her. (internal only, cf. (13))

1.5 Summary

<table>
<thead>
<tr>
<th>VARIATION</th>
<th>NO VARIATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a. Pat’s picture ~ the picture of Pat</td>
<td>2a. some of my pictures / *my pictures’ some</td>
</tr>
<tr>
<td>1b. my picture ~ the picture of me</td>
<td></td>
</tr>
<tr>
<td>1c. John’s performance ~ the performance of John</td>
<td></td>
</tr>
<tr>
<td>1d. the opera’s performance ~ the performance of the opera</td>
<td></td>
</tr>
<tr>
<td>1e. its performance ~ the performance of it</td>
<td></td>
</tr>
<tr>
<td>1f. God’s love ~ the love of God</td>
<td></td>
</tr>
<tr>
<td>1g. ?the tree’s removal ~ the removal of the tree</td>
<td></td>
</tr>
<tr>
<td>1h. its removal ~ ?the removal of it</td>
<td></td>
</tr>
<tr>
<td>1i. Pat’s cat ~ ?the cat of Pat</td>
<td></td>
</tr>
<tr>
<td>2b. my cat / *the cat of me</td>
<td></td>
</tr>
</tbody>
</table>
**Table:**

<table>
<thead>
<tr>
<th>AMBIGUITY</th>
<th>NO AMBIGUITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>3a. <em>Pat’s picture</em>&lt;br&gt;‘picture representing Pat’&lt;br&gt;‘picture owned by Pat’</td>
<td>4a. <em>the picture of Pat</em>&lt;br&gt;‘picture representing Pat’</td>
</tr>
<tr>
<td>3b. <em>the love of God</em>&lt;br&gt;‘God loves someone’ (external)&lt;br&gt;‘someone loves God’ (internal)</td>
<td>4b. <em>God’s love</em>&lt;br&gt;‘God loves someone’ (external)</td>
</tr>
<tr>
<td>3c. <em>Aida’s performance</em>&lt;br&gt;‘performance by Aida’ (external)&lt;br&gt;‘performance of Aida’ (internal)</td>
<td>4c. <em>the performance of it</em>&lt;br&gt;‘performance of it’ (internal)</td>
</tr>
<tr>
<td>3d. <em>the performance of Aida</em>&lt;br&gt;‘performance by Aida’ (external)&lt;br&gt;‘performance of Aida’ (internal)</td>
<td></td>
</tr>
</tbody>
</table>

### 1.6 Empirical generalizations

(20) **The Barker-Dowty Generalization:** If a noun can take a genitive of-phrase and if the of-phrase can also be paraphrased by a prenominal possessive, then we can generally assume that [the] noun has the appropriate relational sense (Barker and Dowty 1993).

a. my picture ~ a picture of me
b. my cat/*a cat of me

(21) **Problems:**

a. the office of the superintendent ~ the superintendent’s office<br>the new firetruck of the fire department ~ the fire department’s new firetruck
b. my nose/*the nose of me<br>the destruction of cities/*cities’ destruction

(22) **The Pronoun Generalization:** Pronouns are preferred in the Specifier position and dispreferred in the Complement position. Non-pronouns show the reverse pattern.

a. ?the tree’s removal ~ the removal of the tree
b. its removal ~ ?the removal of it

(23) **Problems:** (22) is only a quantitative tendency.

a. The tree’s removal has sparked a reaction on campus. (Google)

b. Since the hair is a woman’s glory, then isn’t the removal of it the removal of her glory? (Google)
(24) **The Noun Class Observation:** Different relational nouns show different ambiguity patterns (E = external, I = internal):

- a. Aida’s performance (E~I) the performance of Aida (E~I)
  the tribe’s discovery (E~I) the discovery of the tribe (E~I)
  the company’s donation (E~I) the donation of the company (E~I)
- b. God’s love (E) the love of God (E~I)
  God’s knowledge (E) the knowledge of God (E~I)
  the enemy’s fear (E) the fear of the enemy (E~I)
- c. Clinton’s picture (E~I) the picture of Clinton (I)
  Clinton’s portrait (E~I) the portrait of Clinton (I)
  Clinton’s statue (E~I) the statue of Clinton (I)
- d. Clinton’s sketch (E) the sketch of Clinton (I)
  Clinton’s painting (E) the painting of Clinton (I)

(25) The lexical variation has strict limits. Some nonexistent patterns:

- a. Pat’s quain (I) the quain of Pat (E)
- b. Pat’s quain (I) the quain of Pat (E~I)
- c. Pat’s quain (E~I) the quain of Pat (E)

(26) Summary:
- The Barker-Dowty Generalization and the Pronoun Generalization are typical examples of regularities that are VIOLABLE and/or QUANTITATIVE.
- The Noun Class Observation is another aspect of the same problem: we need to explain the systematic restrictions, but also accommodate the lexical diversity.

2. An approach to meaning-form mapping

(27) Questions:
- Why do we find certain patterns of variation and ambiguity, but not others?
- How to explain the quantitative preferences in variation and ambiguity?

2.1 Inputs and outputs

(28) An OT grammar defines a set of possible mappings between meanings and forms.

(29) Sample meanings (Barker 1995):

- a. \( \lambda x (\pi (\text{john} , x) \wedge \text{cat}_{\text{specific, definite}}(x)) \) ‘the cat in some extrinsic relation with John’
- b. \( \lambda x (\text{child}_{\text{specific}}(\text{john} , x)) \) ‘a child of John’

(30) Simplified notation:

\[ \text{R}\{\text{e},\text{i}\} \] Relation is external (“e”) or internal (“i”).
\[ \{\text{a, the}\} \text{N} \] The possessum is specific (“a”) or specific and definite (“the”).
\[ \{\text{PRO, NP}\} \] The possessor is a pronoun (“PRO”) or a non-pronoun (“NP”).
(31) Sample forms:
   a. John's cat\textsuperscript{[specific, definite]} (’s-genitive)
      John's child\textsuperscript{[specific, definite]}
   b. the cat of John\textsuperscript{[specific, definite]} (of-genitive)
      a child of John\textsuperscript{[specific]}

   a. the, my, your, his, her, its, our, their, ’s express \textsuperscript{[specific, definite]}
   b. a(n) expresses \textsuperscript{[specific]}

2.2 Constraints

(33) Markedness:
   a. *C ‘No Complement’
   b. *S ‘No Specifier’

(34) Three prominence scales:
   a. Animacy Hierarchy: Pronoun > Non-pronoun
   b. Argument Hierarchy: External > Internal (Grimshaw, 1990)
   c. Structural Hierarchy: Specifier > Complement

(35) Harmonic alignment (Prince and Smolensky, 1993: 139):

<table>
<thead>
<tr>
<th>Scales</th>
<th>Harmonic Alignment</th>
<th>Constraint Alignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pronoun &gt; Non-Pronoun</td>
<td>S/P (&gt;_H) S/NONP</td>
<td>{*C/P} (\gg) {*S/P} {*S/NONP}</td>
</tr>
<tr>
<td>Specifier &gt; Complement</td>
<td>C/ NONP (&gt;_H) C/P</td>
<td>{</td>
</tr>
</tbody>
</table>

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<tr>
<th>Scales</th>
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</tr>
</thead>
<tbody>
<tr>
<td>External &gt; Internal</td>
<td>S/E (&gt;_H) S/I</td>
<td>{</td>
</tr>
<tr>
<td>Specifier &gt; Complement</td>
<td>C/I (&gt;_H) C/E</td>
<td>{</td>
</tr>
</tbody>
</table>

(36) Active constraints:
   a. *S/I ‘No Specifier with an internal argument’
      (Koopman and Sportiche, 1991; Bernstein, 2001)
   b. *C/P ‘No Complement with a pronoun’ (Giorgi and Longobardi, 1991;
      Cardinaletti and Starke, 1999; cf. also Babyonyshev, 2002)
   c. *S/NONP ‘No Specifier with a non-pronoun’

(37) An alternative analysis: The last two constraints are prosodic [see handout #5].
(38) Faithfulness:
   a. MAX ‘Express meaning present in the input’
   b. DEP ‘Do not express meaning not present in the input’

(39) Examples of faithfulness violations:
   a. ‘the cat of John’ *→ \textit{a cat of John}[^{specific}] MAX-violation ([definite])
   b. ‘a child of John’ ?→ \textit{John’s child}[^{specific, definite}] DEP-violation ([definite])
   c. ‘a sister of mine’ → \textit{my sister}[^{specific, definite}] DEP-violation ([definite])

(40) Two special cases: partitive constructions and generic possessors
   a. some of us *our some
      most of the time *the time’s most
      two or three of my friends *my friends’ two or three
      one of them *their one
   b. a ring of gold *gold’s ring
      a state of shock *shock’s state
      a man of brooding suspicions *brooding suspicions’ man
      the goal of human dignity *human dignity’s goal

(41) For now, we will assume the following descriptive constraints:
   a. In partitives, the genitive phrase is in the Complement (undominated)
   b. No non-specific Specifiers (undominated, cf. Taylor 1996, Ch. 7)

2.3 Deriving variation

(42) In order to rank two constraints, we must find data where they \textbf{CONFLICT}. This
    presupposes categorical well-formedness contrasts such as \textit{my cat}/*\textit{the cat of me}.

(43) Problem: there are very few categorical contrasts, so ranking is nearly impossible.

(44) The starting point: pronoun/relational noun interactions. 4 possible input types:
   a. Pronominal genitive phrase, non-relational noun \textit{(e.g. my cat)}
   b. Pronominal genitive phrase, relational noun \textit{(e.g. a picture of him)}
   c. Non-pronominal genitive phrase, non-relational noun \textit{(e.g. Clinton’s cat)}
   d. Non-pronominal genitive phrase, relational noun \textit{(e.g. a picture of Clinton)}

(45) Motivation for *C/P >> *S: ‘the cat owned by me’ → \textit{my cat}

<table>
<thead>
<tr>
<th>Re (the cat, PRO)</th>
<th>MAX</th>
<th>*C/P</th>
<th>*C</th>
<th>*S</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) \textit{my cat}[^{specific, definite}]</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>(b) *the cat of me[^{specific, definite}]</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>(c) *a cat of me[^{specific}]</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>
(46) Note the contrast between non-relational and relational nouns:

a. You’re my man. *You’re the man of me.
   Get your timing right! *Get the timing of you right!
   All he knows is his music. *All he knows is the music of him.
   our hospitals *the hospitals of us
   Their flight was delayed. *The flight of them was delayed.

b. pictures of me the length of it the likes of me
   the memory of him the sight of me in the forepart of him
   a combination of them to the west of us the name of it
   on the other side of her through fear of him the real cause of them

(47) Variation: ‘the picture representing me’  \(\rightarrow\)  the picture of me \(\sim\) my picture

<table>
<thead>
<tr>
<th>Ri (the picture, PRO)</th>
<th>MAX</th>
<th>*S/I</th>
<th>*C/P</th>
<th>*C</th>
<th>*S</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) my picture [specific, definite]</td>
<td></td>
<td>!</td>
<td>!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) the picture of me [specific, definite]</td>
<td></td>
<td>!</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>(c) a picture of me [specific]</td>
<td></td>
<td>*</td>
<td>!</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MAX</th>
<th>*C/P</th>
<th>*S/I</th>
<th>*C</th>
<th>*S</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td></td>
<td>!</td>
<td>!</td>
<td></td>
</tr>
<tr>
<td>(b)</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>(c)</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

(48) Quantitative interpretation (Anttila 1997): The number of total rankings that generate each output is proportional to the probability of occurrence of this output.

(49) A&F’s prediction: my picture is optimal by 80% and the picture of me by 20% of the total rankings compatible with *C/P \(\gg\) *S. This quantitative bias comes from the ranking *C/P \(\gg\) *S which prefers my picture over the picture of me.

(50) The same ranking may yield categorical or quantitative effects, depending on the input.

(51) Variation is also predicted in the following two cases [no tableaux shown]:
   (a) ‘the cat owned by Mr. Clinton’ \(\rightarrow\) Mr. Clinton’s cat ~ the cat of Mr. Clinton
   (b) ‘the picture representing Mr. Clinton’ \(\rightarrow\) Mr. C’s picture ~ the picture of Mr. C

(52) Motivation for *C/P \(\gg\) DEP: ‘a cat owned by me’ \(\rightarrow\) my cat

<table>
<thead>
<tr>
<th>Re (a cat, PRO)</th>
<th>*C/P</th>
<th>DEP</th>
<th>*C</th>
<th>*S</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) (\rightarrow) my cat [specific, definite]</td>
<td></td>
<td></td>
<td>!</td>
<td></td>
</tr>
<tr>
<td>(b) *a cat of me [specific]</td>
<td>!</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>(c) *the cat of me [specific, definite]</td>
<td>!</td>
<td></td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>
2.4 Typology and T-orders

With seven constraints, we have a factorial typology of \(7! = 5040\) grammars. The typology yields 14 distinct output patterns (Table 1).

Table 1: Factorial Typology

<table>
<thead>
<tr>
<th>Input</th>
<th>Output #1</th>
<th>Output #2</th>
<th>Output #3</th>
<th>Output #4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Re(the N, PRO)</td>
<td>PRO's N</td>
<td>PRO's N</td>
<td>PRO's N</td>
<td>PRO's N</td>
</tr>
<tr>
<td>Re(the N, NP)</td>
<td>NP's N</td>
<td>NP's N</td>
<td>NP's N</td>
<td>NP's N</td>
</tr>
<tr>
<td>Re(a N, PRO)</td>
<td>PRO's N</td>
<td>PRO's N</td>
<td>PRO's N</td>
<td>PRO's N</td>
</tr>
<tr>
<td>Re(a N, NP)</td>
<td>NP's N</td>
<td>NP's N</td>
<td>NP's N</td>
<td>a N of NP</td>
</tr>
<tr>
<td>Ri(the N, PRO)</td>
<td>PRO's N</td>
<td>PRO's N</td>
<td>the N of PRO</td>
<td>PRO's N</td>
</tr>
<tr>
<td>Ri(the N, NP)</td>
<td>NP's N</td>
<td>the N of NP</td>
<td>the N of NP</td>
<td>NP's N</td>
</tr>
<tr>
<td>Ri(a N, PRO)</td>
<td>PRO's N</td>
<td>PRO's N</td>
<td>a N of PRO</td>
<td>PRO's N</td>
</tr>
<tr>
<td>Ri(a N, NP)</td>
<td>NP's N</td>
<td>a N of NP</td>
<td>a N of NP</td>
<td>a N of NP</td>
</tr>
</tbody>
</table>

Some implicational universals: If a pronoun possessor is possible in the complement position, then so is a non-pronoun possessor.

This corresponds to four implicational universals stated as pairs of <input, output> pairs:

\[
\begin{align*}
&<\text{Re}(\text{the } N, \text{ PRO}), \text{ the } N \text{ of PRO}> \rightarrow <\text{Re}(\text{the } N, \text{ NP}), \text{ the } N \text{ of NP}> \\
&<\text{Re}(\text{a } N, \text{ PRO}), \text{ a } N \text{ of PRO}> \rightarrow <\text{Re}(\text{a } N, \text{ NP}), \text{ a } N \text{ of NP}> \\
&<\text{Ri}(\text{the } N, \text{ PRO}), \text{ the } N \text{ of PRO}> \rightarrow <\text{Ri}(\text{the } N, \text{ NP}), \text{ the } N \text{ of NP}> \\
&<\text{Ri}(\text{a } N, \text{ PRO}), \text{ a } N \text{ of PRO}> \rightarrow <\text{Ri}(\text{a } N, \text{ NP}), \text{ a } N \text{ of NP}>
\end{align*}
\]
(56) T-orders for 's-genitives and of-genitives:

a. 's-genitives

\[
<\text{Ri}(a \ N, \ NP), \ NP's \ N> \\
<\text{Re}(a \ N, \ NP), \ NP's \ N> \\
<\text{Ri}(\text{the} \ N, \ NP), \ NP's \ N> \\
<\text{Ri}(a \ N, \ PRON), \ PRON's \ N> \\
<\text{Re}(\text{the} \ N, \ NP), \ NP's \ N> \\
<\text{Re}(a \ N, \ PRON), \ PRON's \ N> \\
<\text{Ri}(\text{the} \ N, \ PRON), \ PRON's \ N> \\
\]

b. of-genitives

\[
<\text{Re}(\text{the} \ N, \ PRON), \ the \ N \ of \ PRON> \\
<\text{Ri}(\text{the} \ N, \ PRON), \ the \ N \ of \ PRON> \\
<\text{Re}(\text{the} \ N, \ NP), \ the \ N \ of \ NP> \\
<\text{Ri}(\text{the} \ N, \ PRON), \ a \ N \ of \ PRON> \\
<\text{Re}(a \ N, \ PRON), \ a \ N \ of \ PRON> \\
<\text{Re}(\text{the} \ N, \ NP), \ a \ N \ of \ NP> \\
<\text{Ri}(a \ N, \ NP), \ a \ N \ of \ NP> \\
\]

(57) Testing the predictions on the Brown Corpus (Francis and Kučera 1982):

- 17 relational nouns (1,116 tokens) based on Barker and Dowty 1993: hand, head, heart, leg, nose (body part nouns); friend, wife (kinship nouns); color, length, shape (function nouns); corner, edge, middle, point, side, surface, top (topological properties).
- 37 non-relational nouns (1,147 tokens): body, boy, business, car, city, church, country, day, fact, field, god, law, life, line, man, moment, money, night, number, office, place, power, problem, program, public, school, system, thing, voice, war, water, week, woman, word, world, work, year.
Only definite noun phrases (*the street’s corner, the corner of the street*) were included.

Variation data: percentage of all <input, output> mappings for a given input

a. ’s-genitives

b. of-genitives

The relative grammaticality of variants for the same input cannot be read off the T-order. However, they follow from the analysis, given the quantitative interpretation in (48).

Examples of preferences among variants for the same input

<table>
<thead>
<tr>
<th>EXPRESSION</th>
<th>COMPETITOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. its removal by Mary</td>
<td>the removal of it</td>
</tr>
<tr>
<td>b. ??the tree’s removal by Mary</td>
<td>the removal of the tree</td>
</tr>
<tr>
<td>c. during the course of its digestion by worms</td>
<td>the digestion of it</td>
</tr>
<tr>
<td>d. ??during the course of the food’s digestion by worms</td>
<td>the digestion of the food</td>
</tr>
</tbody>
</table>

(from Grimshaw 1990:87, citing Kayne 1984)
Predictions and observations (preliminary data):

<table>
<thead>
<tr>
<th></th>
<th>Predictions</th>
<th>Observations</th>
<th>N of tokens, total = 2,263</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Spec</td>
<td>Comp</td>
<td>Spec</td>
</tr>
<tr>
<td>a. Non-relational noun + pronoun</td>
<td>100%</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>my cat / *the cat of me</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Relational noun + pronoun</td>
<td>80%</td>
<td>20%</td>
<td>97%</td>
</tr>
<tr>
<td>my picture ~ the picture of me</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Non-relational noun + non-pronoun</td>
<td>40%</td>
<td>60%</td>
<td>37%</td>
</tr>
<tr>
<td>Mr. C’s cat ~ the cat of Mr. C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Relational noun + non-pronoun</td>
<td>29%</td>
<td>71%</td>
<td>18%</td>
</tr>
<tr>
<td>Mr. C’s picture ~ the picture of Mr. C</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PREDICTIONS:

- its removal, 0.8
- the tree’s removal, 0.29
- its digestion, 0.8
- the food’s digestion, 0.29

2.5 Deriving ambiguity

Aida’s performance: ‘the performance by Aida’ (E), ‘the performance of Aida’ (I)

The argument:

a. Grammatical knowledge is involved in determining the preferred reading.
b. A grammatical theory that only makes qualitative distinctions cannot provide any rationale for such preferences, predicting that they are extragrammatical in nature.
c. The grammatical theory explored here provides such a rationale.

Ambiguity = one output, multiple inputs. The T-order imposes a preference ordering on alternative readings:
Preliminary ambiguity data for six picture nouns (picture, statue, sketch, painting, photograph, portrait). The numbers indicate absolute frequencies of readings in the Brown corpus, 73 tokens in all.

1. the N of NP:
   Preferences:
   \[ \text{Ri}(\text{the N, NP}) > \text{Re}(\text{the N, NP}) \]
   \( 27 > 1 \)

2. NP's N:
   Preferences:
   \[ \text{Re}(\text{an NP, NP}) > \text{Ri}(\text{an NP, NP}) \]
   \( 0 > 0 \)
   \[ \text{Re}(\text{the N, NP}) > \text{Ri}(\text{the N, NP}) \]
   \( 1 > 0 \)
   \[ \text{Re}(\text{the N, NP}) > \text{Ri}(\text{an NP, NP}) \]
   \( 1 > 0 \)
   \[ \text{Ri}(\text{the N, NP}) > \text{Ri}(\text{an NP, NP}) \]
   \( 0 > 0 \)
   \[ \text{Re}(\text{the N, NP}) > \text{Re}(\text{an NP, NP}) \]
   \( 1 > 0 \)

3. PRON's N:
   Preferences:
   \[ \text{Re}(\text{an NP, PRON}) > \text{Ri}(\text{an NP, PRON}) \]
   \( 0 > 2 \)
   \[ \text{Re}(\text{the N, PRON}) > \text{Ri}(\text{the N, PRON}) \]
   \( 4 > 2 \)
   \[ \text{Re}(\text{the N, PRON}) > \text{Ri}(\text{an NP, PRON}) \]
   \( 4 > 4 \)
   \[ \text{Ri}(\text{the N, PRON}) > \text{Ri}(\text{an NP, PRON}) \]
   \( 4 > 2 \)
   \[ \text{Re}(\text{the N, PRON}) > \text{Re}(\text{an NP, PRON}) \]
   \( 4 > 0 \)

4. the N of PRON:
   Preferences:
   \[ \text{Ri}(\text{the N, PRON}) > \text{Re}(\text{the N, PRON}) \]
   \( 0 > 0 \)

5. a N of NP:
   Preferences:
   \[ \text{Ri}(\text{an NP, NP}) > \text{Re}(\text{an NP, NP}) \]
   \( 31 > 0 \)

6. a N of PRON:
   Preferences:
   \[ \text{Ri}(\text{an NP, PRON}) > \text{Re}(\text{an NP, PRON}) \]
   \( 3 > 0 \)

Identifying the intended reading can be difficult:

a. I remember her because she didn't want her picture in the paper. [Interpretation: internal (wedding photo).]

b. And when the child dies in Lawrence's story in a delirium that is somehow brought on by his mania to win and to make his mother rich, the manifest absurdity of such a disease and such a death does not enter into our thoughts at all. [Interpretation: external]

c. Grigorss, at seventeen, learns his story and goes forth as a knight to uncover his origins. [Interpretation: internal]

d. Martin guessed that Dolores would not be eager to tell the next installment of her story. [Interpretation: ???]

The current grammar makes specific predictions about the probability of different readings.
(70) **Quantitative interpretation** (generalized to include ambiguity, see Anttila and Fong 2000): The number of total rankings that generate an <input, output> mapping is proportional to the probability of this mapping.

(71) Predicted interpretation probabilities

<table>
<thead>
<tr>
<th>Structure</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘the performance by Aida’ (external, definite)</td>
<td>0.31</td>
</tr>
<tr>
<td>‘a performance by Aida’ (external, indefinite)</td>
<td>0.27</td>
</tr>
<tr>
<td>‘the performance of Aida’ (internal, definite)</td>
<td>0.22</td>
</tr>
<tr>
<td>‘a performance of Aida’ (internal, indefinite)</td>
<td>0.20</td>
</tr>
<tr>
<td>‘the performance of Aida’ (internal, definite)</td>
<td>0.54</td>
</tr>
<tr>
<td>‘the performance by Aida’ (external, definite)</td>
<td>0.46</td>
</tr>
</tbody>
</table>

The definition in (69) amounts to a theory of **BLOCKING** (Aronoff, 1976; Kiparsky, 1982; Briscoe et al., 1995; Copestake and Briscoe, 1995; Blutner, 2000).

(72) Example: Conceptual grinding (e.g. Pelletier and Schubert, 1989).

a. This is a fish vs. We had fish for dinner.

b. This is a tree vs. ??This table is made of tree.

(74) Assume a grammar with 6 total rankings (= <input, output> mappings):

```
  ['fish-stuff', 'fish']      'fish' 6/12
     |                    |
  | 6                        6
     |                    |
  fish
```

(75) Assume a grammar with 6 total rankings (= <input, output> mappings):

```
  ['tree-stuff', 'tree']      'tree' 6/7
     |                    |
  | 5                        1
     |                    |
  wood

  tree

  wood—’tree-stuff’ 1/7
  tree—’tree-stuff’ 5/5
```

(76) The expression wood reduces the number of <‘tree-stuff’, tree> mappings to one because the number of total rankings in the grammar (t) is constant, hence (partial) blocking.
2.6 Summary

(77) One and the same grammar derives three kinds of facts:
(a) Categorical judgments, e.g. my cat, *the cat of me, *a cat of me
(b) Variation, preferences in expression
(c) Ambiguity, preferences in interpretation

(78) Evidence from all three sources should converge.

3. Deriving noun classes

3.1 The facts

(79) Classes of relational nouns

<table>
<thead>
<tr>
<th>NOUN CLASS</th>
<th>GENITIVE PHRASE</th>
<th>’S-GENITIVE READINGS</th>
<th>OF-GENITIVE READINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>performance</td>
<td>PRONOUN</td>
<td>E−I its performance</td>
<td>I the performance of it</td>
</tr>
<tr>
<td></td>
<td>NON-PRONOUN</td>
<td>E−I Aida’s performance</td>
<td>E−I the performance of Aida</td>
</tr>
<tr>
<td>picture</td>
<td>PRONOUN</td>
<td>E−I my picture</td>
<td>I the picture of me</td>
</tr>
<tr>
<td></td>
<td>NON-PRONOUN</td>
<td>E−I Clinton’s picture</td>
<td>I the picture of Clinton</td>
</tr>
<tr>
<td>love</td>
<td>PRONOUN</td>
<td>E her love</td>
<td>I the love of her</td>
</tr>
<tr>
<td></td>
<td>NON-PRONOUN</td>
<td>E God’s love</td>
<td>E−I the love of God</td>
</tr>
<tr>
<td>expression</td>
<td>PRONOUN</td>
<td>E−I its expression</td>
<td>I the expression of it</td>
</tr>
<tr>
<td></td>
<td>NON-PRONOUN</td>
<td>E Pat’s expression</td>
<td>I the expression of anger</td>
</tr>
<tr>
<td>sketch</td>
<td>PRONOUN</td>
<td>E my sketch</td>
<td>I the sketch of me</td>
</tr>
<tr>
<td></td>
<td>NON-PRONOUN</td>
<td>E Clinton’s sketch</td>
<td>I the sketch of Clinton</td>
</tr>
<tr>
<td>brother</td>
<td>PRONOUN</td>
<td>E−I my brother</td>
<td>∅ --</td>
</tr>
<tr>
<td></td>
<td>NON-PRONOUN</td>
<td>E−I Pat’s brother</td>
<td>I the brother of Clinton</td>
</tr>
</tbody>
</table>

(80) More examples:
- performance-nouns: performance, robbery, conquest, discovery, examination, donation, summary, write-up, declaration, review, destruction, promulgation
- picture-nouns: picture, photograph, portrait, statue, history, biography, story, draft, version, name, birthday
- love-nouns: love, fear, admiration, knowledge, ignorance, desire, survey, account, criticism, contribution, news, report, statement, most -ing forms
- expression-nouns: expression, avoidance
- sketch-nouns: sketch, tale, painting, part
- brother-nouns: brother, sister, wife, hand, nose, child, mother

(81) Hypothesis 1: Noun classes are grounded in lexical semantics, e.g. thematic roles, aspectual structure, affectedness of arguments, etc. (Anderson, 1979; Grimshaw, 1990; Doron and Rappaport-Hovav, 1991; Taylor, 1996; cf. Levin, 1993, for verbs).
This is probably in the right direction, but there are problems:

a. *picture* vs. *nose*, *picture* vs. *sketch*, *picture* vs. *painting*

b. Many *performance*-nouns are action nouns, but cf. *discovery*, *examination*, *review*, *donation*.

c. Many *picture*-nouns are representational, but cf. *name*, *birthday*.

d. Many *love*-nouns derive from cognitive verbs, but cf. *criticism*, *contribution*, *-ing*

The same verbs behave differently in different languages:

a. The description of Mary was inaccurate. (only internal reading)

b. La descrizione di Maria non era accurata. (external or internal reading)

(Giorgi and Longobardi, 1991: 121-2):

Conclusion: The noun classes are not semantically completely arbitrary, but not completely predictable either.

### 3.2 A subregularity interpretation of OT grammars

Hypothesis 2: The grammar of English *C/P >> *S, *C/P >> DEP defines the space of possible lexical variation (1,680 total rankings).

A subregularity interpretation of OT grammars (Anttila, 2002): Different lexical items may subscribe to different partial orders within the grammar of a language.

12 types of inputs, 1,680 total rankings

Sample ranking: *S/I >> *C/P >> DEP >> *S/NONP >> *C >> *S >> MAX

<table>
<thead>
<tr>
<th>HEAD</th>
<th>GENITIVE PHRASE</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>definite pronominal, specific, external</td>
<td>X’s Y</td>
</tr>
<tr>
<td>2.</td>
<td>definite pronominal, specific, internal</td>
<td>Y of X</td>
</tr>
<tr>
<td>3.</td>
<td>definite non-pronominal, specific, external</td>
<td>Y of X</td>
</tr>
<tr>
<td>4.</td>
<td>definite non-pronominal, specific, internal</td>
<td>Y of X</td>
</tr>
<tr>
<td>5.</td>
<td>definite non-pronominal, non-specific, external</td>
<td>Y of X</td>
</tr>
<tr>
<td>6.</td>
<td>definite non-pronominal, non-specific, internal</td>
<td>Y of X</td>
</tr>
<tr>
<td>7.</td>
<td>indefinite pronominal, specific, external</td>
<td>X’s Y</td>
</tr>
<tr>
<td>8.</td>
<td>indefinite pronominal, specific, internal</td>
<td>Y of X</td>
</tr>
<tr>
<td>9.</td>
<td>indefinite non-pronominal, specific, external</td>
<td>Y of X</td>
</tr>
<tr>
<td>10.</td>
<td>indefinite non-pronominal, specific, internal</td>
<td>Y of X</td>
</tr>
<tr>
<td>11.</td>
<td>indefinite non-pronominal, non-specific, external</td>
<td>Y of X</td>
</tr>
<tr>
<td>12.</td>
<td>indefinite non-pronominal, non-specific, internal</td>
<td>Y of X</td>
</tr>
</tbody>
</table>
6 predicted types of ambiguity, at least 5 are attested:

<table>
<thead>
<tr>
<th>SPEC</th>
<th>COMP</th>
<th>GENITIVE PHRASE</th>
<th>EXAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>E</td>
<td>specific</td>
<td>Pat’s sketch ~ a sketch of Pat</td>
</tr>
<tr>
<td>b.</td>
<td>E~I</td>
<td>-- specific</td>
<td>my brother ~ *the brother of me</td>
</tr>
<tr>
<td>c.</td>
<td>--</td>
<td>non-pronominal</td>
<td>?</td>
</tr>
<tr>
<td>d.</td>
<td>E~I</td>
<td>I specific</td>
<td>Pat’s picture ~ the picture of Pat</td>
</tr>
<tr>
<td>e.</td>
<td>E</td>
<td>E~I specific</td>
<td>God’s love ~ the love of God</td>
</tr>
<tr>
<td>f.</td>
<td>E~I</td>
<td>E~I specific, non-pronom.</td>
<td>Aida’s performance ~ the performance of Aida</td>
</tr>
</tbody>
</table>

Excluded patterns

a. Pat’s quain (I) the quain of Pat (E)  
b. Pat’s quain (I) the quain of Pat (E~I)  
c. Pat’s quain (E~I) the quain of Pat (E)  
d. Pat’s quain (E) the quain of Pat (E)  
e. Pat’s quain (I) the quain of Pat (I)  
f. its quain (E~I) the quain of it (E~I)

The corresponding partial orders:

- **performance** English
- **picture** English ∪ {*C >> *S/NonP, *C >> *S}  
- **love** English ∪ {*S/I >> *C, *S/I >> *C/P}  
- **expression** English ∪ {*S/I >> *C, *C >> *S/NonP, *C >> *S}  
- **brother** English ∪ {*C/P >> *S/I, *C << *S/NonP, *C >> *S}
(93) The organization of relational nouns (general rankings for English omitted)

\[
\begin{array}{c}
\text{performance-nouns} \\
(= \text{English}) \\
\text{picture-nouns} \\
*S/I >> *C \quad *C >> *S/\text{NONP} \\
\text{love-nouns} \quad *S/I >> *C \quad *S/I >> *C/P \\
\text{expression-nouns} \quad *S/I >> *C \quad *C >> *S/\text{NONP} \quad *C >> *S \\
\text{brother-nouns} \quad *S/I >> *C/P \quad *C/P >> *S/I \quad *C >> *S \\
\text{sketch-nouns} \quad *S/I >> *C \quad *S/I >> *C/P \quad *C >> *S/\text{NONP} \quad *C >> *S \\
\end{array}
\]

I II III IV V VI VII VIII

(94) Outstanding problems:

- concealment, disappointment, amusement, exposure seem to be (I, I): Pat’s amusement (I), the amusement of Pat (I). Note also *X’s Y of Z, e.g. *the news’s disappointment of the audience (Taylor, 1996: 156-7), cf. Pat’s performance of Aida.
- Given two genitive phrases (Pat’s performance of Aida), where external argument is a non-pronoun and internal argument a pronoun, the analysis optionally permits the wrong linking, e.g. ‘the performance of it by Aida’ *→ its performance of Aida. Possible fixes: (i) A constraint that prohibits linking an internal argument structurally higher than the external argument (e.g. Williams, 1981; Grimshaw, 1990); (ii) *C/E >> *C/P.
4. Future directions

- Subtler distinctions in semantic relations (Hawkins, 1981; Pustejovsky, 1995; Borschev and Partee, 2002; Jensen and Vikner, 2002), nominalization types (Grimshaw, 1990), animacy and referentiality (Altenberg, 1982; Rosenbach, to appear), and thematic roles
- Discourse effects (Deane, 1987; Anschutz, 1997; O’Connor, 1999a,b)
- Grammatical weight (Wasow, 1997; Arnold, Wasow, Losongco and Ginstrom, 2000, Anttila 2007)

5. Conclusions

- OT grammars relate four apparently independent phenomena:
  a. categorical grammaticality contrasts
  b. variation and preferences in expression
  c. ambiguity and preferences in interpretation
  d. lexical organization
- The same constraints yield both categorical and gradient effects.
- Variation, ambiguity, and the typology of argument linking are interconnected aspects of meaning-form mapping and follow from the same grammar.

References


