The importance of contrasts in bilingual language developments - Part II

International Summer School on Multilingualism - 2022

Mike Putnam

Penn State University & University of Greenwich

July 13, 2022
Where we left of yesterday

- Grammars are multi-layered systems
- Bi/multilingual grammars contain *all* representations and contrasts
- The role of **contrasts** in storing and activating linguistic knowledge is key in (bi/multilingual) language acquisition and development
At least 3 distinction levels of representation:
- **phonology** (represents contrasts)
- **phonetics-phonology** (builds articulations/gestures from abstract categories)
- **phonetics** (properties of the speech signal)

Multilingual sound systems consist of *all* contrastive representations, both shared and unique to each languages, that comprise a speaker’s integrated grammatical knowledge.

These categories can undergo various completion and implementation procedures.
Overview & objectives for today

- We will take a closer look at bilingual language development from the perspective **contrasts**
- **Morphology & syntax:** Today we take a closer look at morphology and syntax
- We’ll take a closer look at two studies:
  - Lohndal & Putnam (2021) - grammatical gender in ‘mixed DPs’ in American Norwegian (AmNo)
  - Natvig et al. (to appear) - Acquiring L2 tense systems (based on McManus 2015)
The ability to search for systematic contrast in the linguistic input, by correlating differences at various levels, is the only mechanism required to account for the abstract building blocks that make up those mental structures: the formal features of grammatical systems (Cowper & Hall 2014:161)

- Dresher (2014) maintains a similar view and argues that UG further requires that features be organized into a hierarchical relationship that reflects language-specific contrasts and patterns of activity.
- Linguistic computations operate using these contrast-marking features (Dresher 2009, 2014; Hall 2020), i.e., the contrastivist hypothesis.
Hall (2020:248) conceptualizes modular relationships an arch of abstract systems that mediate between FORMS and MEANINGS.

Representations towards the top are more abstract and discrete than those at the bottom.
The lexicon

Competing notions of what *lexical* means:

- The idea that the lexicon is a generative system in which words (as opposed to syntactic objects) are derived
- The idea that basic elements (morphemes) must be listed because they are underived
- The idea that the unpredictable behavior of complex objects must be listed

(Embick 2015:14)
Neo-constructivist approaches

Exo- vs. Endoskeletal approaches:

- Exo-skeletal approaches are *realizational* wrt morphology
  - Syntax determines morphology
- The syntax is composed of atomic units - *roots* and *formal features* that mark syntactic and semantic properties (i.e., synsem-features)
- These features map to morphophonological realizations, which we call *exponents*

(1) **Vocabulary Item**

\[
[\alpha\beta\gamma] \leftrightarrow /X/ \\
\text{synsem-features} \quad \text{phonological exponents}
\]
a. Kim whistled.
b. Kim whistled at the dog.
c. Kim whistled a tune.
d. Kim whistled a warning.
e. Kim whistled me a warning.
f. Kim whistled her appreciation.
g. Kim whistled to the dog to come.
h. The bullet whistled through the air.
i. The air whistled with bullets.

RAPPAPORT HOVAV & LEVIN, 1998, p. 98
### Table 1: (Traditional) Three-Gender System in Norwegian (M/F/N)

<table>
<thead>
<tr>
<th></th>
<th>Masculine</th>
<th>Feminine</th>
<th>Neuter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indefinite</td>
<td>en hest</td>
<td>ei seng</td>
<td>et hus</td>
</tr>
<tr>
<td><em>a horse</em></td>
<td><em>a bed</em></td>
<td><em>a house</em></td>
<td></td>
</tr>
<tr>
<td>Definite</td>
<td>hesten horse.DEF</td>
<td>senga</td>
<td>huset</td>
</tr>
<tr>
<td></td>
<td>bed.DEF</td>
<td></td>
<td>house.DEF</td>
</tr>
<tr>
<td>Double definite</td>
<td>den hesten</td>
<td>den senga</td>
<td>det huset</td>
</tr>
<tr>
<td></td>
<td>DEF horse.DEF</td>
<td>DEF bed.DEF</td>
<td>DEF house.DEF</td>
</tr>
<tr>
<td>Adjectives</td>
<td>en fin hest</td>
<td>ei fin seng</td>
<td>et fint hus</td>
</tr>
<tr>
<td></td>
<td><em>a nice horse</em></td>
<td><em>a nice bed</em></td>
<td><em>a nice house</em></td>
</tr>
<tr>
<td>Possessives</td>
<td>min hest</td>
<td>mi seng</td>
<td>mitt hus</td>
</tr>
<tr>
<td></td>
<td>my horse</td>
<td>my bed</td>
<td>my house</td>
</tr>
</tbody>
</table>
Hierarchical tree structure of the DP

- For our purposes, we follow Kramer (2015, 2016) and assume that $n$ licenses gender
Feature-Value associations of $n$

Following Lohndal & Westergaard (2016):

a. $n$ []  (neuter)
b. $n$ [GEN: masc]  (masculine)
c. $n$ [GEN: fem]  (feminine)
Transparent relationships

There is a transparent relationship between gender features and the exponents (or indefinite articles) in Norwegian.

\[ a. \ n [\cdot] \leftrightarrow /e:t/ \quad \text{(neuter)} \]
\[ b. \ n [\text{GEN: masc}] \leftrightarrow /e:n/ \quad \text{(masculine)} \]
\[ c. \ n [\text{GEN: fem}] \leftrightarrow /e:i/ \quad \text{(feminine)} \]

There is a transparent relationship between gender features and the exponents (or indefinite articles) in Norwegian.
‘mixed DPs’ in AmNo

Indefinite DPs
a. *ei nurse* (F) (coon_valley_wi_02gm)
b. *et shed* (N) (coon_valley_wi_02gm)
c. *en chainsaw* (M) (blair_wi_07gm)

Definite DPs
a. *field-a* (F) (coon_valley_wi_02gm)
b. *shed-et* (N) (westby_wi_06gm)
c. *chopper-en* (M) (blair_wi_01gm)
Gender of ‘mixed DPs’ in AmNo

Table 2: Distribution of CANS data from Riksem (2018)

<table>
<thead>
<tr>
<th>Gender</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Masculine</td>
<td>66.1%</td>
</tr>
<tr>
<td>Feminine</td>
<td>6.5%</td>
</tr>
<tr>
<td>Neuter</td>
<td>6.2%</td>
</tr>
<tr>
<td>Alternating</td>
<td>21.2%</td>
</tr>
</tbody>
</table>

- CANS (Corpus of American Nordic Speech; Johannessen (2015))
- $n=1265$ nouns, with 1034 of them occurring in ‘Norwegian’ structures (Riksem 2018)
mixed AmNo DP of *field* (prior to lexical insertion)
mixed AmNo DP of *field* (post to lexical insertion)

```
DP
  D[DEF:–Def, NUM:+Sg; GEN:Fem]
    DefP
      Def[DEF:–Def]
        NumP
          Num[NUM:+Sg]
            nP
              n[GEN: Fem] √field
              ei
```
The problems with ‘traditional’ morphemes

Traditional morpheme: 
\[ \alpha, /X/ \]

- Traditional morphemes store synsem-information (represented as \( \alpha \)) and any associated (morpho)phonological exponency (represented as /\( X/\)) as a unified, non-decompositional unit.
- Nouns will have their gender features inherently specified.
- Since English nouns mixed into AmNo display gender on the Norwegian indefinite article, an identical copy of all English nouns would need to be specified for gender in the lexicon.
- Some items would have to be \textit{multiply} specified, since a speaker can use the same noun with multiple indefinite articles.
Figure 2: Organization of the grammar
(3) **Span:**
An n-tuple of heads $< X_n, ..., X_1 >$ is a span in a syntactic structure $S$, iff $X_{n-1}P$ is the complement of $X_n$ in $S$.

(4) **Superset Principle:**
In case a syntactic span does not have an identical match in the lexical repertoire, select a UoL which contains a superset of the features present in the syntactic span.
(Fábregas & Putnam 2020:40)
### Figure 3: Matching spans to UoLs

<table>
<thead>
<tr>
<th>Syntactic span</th>
<th>Lexical span</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Sa) $F_3 F_2 F_1$</td>
<td>(La) $UoL_1 \leftrightarrow F_5 F_4 F_3 F_2 F_1$</td>
</tr>
<tr>
<td>(Sb) $F_7 F_6 F_5$</td>
<td>(Lb) $UoL_2 \leftrightarrow F_7 F_6 F_5 F_4 F_3$</td>
</tr>
<tr>
<td>(Sc) $F_4 F_3 F_1$</td>
<td>(Lc) $UoL_3 \leftrightarrow F_7 F_6 F_4 F_3$</td>
</tr>
<tr>
<td>(Sd) $F_6 F_5 F_4 F_3$</td>
<td>(Ld) $UoL_4 \leftrightarrow F_5 F_4 F_3 F_2 F_1$</td>
</tr>
</tbody>
</table>
Q: How do we establish notions of typological proximity (i.e., closeness) between/among languages?

McManus (2015):

- Tested the effects of different L1 mapping patterns in German and English on the acquisition of aspect in L2 French learners
- Looked at (i) simple past and (ii) periphrastic constructions involving an auxiliary + present participle
a. Jack **played** football.

b. Jack **has played** football. [ENGLISH]

---

a. Jacques jou-a**it** au foot
   Jacques play-IMP to.DEF.MASC football
   ‘Jacques used to play football.’

b. Jacques a jou-é au foot
   Jacques has play-PC to.DEF.MASC football
   ‘Jacques played football.’ [FRENCH; McManus 2015, 162]

---

a. Jack spiel-**te** Fußball
   Jack play-PRET football
   ‘Jack played/used to play football.’

b. Jack **hat** Fußball ge-spiel-**t**
   Jack has football PERF-play-PERF
   ‘Jack played/used to play football.’ [GERMAN; McManus 2015, 162]
Differences

Whereas French has a 1:1 relationship between the simple/periphrastic past form and habitual/perfective meanings, English and German do not.

In German, aspectual distinctions are not encoded in these constructions (both forms can express either aspect, with *Preteritum* being generally used in literary and *Perfektum* in spoken contexts).

In English, simple past can encode both habitual and perfective meaning, whereas the periphrastic construction can only encode perfective meaning.

<table>
<thead>
<tr>
<th>Language</th>
<th>Simple past</th>
<th>Periphrastic past</th>
<th>ex.</th>
<th>ex.</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>Habitual, Perfective</td>
<td>Perfective</td>
<td>(5a)</td>
<td>(5b)</td>
</tr>
<tr>
<td>French</td>
<td>Habitual</td>
<td>Perfective</td>
<td>(6a)</td>
<td>(6b)</td>
</tr>
<tr>
<td>German</td>
<td>NA</td>
<td>NA</td>
<td>(7a)</td>
<td>(7b)</td>
</tr>
</tbody>
</table>

*(past, literary) (past, spoken)*

Table 1: Aspectual meaning x simple/periphrastic past in English, French & German
McManus’s (2015) study

- Four groups of L2 French learners, 2 with an English L1 background and 2 with a German L1 background, were compared with one another.
  - One group had 1 year of French, the other 4 years of French.
- **Aim of the study**: To test how the aspectual mapping patterns of English and German might affect the acquisition of the French habitual/perfective aspect mappings onto the simple/periphrastic past contexts.
- **Task**: Oral narrative from a picture-based task (to elicit the use of past aspectual forms).
Clear L1 effects on the production of target forms (McManus 2015:167-72)

English speakers were slightly more accurate in year 1 (although they displayed highly variable performance)

In contrast, year 1 German L1ers overrused the periphrastic form for both the habitual and perfective meanings

Both L1 groups in year 4 produced target forms at rates of 80% or above (MacManus 2015:166-179), consistent with the French 1:1 semantic associations
Modeling these observations

- **English grammatically:**
  - encodes the distinction between habitual and perfective aspect, and
  - the English simple past form is ambiguous between these two aspectual meanings

- **German does not employ simple/perphrastic past forms to encode the relevant aspectual distinction (the periphrastic form was highly preferred by the German learners, regardless of the target aspectual meaning)**
Modeling these observations

Returning to our framework:

- English speakers initially outperform German speakers because the former already have a grammatical ‘toolkit’ (features, S-spans, and the UoLs with matching L-spans) in place for encoding these aspectual distinctions.

- For English speakers, the acquisition task involves:
  - acquiring new, distinct UoLs
  - isolating features
  - associating those features to forms (i.e., building distinct L-spans for the newly acquired UoLs)

- German speakers by contrast must constitute this toolkit ‘from scratch’, i.e., acquire representations for aspectual contrast as well as the appropriate mapping processes.
Julien (2001): Simple past

```
FinP
  /   \\
 he_i  FinP
   /     \\
  Fin [FIN]  TP(past)
     /   \     /  \\
  T(past) TP(future)
      /   \     / \\
 [PST] play-ed T(future) VP
     /     \     /   \\
    /     \     /   \\
   t_i   VP   t_j
```
Julien (2001): Periphrastic past

```
FinP
  └── he_i FinP
      ├── Fin [±FIN]
      │    ├── T(past) [−PST]
      │    │    ├── has
      │    │    └── T(future) [−FUT]
      │    └── t_i VP
      └── CP
          └── have
              ├── t_C FinP
              │    └── FinP
              │         └── TP(past) [±PST] play-ed
              │             ├── T(future) [−FUT]
              │             └── t_i VP
              └── t_j

```
Our adaptation of Julien’s system

(10)

FIN

PST  ‘V’+√

(11)

FIN

‘V’²

PST  ‘V’¹+√
<table>
<thead>
<tr>
<th>French L-spans</th>
<th>English L-spans</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) <em>Imparfait</em> verbal ending ↔</td>
<td>(d) Simple past /-ed/ ↔</td>
</tr>
<tr>
<td><img src="fin_pst.png" alt="Diagram" /></td>
<td><img src="fin_pst.png" alt="Diagram" /></td>
</tr>
<tr>
<td>(b) <em>Passé composé</em> auxiliary ↔</td>
<td>(e) ‘Auxiliary’ <em>has</em> ↔</td>
</tr>
<tr>
<td><img src="fin_v.png" alt="Diagram" /></td>
<td><img src="fin_v.png" alt="Diagram" /></td>
</tr>
<tr>
<td>(c) <em>Passé composé</em> verbal ending ↔</td>
<td></td>
</tr>
<tr>
<td><img src="fin_pst.png" alt="Diagram" /></td>
<td></td>
</tr>
</tbody>
</table>

Figure 4: UoLs of French & English for simple/periphrastic tenses
Combined French/English lexicon

Figure 5: Combined French/English lexicon
German S-spans

(12)  
\[
\begin{array}{c}
\text{FIN} \\
\quad \mid \\
\text{-te} \\
\text{PST} \\
\quad \mid \\
\quad \text{‘V’+√} \\
\quad \text{spiel}
\end{array}
\]

(13)  
\[
\begin{array}{c}
\text{FIN} \\
\quad \mid \\
\text{hat} \\
\quad \mid \\
\text{PST} \\
\quad \mid \\
\quad \text{‘V’+√} \\
\quad \text{spiel}
\end{array}
\]
Figure 6: UoLs of German for simple/periphrastic tenses
The task facing German learners of French is thus not ‘simply’ to acquire new morphological forms and to encode them with the correct L-span (as is the case for English learners of French). German learners must also acquire the ability to generate the bi-clausal S-span which is associated with the French (but not the German) periphrastic expression.

(Natvig et al. to appear: 25)
Taking stock

- Neo-constructivist (exoskeletal) approaches to morphosyntax are both (i) descriptively and (ii) explanatorially adequate.
- The FORM-MEANING pairings of FEATURES holds across different modules of grammatical knowledge.
- If we’re on the right track, bi/multilinguals are an interesting and unique subset of grammars, but we don’t require any special stipulations or additional machinery to model these grammars.