Multilingual grammars from a Nanosyntactic perspective: An overview

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What we’ll accomplish in this session:

- Review the essential and central role of mental representations in linguistic theorizing and experimental approaches
- Outline and evaluate recent advances in generative theorizing wrt bi/multilingual grammars
- Provide a sketch of Nanosyntax and what it offers to bi/multilingual research moving forward
• BQ₁: What is the general cognitive architecture underlying the language faculty?
• BQ₂: How do children and language acquires (later in life) of other languages address the *problem of induction*?
• BQ₃: What sorts of structures and operators should we postulate in the language faculty?
• BQ₄: How do these formal heuristics address the *competence v. performance* (nowadays recast as: *representation v. processing* – NB: attend Lydia’s talk tomorrow!!)?
Q: Why are mental representations so important?

- Some version of these has been around since the “cognitive revolution" of the 1950s
- Following Smortchkova et al. (2020), mental representations represent abstract notions of our knowledge of the world
- Various cognitive processes, e.g., motor control, perception, reasoning, etc., can be conceived as the usage and manipulation of these contentful units
- Mental representations thus establish a measurable heuristic for cognitive knowledge and behavior
Q: What particular advantages are there to being ‘formal & explicit’?

- **Formalism is concise**
  - $F = G(m_1 m_2 / r_2)$

- **Formalism is deductive**

- **Formalism is heuristic**
  - This enables us to make predictions of behaviors and structures we haven’t seen before

Findings:

- Two structural priming structures were conducting investigating the production of dative sentences in Mandarin
- Mandarin relies more heavily on animacy features (than English)
- Participants repeated syntax to the same extent irrespective of whether prime and target arguments had (mis)matched animacy

Result: These findings support the separation of syntax and semantic representations in Mandarin.
More big questions...

- What do these representations consist of?
- How big can they become?
- Do they have a minimal size?
- How are they built?
- How can we distinguish between ‘good’ and ‘bad’ ones?
- How can we easy the tension between storage and computation?
Three Factors of Language Design (Chomsky, 2005; Slabakova et al., 2020):

a. $F_1$: Genetic/biological endowment;

b. $F_2$: Experience, or primary linguistic data (PLD); and

c. $F_3$: Principles not specific to the language faculty (i.e., domain-general properties)
Modularity: Architecture of grammar (Rizzi, 2013)

Diagram:
- Lexicon
- Syntax
- PF
- LF
- Articulatory-perceptual systems
- Conceptual-intentional systems
Recipe for a theory of representations

What we know/have seen thus far:

- The computational system (= syntax) acts upon individual - as well as groups - of features
- Syntactic representations are unique and separate entities
  - They interface with morphophonology and semantics (and likely also information-structure)
  - Which, of course, necessitates a theory of interfaces and interaction with syntax, i.e., this computational system ...

...but there are still (many) open questions:

- Q$_1$: Do we need a pre-syntactic lexicon?
- Q$_2$: How do we establish relationships between syntactic structures and interface information?
Architectural concerns: Integrated/shared

Evidence abounds confirming the integrated nature of the bi- and multilingual cognitive architecture (Hartsuiker et al., 2004, 2016; Hsin, 2014; Kroll & Gollan, 2014, etc.)

Three Axioms (Putnam et al., 2018: 4):

- **Axiom 1**: Mental representations and their sub-components are lossy and gradient by nature. The reliability and stability can be affected by myriad factors such as proficiency, working memory constraints, and activation/usage.

- **Axiom 2**: These mental representations only exhibit temporary “resting periods” or, *attractor states*, although these states may often be extremely stable and long-lasting.

- **Axiom 3**: Parametric variation is no longer (primarily) tied to parameters licensed in a narrow computational faculty (i.e., the narrow syntax), and are now external from this core architecture.
Resolving tensions

3 constraints (Jackendoff, 2011):

- **Descriptive Constraint**: Class of possible languages permitted by the theory of the language capacity must account for the individual’s competence in a given $L$.
- **Learnability Constraint**: There must be a way for the individual to attain (proficient) command of the grammar, based on received input.
- **Evolutionary Constraint**: Places a premium on minimizing the number and scope of ‘genetic innovations’ that make the human language capacity possible.

Q: How do these three constraints exist in (constant) conflict with each other in theory-building?
Let’s build a model: desiderata

We need...

- A rich, symbolic, combinatorial system
- Hierarchical syntactic representations stand alone
- Features inform interface compatibility
- An architecture that can attend to the tension of Jackendoff’s (2011) three constraints
One Head-One Feature (OHOF) architecture (Kayne, 2005; Starke, 2008; Putnam, 2020)

Each head is unary and additive
Domains in the spine

Ramchand & Svenonius (2014)

```
C
/\    proposition, domain of sort p
|  \   transition: \( \exists s. R(p,s) \)
|   \  situation, domain of sort s
|    \ transition: \( \exists e. R(s,e) \)
|     \ event, domain of sort e
\   / 
|  Fin*
| / \    transition: \( \exists s. R(p,s) \)
|  |  situation, domain of sort s
|  | transition: \( \exists e. R(s,e) \)
|  | event, domain of sort e
|  T
| / 
| Asp*
\ \ V
```
Introducing *spans*

Sequence of heads/features in the spine (fseq) can form a larger unit

These units are known as **spans**
Defining *spans*

(4) **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 $S$. (Blix 2021:7)
Immediate consequence: An architecture of grammar that contains sub-morphemic syntactic terminals is that “many - perhaps most - morphemes will span several terminals and therefore they will correspond to an entire subtree” (Starke 2009:2).

- These **subtrees** represent licit syntactic objects that, once successfully generated, can be successfully stored in the (post-syntactic) lexicon
- We refer to such units as **L-trees**
- **Important point!** - L-trees should not be confused with the **S-tree**, which contains a vastly larger number of functional projections - the **fseq** - from which L-trees are derived
Doing away with *categories*

Wiltschko (2014)

- Units of Language (UoLs) (rather than *categories*)
- Adjusted to the hypothesis of a Universal Spine (fseq), we can postulate that *categories* are derived rather than preconditioned/determined

\[
\begin{align*}
\text{(5) a. } & C_{UG} = \{C_1, C_2, C_3, \ldots, C_{n+1}\} \\
\text{b. } & C_{Lg1} = \{C_1, C_2, C_3, \ldots, C_{n+1}\} \\
\text{c. } & C_{Lg2} = \{C_1, C_4, C_5, \ldots, C_{n+1}\}
\end{align*}
\]

Content seems to come in one of 4 flavors:

- Substantive (e.g., *tense*, *number*)
- Word class (e.g., *determiner*, *complementizer*)
- Morphological type (e.g., *inflection*, *clitic*)
- Traditional grammatical category (e.g., *mood*, *aspect*)
The Superset Principle

(6) **Superset Principle:**
In case a set of syntactic features does not have an identical match in the lexical repertoire, select a lexical form which contains a superset of the features present in the syntax.

(Fábregas & Putnam 2020:40)
Consequences of this architecture:

- If this architecture is on the right track, **lexical items** are triplets of information, consisting of:
  - Underlying phonological representations
  - Syntactic structures (L-trees)
  - Semantic decomposition

- Linguistic variation can be reduced to the size and shape of L-trees (Starke, 2014)
Architecture of grammar (Baunaz et al., 2018)

Syntax (SMS)
Atomic features merged as fseq

Spellout

Lexicon

PF

Articulatory-perceptual systems

LF

Conceptual-intentional systems
Lexicalizing exponents

(7)  
   a.  karhu-lle
       bear-ALL
       ‘onto the bear’
   b.  karhu-i-lle
       bear-PL-ALL
       ‘onto the bears’  [Finnish]

(8)  
   puell-ās
       girl-ACC.FEM.PL
       ‘girls.acc’  [Latin]

Q: How is case and number expressed differently in Finnish and Latin?
Finnish L-tree

(9)
NB: Baunaz & Lander (2018) outline a list of operations (Stay, Roll-up movement, and Snowball movement) which we will not discuss in detail here.
Consequences of this architecture

- The OFOH-architecture is an instantiation of Minimalist syntax (Chomsky, 1995 et seq.)
- Syntax/The computational system acts upon individual features rather than bundles of them
- No pre-syntactic lexicon
- Language variation can be reduced to:
  - The size of L-trees
  - The matching procedure
  - Exponency
Both Norwegian (N) and Swedish (S) exhibit passive voice constructions that are (i) morphological (involving the bound lexical s-exponent, and (ii) syntactic (consisting of an auxiliary + a past participle/supine verb):

(11) Dette må kaste-s bort.
    this must thrown-s away
    ‘This must be thrown away.’
    [Norwegian]

(12) a. Dette måste kasta-s bort.
    [Swedish]
    b. Hund-en ble jag-et bort.
    [N]
    [S]
Lexical middles


(13) Denne bandasjen fjerne-s lett fra huden.
    this bandage.def remove-s easily from skin.def
    ‘This (type) of bandage is easily removed from the skin.’ [N]

(14) #Detta förband avlägsna-s lätt från huden. [S]

- Many/most(?) varieties of Swedish reject the application of the lexical s-exponent in middle constructions.
Swedish strongly prefers middles composed of complex adjectival structures (Klingvall, 2007).

Both lexical and complex adjectival middles are acceptable in Norwegian.

(15) Denne bandasjen er lett-fjernet fra huden.
This bandage.def is easy-removed from skin.def
‘This (type of) bandage is easy to remove from the skin.’ [N]

(16) Detta förband är lätt-avlägsn-at från huden. [S]
The puzzle in front of us

The lexical s-exponent can be utilized:

- In both Norwegian and Swedish to license a lexical passive (with the s-exponent), but,
- the s-exponent can ‘double dip’ in Norwegian in middles (which is not possible in most varieties of Swedish)

Q: Should we consider the s-exponent is used differently in passives and middles?

- This is far from an optimal solution – it also flies in the face of cross-linguistic research that shows the same sorts of markings/exponents are used in a variety of unrelated languages (e.g., Haspelmath, 1990; Koontz-Garboden, 2009; Alexiadou et al., 2015)
- Given the close semantic relation between middles and passives, the underlying structures should also be quite similar
The s-passive in Swedish is a pronoun (occupying the Spec, VoiceP position (see Hedlund (1992) and Julien (2007) for related proposals).

Wood (2014, 2015) puts forward a related proposal for the st-exponent in Icelandic, but there are subtle differences between the Swedish s-passive and its Icelandic relative.
Size matters: Norwegian s-passives

(18)

In Norwegian the s-exponent is the phonological realization of the an extended projection, i.e., span (Mikkelsen, 1911; Lødrup, 2000)
Consider the following example:

(19) *Boken har skrevet-s.
    book.def has written-s

Intended: ‘The book was written.’

Q: Why might this be ill-formed?

Based on this analysis, the s-passive (in Norwegian) is not expected to be compatible with any syntactic configuration where the information carried by Aspect differs from the non-episodic, habitual reading.
(20) Denne bandasjen skal fjerne-s lett fra huden. 
this bandage.def should remove-s easy from skin.def 
‘This bandage should be easily/gently removed from the skin.’

- The modal skal is a different lexicalization of the modifier Mood (and, crucially, is not contained in the lexical entry for the exponent)
- This analysis also supports the claim that deontic modals are merged lower than epistemic ones.
As we saw previously with s-passives in Norwegian, the s-exponent is the phonological realization of a sequence of functional heads (= span) of the eventive (and situational) construal(s).
As discussed previously, the s-exponent in Swedish has a different underlying syntactic structure.

Swedish simply cannot lexicalize the middle operator with the s-exponent.
Explanatory merit #2: *Absolute use of s-* in Swedish

(23) a. See upp, katten riv-s.
   look up, cat.def scratch-s
   ‘Beware, the cat scratches.’ (= the cat has a tendency to scratch)

b. Pojken ret-s.
   boy.the tease-s
   ‘The boy has a tendency to tease.’

- These structures are ungrammatical in Norwegian
- Can our account of the s-exponent in Swedish middles & passives shed some light on this?
In Swedish, the s-exponent spells out an argument.

This argument is, in fact, expected to be available not just as an element introduced in VoiceP, but also in other potential argument positions.

The absolute use is the instance when the generic pronoun is introduced as an internal argument.
The Norwegian s-exponent is excluded from this use.

It spells out a set of functional heads (= span) that range from MoodP to VoiceP.

The size of s- in Norwegian simply takes up too much space for an absolute s-interpretation.
The syntax of s-exponents in two mutually intelligible languages, Norwegian and Swedish, can vary considerably.

This variation cannot be left to morphosyntax and morphophonology alone.

Only by anchoring these structures to syntactic structures of varying sizes (= spans) can we capture recalcitrant behaviors that have resisted a unified treatment until now.

Elements perceived to be ‘simple’ or ‘small’ can have arbitrarily complex underlying structures.
A new frontier w/ new questions:

- Q₁: Are there any potential advantages to using this architecture in research on bi- and multilingual grammars?
- Q₂: How do bi/multilinguals resolve the following to problems?
  - Tree size problem
  - Mapping problem
3 domains of inquiry

- Gender assignment in language mixing
- The syntax-phonology interface
- Shallow Structures 2.0 (decomposing spans)
American Norwegian (AmNo):

(26) 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)

(27) Definite DPs
   a. **field**-a (F) (coon_valley_WI_02gm)
   b. **shed**-et (N) (westby_WI_06gm)
   c. **chopper**-en (M) (blair_WI_01gm)
### 3-gender system in Bokmål

<table>
<thead>
<tr>
<th></th>
<th>Masculine</th>
<th>Feminine</th>
<th>Neuter</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indefinite</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Definite</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Double definite</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Adjectives</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Possessives</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>en hest</strong></td>
<td><em>a horse</em></td>
<td><em>ei seng</em></td>
<td><em>et hus</em></td>
</tr>
<tr>
<td><strong>hesten</strong></td>
<td><em>horse.def</em></td>
<td><em>senga</em></td>
<td><em>huset</em></td>
</tr>
<tr>
<td><strong>den hesten</strong></td>
<td><em>def horse.def</em></td>
<td><em>den senga</em></td>
<td><em>det huset</em></td>
</tr>
<tr>
<td><strong>en fin hest</strong></td>
<td><em>a nice horse</em></td>
<td><em>ei fin seng</em></td>
<td><em>et fint hus</em></td>
</tr>
<tr>
<td><strong>min hest</strong></td>
<td><em>my horse</em></td>
<td><em>mi seng</em></td>
<td><em>mitt hus</em></td>
</tr>
</tbody>
</table>

*Table 1: (Traditional) three-gender system in Norwegian (M/F/N)*
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>
Syntax of Norwegian DPs (Julien, 2005)

(28)

Projections:
- An acategorical $\sqrt{\text{root}}$ merges with $n$
- $n$ is also the locus of grammatical gender (Kramer, 2015, 2016)
- Num encodes number
- Def is where the post-nominal definite suffix is merged
- The prenominal, free-standing determiner appears in D
- There may be other/additional projections....
\( n \) and gender features

(29)  
\[
\begin{align*}
\text{a. } & n \begin{bmatrix} \text{[ ]} \end{bmatrix} & \text{(neuter)} \\
\text{b. } & n \begin{bmatrix} \text{GEN: masc} \end{bmatrix} & \text{(masculine)} \\
\text{c. } & n \begin{bmatrix} \text{GEN: fem} \end{bmatrix} & \text{(feminine)} \\
\end{align*}
\]

- \([\text{GEN}]\) is a multivalent feature whose values in Norwegian are either masculine or feminine
- Example: the root \textit{bil} ‘car’, the result becomes \textit{en bil} ‘a.masc car’
- Two types of licensing conditions (Kramer 2015: 50-57)
  - Semantic licensing conditions
  - Arbitrary licensing conditions
Matching features with exponents

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

Note: These exponents also express indefiniteness.

Gender features - like most other features - exist in combinations (of features and their representative values).
(31) DP in AmNo: \textit{ei field} ‘a field’ (before lexical insertion)
(32) DP in AmNo: *ei field* ‘a field’ (after lexical insertion)
The problem(s) with ‘traditional’ morphemes

(33) 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

Problems (adopted from Lohndal & Putnam, to appear):

- Under this traditional approach, nouns will have their gender features inherently specified
  - We’d have to specify all the English nouns for gender!
- Furthermore, some would have to be multiply specified as a speaker can use the same noun with multiple indefinite articles
Advantages:

- The underlying structure of the ‘DP’ is the same for Bokmål and AmNo
- There is little - if any - source grammar-specific syntax
- This treatment escapes the need to assign gender to English-based \( \sqrt{roots} \) (prior to syntax)
Exchanging hierarchical representations for linear representations

Where is the division of labor for morphology?

- **Strong Nano**: No allomorphy (all syntax, except predictable phonological alternations)
- **Precedence phonology**: ‘Anchors’ can be part of PF, specifying licit concatenations
- But we don’t want each module to be able to read into the other

Q: Many-to-one and One-to-many mappings?

- Multilinguals / multilectals
- Competition and exponent selection
- Generating (restricted) options vs. selecting among the options
### Table 3: Sample infinitives, preterites, and participles

<table>
<thead>
<tr>
<th>Class</th>
<th>Infinitive</th>
<th>Preterite</th>
<th>Participle</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>-a</td>
<td>kost-e</td>
<td>kost-a</td>
<td>kost-a</td>
<td>‘cost’</td>
</tr>
<tr>
<td></td>
<td>flytt-e</td>
<td>flytt-a</td>
<td>flytt-a</td>
<td>‘move’</td>
</tr>
<tr>
<td></td>
<td>snakk-e</td>
<td>snakk-a</td>
<td>snakk-a</td>
<td>‘speak’</td>
</tr>
<tr>
<td>-Te</td>
<td>kjør-e</td>
<td>kjør-te</td>
<td>kjør-t</td>
<td>‘drive’</td>
</tr>
<tr>
<td></td>
<td>bruk-e</td>
<td>bruk-te</td>
<td>bruk-t</td>
<td>‘use’</td>
</tr>
<tr>
<td></td>
<td>tru-Ø</td>
<td>tru-dde</td>
<td>tru-dd</td>
<td>‘believe’</td>
</tr>
<tr>
<td>mixed</td>
<td>spørj-e</td>
<td>spur-de</td>
<td>spur-t</td>
<td>‘ask’</td>
</tr>
<tr>
<td></td>
<td>velj-e</td>
<td>spur-te</td>
<td>val-t</td>
<td>‘choose’</td>
</tr>
<tr>
<td></td>
<td>fortelj-e</td>
<td>val-te</td>
<td>fortal-t</td>
<td>‘tell’</td>
</tr>
<tr>
<td>strong</td>
<td>ver-e</td>
<td>var</td>
<td>vørr-e</td>
<td>‘be’</td>
</tr>
<tr>
<td></td>
<td>syng-e</td>
<td>sang</td>
<td>sung-e</td>
<td>‘become’</td>
</tr>
<tr>
<td></td>
<td>få</td>
<td>fikk</td>
<td>få-tt</td>
<td>‘get’</td>
</tr>
</tbody>
</table>
Table 4: Distribution of AmNo verbs by class

<table>
<thead>
<tr>
<th></th>
<th>-a</th>
<th>-Te</th>
<th>mixed</th>
<th>strong</th>
<th>other</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>-a</td>
<td>79</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>6</td>
<td>86</td>
<td>91.9%</td>
</tr>
<tr>
<td>-Te</td>
<td>6</td>
<td>1279</td>
<td>0</td>
<td>1</td>
<td>42</td>
<td>1328</td>
<td>96.3%</td>
</tr>
<tr>
<td>mixed</td>
<td>1</td>
<td>1</td>
<td>146</td>
<td>0</td>
<td>9</td>
<td>157</td>
<td>93.0%</td>
</tr>
<tr>
<td>strong</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>3771</td>
<td>8</td>
<td>3784</td>
<td>99.7%</td>
</tr>
</tbody>
</table>
Table 5: AmNo past syncretism by verb class

<table>
<thead>
<tr>
<th></th>
<th>Preterite</th>
<th>Perfect</th>
<th>Sum</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>-Te</td>
<td>1040</td>
<td>239</td>
<td>1279</td>
<td>18.7</td>
</tr>
<tr>
<td>mixed</td>
<td>95</td>
<td>51</td>
<td>146</td>
<td>34.9</td>
</tr>
<tr>
<td>strong</td>
<td>3763</td>
<td>8</td>
<td>3771</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Table 6: AmNo /t d/ variation by verb class and verb form

<table>
<thead>
<tr>
<th></th>
<th>Preterite</th>
<th>Perfect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>/te/</td>
<td>/de/</td>
</tr>
<tr>
<td>-Te</td>
<td>129 (15.2%)</td>
<td>717 (84.8%)</td>
</tr>
<tr>
<td>mixed</td>
<td>13 (14.9%)</td>
<td>74 (85.1%)</td>
</tr>
</tbody>
</table>
Size matters: *Features*

- All verbs: [+past] → ‘participle form’
  - regular: -a or -t/-d suffix
    - Allomorphy Problem for verb class
  - mixed/strong: (possible) stem alternation for participle
- mixed/strong
  - mixed: [+fin] → -Te + participle form
    - Allomorphy Problem for /-te, -de/
  - strong: [+fin] → stem change (preterite)
Size matters: *Spans*

**Span:** A sequence of functional heads that are identified as a single unit used to identify potential exponents (Svenonius, 2016, 2020)

(34) \[ [S \underbrace{+PAST \ [-FUT \ ]}] -a, -t/-d \]

where \( S = \) past participle

(35) \[ [S \underbrace{+[FIN[+PAST[ -FUT \ ]]]}] -Te \]

where \( S = \) (simple) past
Key Questions:

Q₁: What is the nature of exponent selection for HL bilinguals?
   - Spans condition/restrict the selection of exponents, which may originate from either source grammar

Q₂: How do we model the ‘Allomorphy Problem’?
   - We attempt to reduce the association of spans-to-exponents to be 1:1 (if/when possible) (see, e.g., Lohndal & Putnam, to appear)

...there’s still (much) work to be done:

(How) do phonological representations interact with exponent selection?

- Verb classes
- -Te subclasses
Decomposing *spans* (Putnam, Carlson, Natvig, & Pretorius, in prep.)

More questions...

- **Q1**: Does learning to parse = learning/acquiring a language?
- **Q2**: Are there structural (and content) differences between on- and off-line representations?
- **Q3**: How does information from multiple (integrated) source grammars affect on-line representations?
Thoughts from Omer Preminger’s blog (Post: 10/28/2020):

- 'Ecological validity' finds its origins in experimental psychology and sociology
- ...but how can you steer clear of a massive interactive effect of many independent (and interdependent) variables such as language production?
  - Brownian motion
  - Leaves blowing in the wind
- We do have the capacity for rote memorization, and we have been shown to use this in language production...
- ...but if our focus is gaining a better understanding of the structure of language
  - Contrary to Tomasello (2008), we do need ‘fancy syntax’
Linguistic ‘structure’ consists of items/bundles of stored information

These **chunks** are ‘abstract’

The connection between them is gradient/lossy, involving the integration of multiple cues

**Now-or-Never processing bottleneck:**

*This forces the language system to compress the input into increasingly abstract chunks, converging progressively longer temporal intervals (p. 107)*

**Q:** What are some of the key architecture (and procedural!) difference between the approach developed here and the one briefly outlined above?
Now-or-Never Processing
Key architectural differences

- Chunks are not necessarily hierarchical
- It’s unclear if any analog to **features** are used
- It’s unclear if/how a theory of ‘separate’ syntactic representations (S-tree / L-trees) works here
- It’s not clear what sorts of commonalities exist among languages wrt to the hierarchical ordering of information that you get ‘for free’ in fseq
- C&C’s call for the need of “passing information between chunks" is highly reminiscent of “linguistic cycles" (which, sadly, they don’t acknowledge or cite)
(36) **Chunking Procedure** (Fasanella & Fortuny 2016: 113)
Given a head $H$, the learner determines:

a. whether $H$ is phonologically dependent of other heads ([+bound]), and
b. whether $H$ conveys only one morpheme ([−synthetic]) or more than one morpheme ([+synthetic])

Q: How can we best translate this into our OHOF-architecture?
How deep is your syntax?

This problem isn’t new...

- Featureless trees (Eubanks, 1994, 1996)
- Shallow Structures
  - Sentence-level (Clahsen & Felser, 2006a,b, 2018)
  - ‘Word’-level phenomena (Song et al., 2019, 2020)
We can interpret chunking as a procedure.

Chunking involves the creating of spans/L-trees (but, crucially, we still need a theory of interface interaction!)

Spans/L-trees created in ‘real time’ sometimes exhibit differences from those hard-wired in competence.

Open question:

Q: What's the relation between competence and performance in language acquisition?, i.e., to what extent can 3rd factor phenomena shape competence representations?
What we’ve discussed today:

- Approaching the formal and scientific study of the structure of the human language faculty from a Galilean Approach is essential.
- A theory of (abstract) mental representations sits at the heart of this enterprise.
- The OFOH-architecture is a serious contender to enhance our understanding of the human language faculty.
We’ve really only the scratched the surface here!

- **Q₁**: What role do ‘default strategies’ vs. ‘typological proximity’ play in shaping bi/multilingual grammars?
- **Q₂**: What might this architecture have to contribute to the ever-growing literature on L3 acquisition (Rothman et al., 2019)?
- **Q₃**: What is the relationship that an OFOH-architecture might have with more experimental-based research?
The road ahead

...and this is where all of you come in!