The Lexicon: An Interdisciplinary Introduction

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Course Outline

- **Lecture 1.** Basics on lexicon, word types, concept-word mapping and lexical information.
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- **Lecture 2.** The global structure of the Lexicon: word classes and word relations.
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■ Lecture 3. Varieties of linguistic evidence in favour of context-sensitive models of lexical meaning.
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Questions

- How is the structure of the LEXICON?
Questions

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- The lexicon is not a DICTIONARY.
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- How is lexical information stored (and processed) in our MIND?
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- What is LEXICAL INFORMATION?
Questions

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- The lexicon is not a DICTIONARY.
- How is lexical information stored (and processed) in our MIND?
- What is LEXICAL INFORMATION?
- How does lexical information interact with grammar, PRAGMATICS and the ontological/CONCEPTUAL dimension?
How to approach these questions

- Gather evidence from large digitalized and annotated corpora, and also from speakers’ judgements.
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- Combine empirical evidence with the formalisms developed in the field of general and theoretical linguistics.
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- Combine empirical evidence with the formalisms developed in the field of general and theoretical linguistics.
- Merge theoretical accounts with computational analysis.
Lexicalization 1

Process based on which, in a given language, a certain information content is associated with a lexical form.
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![Diagram of lexicalization process]

```
concept   ────> WORD
          └──────
            └───>
                lexical form
                meaning
```
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Lexicalization 2

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- Engl. *a happy go lucky attitude*. 
Process according to which **a sequence of words** that frequently recur together in texts acquires the status of **lexical unit** with an autonomous meaning.

The sequence *per haps* in fifteenth-century English - with the plural of a disappeared noun *hap* we may still recognize in *happening* - has become lexicalized and has produced a new lexical item in Modern English, that is, *perhaps*.

**Engl. a happy go lucky attitude.**

**Univerbation** (Cruse 2011, 82-91; Booij 2007, 19).
Word forms that acquire the status of autonomous words.
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Fr. *pendant*, originally the present participle of the verb *pendre* ‘to hang’, is used today primarily as a preposition, as in “*pendant le diner*” ‘during dinner’.
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Two usages of a word become semantically distinct to the point that the link between the two is no longer available to the speaker, and they are perceived as two separate words.

- Engl. *chair* ‘seat’ ("a comfortable chair") and *chair* ‘position of authority’ ("the department chair")
- It. *penna* ‘feather’ ("una penna d’oca" ‘a goose feather’) and *penna* ‘pen’ ("una penna d’oro" ‘a golden pen’).
Lexicalization 5

- Word that **exists** in a language.
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- English has **two lexicalizations** to express the state of being able or allowed to do what one wants to do, i.e. *liberty* and *freedom*. 
Synthetic Lexicalization

A combination of concepts is expressed by a single word.
Synthetic Lexicalization

- A **combination of concepts** is expressed by a single word.
- MOTION and INSTRUMENT: German *gehen* (feet), *fahren* (vehicles), *reiten* (horses); Dutch *schaatsen* (skate), *fietsen* (bikes).
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- **MOTION and INSTRUMENT**: German *gehen* (feet), *fahren* (vehicles), *reiten* (horses); Dutch *schaatsen* (skate), *fietsen* (bicycles).

- **MOTION, MANNER and INSTRUMENT**: Engl. *run* (feet, high speed), *march* (feet, with a regular measured tread), *limp* (feet, with difficulty).
A concept that can be analyzed as unitary is expressed by **multiple words**.
Analytic Lexicalization

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- Engl. *have dinner, make an effort, get ready, get sick, become aware, fall asleep, be late, be ashamed.*
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Both processes present in the same language: *dine/have dinner, stimulate/provide a stimulus, consider/take into consideration, distinguish/make a distinction, exit/go out.*
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Crosslinguistic evidence: Engl. *be late / It. tardare.*
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*stone* ‘that which has become hard’, *bask*et ‘that which is woven’ (Cahuilla, Uto-Aztec language of Southern California, Seiler 1975).
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- *table* ‘she (impersonal pronoun) prepares food on it’; *horse* ‘he drags logs’ (Cayuga, Iroquois language of Canada, Sasse 1993).
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- palace (vs. building)
- doctor (vs. worker)
Labeling Lexicalization

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- *doctor* (vs. *worker*)
Word types

- Simple words.
Word types

- Simple words.
- Complex words with morphological structure.
Word types

- Simple words.
- Complex words with morphological structure.
- Complex words with syntactic structure.
Word types

Lexicon

Morphology

- morphologically simple words
  - free morphemes: Engl. table
  - bound morphemes and inflection: It. borsa
  - derivations: Engl. printer
  - compounds: Engl. bookstore

Syntax

- morphologically complex words
- phrasal words
  - fixed phrases: Engl. part of speech
### Word types

<table>
<thead>
<tr>
<th>Morphology</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>incorporated compounds</td>
<td>fixed phrases</td>
</tr>
<tr>
<td>juxtaposed compounds</td>
<td>ordinary phrases</td>
</tr>
</tbody>
</table>

- *Lexicon*:
  - Engl. *breastfeed*
  - Engl. *love hate, family love*
  - Engl. *part of speech*
  - Engl. *the first part of his speech*
Expressions that are made up of multiple words and yet exhibit a word-like behavior (tests for wordhood, cf. Jezek, 2016, 25-28).
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Continuum ranging from lexicon to syntax.

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The Lexicon: an Interdisciplinary Introduction
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- Continuum ranging from lexicon to syntax.
The received view is that a word expresses a unitary meaning, is included between two white spaces in a text, and can be pronounced in isolation.
The notion *word*

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*The Lexicon: an Interdisciplinary Introduction*
The notion *word*

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- Engl. *air bag*, one word no matter how it is spelled (hyphenated, joined, or not joined).
- A word expresses a **semantic constituent** (Cruse 1986), a concept that is salient - for a given community - when taken as a whole, and therefore unitary.
Tests for *wordhood*

- Verify the presence of certain properties that are assumed to constitute the essential requirements of a word:
Tests for wordhood

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  - cohesiveness and fixed order of the constituent parts;
Tests for *wordhood*

- Verify the presence of certain properties that are assumed to constitute the essential requirements of a word:
  - **cohesiveness** and **fixed order** of the constituent parts;
  - **autonomy**, that is, the ability of standing alone and of carrying a meaning in and of themselves.
waiting room  *a waiting little room
waiting room
credit card
*a waiting little room
*a credit new card
Insertion Test

- waiting room
- credit card
- evening dress

*a waiting little room
*a credit new card
*an evening black dress
Insertion Test

- waiting room
- credit card
- evening dress
- blind spot

* a waiting little room
* a credit new card
* an evening black dress
* a blind and tiny spot
Insertion Test

- waiting room
- credit card
- evening dress
- blind spot
- round table

*a waiting little room
*a credit new card
*an evening black dress
*a blind and tiny spot
*a round and big table
Insertion Test

- waiting room
- credit card
- evening dress
- blind spot
- round table
- work in progress

- a waiting little room
- a credit new card
- an evening black dress
- a blind and tiny spot
- a round and big table
- a work of art and in progress
Engl. take care (of)  take good care (of)
Insertion Test

- Engl. take care (of)
- Engl. catch fire

- take good care (of)
- *catch big fire
- Engl. take care (of)
- Engl. catch fire
- Engl. take advantage (of)
Insertion Test

- Engl. take care (of)  
- Engl. catch fire  
- Engl. take advantage (of)  
- Engl. take a stab (at)  

always
- take good care (of)  
- *catch big fire  
- take full advantage (of)  
- take a serious stab (at)
Insertion Test

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Insertion Test

- Engl. take place

*The event will take soon place.*
- Engl. take place
  *The event will take soon place.
- Engl. catch fire
  *The roof caught quickly fire.
Insertion Test

- Engl. take place
  - *The event will take soon place.
- Engl. catch fire
  - *The roof caught quickly fire.
- Engl. take advantage (of)
  - *He took immediately advantage (of).
- Engl. take place
- Engl. catch fire
- Engl. take advantage (of)
- Engl. turn up

*The event will take soon place.
*The roof caught quickly fire.
*He took immediately advantage (of).
*The guests turned late up.
Insertion Test

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- Engl. take advantage (of)
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- Engl. look up
  ?The man looked quickly up.

- Engl. go out
  We went straight out for dinner.
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- Engl. turn up
  *The guests turned late up.
- Engl. look up
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- Engl. go out
  We went straight out for dinner.
Object Inversion Test

- Engl. look after
  - *We looked the baby after.*
Object Inversion Test

- Engl. look after *We looked the baby after.
- Engl. look up We looked the word up (in the dictionary).
Object Inversion Test

- Engl. look after  *We looked the baby after.*
- Engl. look up  We looked the word up (in the dictionary).
- Engl. take into consideration  We took everything into consideration.
Lexical Information

meaning
sound structure
morphological structure
?word class
Meaning

- **Grammatical** (i.e. functional, relational) and **lexical** meaning.
Meaning

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- Content words are **semantically autonomous**, whereas the meaning of function words is more readily **dependent** on the content words to which they are related.
Meaning

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- Grounds the distinction between **content words** and **function words**.
- Content words are **semantically autonomous**, whereas the meaning of function words is more readily **dependent** on the content words to which they are related.
- The word *in* in the context “Rain *in* the morning” means ‘during’ because the noun *morning* denotes a time period; should it be combined with the noun *building*, it would mean ‘inside.’
### Meaning

<table>
<thead>
<tr>
<th>Content words</th>
<th>Function words</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbs: <em>go, run, call</em></td>
<td>Pronouns: <em>our, I, you</em></td>
</tr>
<tr>
<td>Nouns: <em>Lynda, pen, beauty</em></td>
<td>Articles: <em>the, an</em></td>
</tr>
<tr>
<td>Adjectives: <em>high, bright, steady</em></td>
<td>Demonstratives: <em>that</em></td>
</tr>
<tr>
<td>Prepositions: <em>over, with</em></td>
<td>Prepositions: <em>to</em></td>
</tr>
<tr>
<td>Adverbs: <em>quickly, late</em></td>
<td>Adverbs: <em>not</em></td>
</tr>
<tr>
<td></td>
<td>Verbs: <em>have</em> (aux.)</td>
</tr>
</tbody>
</table>
The distinction between **content words** and **function words** is a matter of degree.
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→ All words are functional from a semantic point of view (Lecture 3); at the same time, functional words do have a meaning.
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This has now also been acknowledged for *logical* words, e.g. quantifiers.

“**Some** guy called you” vs. “There is **some** milk in the fridge”.
Meaning

- The distinction between content words and function words is a matter of degree.
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- “Some guy called you” vs. “There is some milk in the fridge”.
- → Abrusán, Asher and Van de Cruys. 2018. Content vs. function words: The view from distributional semantics, SuB.
Denotative meaning (or denotation or extension or referential or logical meaning) and connotative meaning (or connotation or intension).
Meaning

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→ Traditional distinction between monosemic *lamp* vs. polysemic *paper.*
Meaning

- Pragmatic meaning.
Pragmatic meaning.

Context: restaurant (21.01.2015)
Pragmatic meaning.

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It. “Voi siete tre risotti di zucca” You are three pumpkin risotto.
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Meaning

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- Context: restaurant (21.01.2015)
- It. “Voi siete tre risotti di zucca” You are three pumpkin risotto.
- “The whole table was laughing”.
- “Look, I didn’t know about that”.
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→ **Stability** of senses in the lexicon.
- Collocational meaning.
Meaning

- Collocational meaning.
- *Heavy (= excessive) drinker.*
Collocational meaning.

Heavy (= excessive) drinker.

Warm (= affectionate) welcome.
■ Collocational meaning.
■ *Heavy* (= excessive) *drinker*.
■ *Warm* (= affectionate) *welcome*.
■ → Is it really distinct from denotative meaning? All meanings are context-sensitive (Lecture 3).
In languages with poor morphology a large number of words may take on different classes in different contexts.
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She tapped him on the back.
Word Class?

- In languages with poor morphology a large number of words may take on different classes in different contexts.
- She tapped him on the back.
- Lock the back door.
In languages with poor morphology a large number of words may take on different classes in different contexts.

She tapped him on the back.

Lock the back door.

Please call me back.
In languages with poor morphology a large number of words may take on different classes in different contexts.

- She tapped him on the back.
- Lock the back door.
- Please call me back.
- Don’t look back.
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- Ta bing le san tian.
  - ‘He was ill for three days’
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(from Li and Thompson 1981, 42)
Also language with rich morphology such as Italian exhibit this phenomenon.
Word Class?

- Also language with rich morphology such as Italian exhibit this phenomenon.
- Ho un dubbio atroce.
- ‘I have a terrible doubt’ (noun)
Word Class?

- Also language with rich morphology such as Italian exhibit this phenomenon.
- Ho un dubbio atroce.
- ‘I have a terrible doubt’ (noun)
- Questo mi sembra un caso dubbio.
- ‘This seems a doubtful case to me’. (adj)
Words that exhibit multiple classes contain information about all the categories they are able to take on in context.
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\[\rightarrow\text{ uneconomical and not satisfactory particularly in the case of isolating languages, where categorial flexibility represents the norm rather than the exception.}\]
The lexicon contains a different lexical entry for each use.
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In a lexicon of this kind words are precategorial, i.e. they do not belong to a particular lexical category (cf. Sasse 1993 and Bisang 2008).
Lexical Information

Shared by all words:
- meaning
- sound structure
- morphological structure
- ?word class

Specific to words which function as predicates:
- argument structure
  - Aktionsart
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### Thematic (or semantic) roles

#### Jezek 2016 The Lexicon

#### Table 4.5. Selected list of thematic roles

<table>
<thead>
<tr>
<th>Roles</th>
<th>Definitions</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agent (Ag)</td>
<td>initiates and carries out the event intentionally</td>
<td><em>The children</em>&lt;sub&gt;Ag&lt;/sub&gt; are swimming</td>
</tr>
<tr>
<td>Cause (Cause)</td>
<td>initiates the event unintentionally</td>
<td><em>The wind</em>&lt;sub&gt;Cause&lt;/sub&gt; broke the window&lt;sub&gt;Pt&lt;/sub&gt;</td>
</tr>
<tr>
<td>Experiencer (Exp)</td>
<td>experiences a perception, emotion, etc.</td>
<td><em>Beth</em>&lt;sub&gt;Exp&lt;/sub&gt; smelt the coffee&lt;sub&gt;Source&lt;/sub&gt;</td>
</tr>
<tr>
<td>Patient (Pt)</td>
<td>is directly affected by the event</td>
<td><em>Jack</em>&lt;sub&gt;Ag&lt;/sub&gt; fixed the roof&lt;sub&gt;Pt&lt;/sub&gt;</td>
</tr>
<tr>
<td>Theme (Th)</td>
<td>is involved in the event, but is not affected</td>
<td><em>The speaker</em>&lt;sub&gt;Th&lt;/sub&gt; is wearing a <em>tie</em>&lt;sub&gt;Th&lt;/sub&gt;</td>
</tr>
<tr>
<td>Result (Result)</td>
<td>is created during the event</td>
<td><em>Peter</em>&lt;sub&gt;Ag&lt;/sub&gt; wrote an essay&lt;sub&gt;Result&lt;/sub&gt;</td>
</tr>
<tr>
<td>Recipient (Rec)</td>
<td>is the goal of the action</td>
<td><em>He</em>&lt;sub&gt;Ag&lt;/sub&gt; sent an email&lt;sub&gt;Th&lt;/sub&gt; to his sister&lt;sub&gt;Rec&lt;/sub&gt;</td>
</tr>
<tr>
<td>Beneficiary (Ben)</td>
<td>benefits from the event</td>
<td><em>Mark</em>&lt;sub&gt;Ben&lt;/sub&gt; won an award&lt;sub&gt;Th&lt;/sub&gt;</td>
</tr>
<tr>
<td>Locative (Loc)</td>
<td>place where the event takes place</td>
<td><em>John</em>&lt;sub&gt;Th&lt;/sub&gt; lives in <em>Rome</em>&lt;sub&gt;Loc&lt;/sub&gt;</td>
</tr>
<tr>
<td>Destination (Dest)</td>
<td>place where the event ends</td>
<td><em>John</em>&lt;sub&gt;Ag&lt;/sub&gt; jumped into the <em>car</em>&lt;sub&gt;Dest&lt;/sub&gt;</td>
</tr>
<tr>
<td>Source (Source)</td>
<td>startpoint of the event</td>
<td><em>The water</em>&lt;sub&gt;Th&lt;/sub&gt; came from the faucet&lt;sub&gt;Source&lt;/sub&gt;</td>
</tr>
<tr>
<td>Instrument (Instr)</td>
<td>is required by the agent to perform the action</td>
<td><em>He</em>&lt;sub&gt;Ag&lt;/sub&gt; sent the letter&lt;sub&gt;Th&lt;/sub&gt; by fax&lt;sub&gt;Inst&lt;/sub&gt;</td>
</tr>
</tbody>
</table>
## Semantic Types

Fragment of T-PAS Corpus-based Ontology, Jezek et al 2014 LREC

|--------------|-----------------|-----------|----------|--------|---------|------|----------------------------|-----------------|------|-------------------------|---------|--------|----------|------|-----------------------------|---------|---------|--------------|---------------|-----------------|
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Elisabetta Ježek

The Lexicon: an Interdisciplinary Introduction
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- Mary broke the key *in ten minutes*/for ten minutes*/at three.
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<tr>
<td>stative verb</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
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**Scalar predicates**: verbs which lexically specify a change along a scale inasmuch as they denote an ordered set of values for a property of an event argument (Hay, Kennedy and Levin 1999, Rappaport Hovav 2008).
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*drink* as a predicate is a theme-to-event homomorphism (Dowty 1991). It maps subparts of beer to subevents of drinking subquantities of that beer. But none of these proper subparts is an event of drinking a glass of beer.

Incremental themes are arguments that completely processed only upon termination of the event, i.e. at its end point.
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- Semelfactives admit iterative readings under coercive contexts (Moens and Steedman 1988).
Course Outline

- **Lecture 1.** Basics on lexicon, word types, concept-word mapping and lexical information.
- **Lecture 2.** The global structure of the Lexicon: word classes and word relations.
- **Lecture 3.** Varieties of linguistic evidence in favour of context-sensitive models of lexical meaning.
- **Lecture 4.** Lexical information and its interplay with cognition and pragmatic inference.
- **Lecture 5.** The meaning of verbs and its representation in compositional vector space models.
The Lexicon

An Introduction

By Elisabetta Ježek, Associate Professor of Linguistics, University of Pavia

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