Experimental Methods in Psycholinguistic Research

Les Sikos & Maria Staudte

SAARLAND UNIVERSITY · WINTER SEMESTER · 2016/7

Agenda

Today

- Introduction to the course

Wednesday

- The basics of experimentation

Next Monday

- Introduction to the course experiment

Next Wednesday

- Methods and measures

Course Information

Les Sikos

- Office: C7.1, 1.13
- E-mail: sikos@coli.uni-saarland.de

Maria Staudte

- Office: C7.4, 2.05
- E-mail: masta@coli.uni-saarland.de

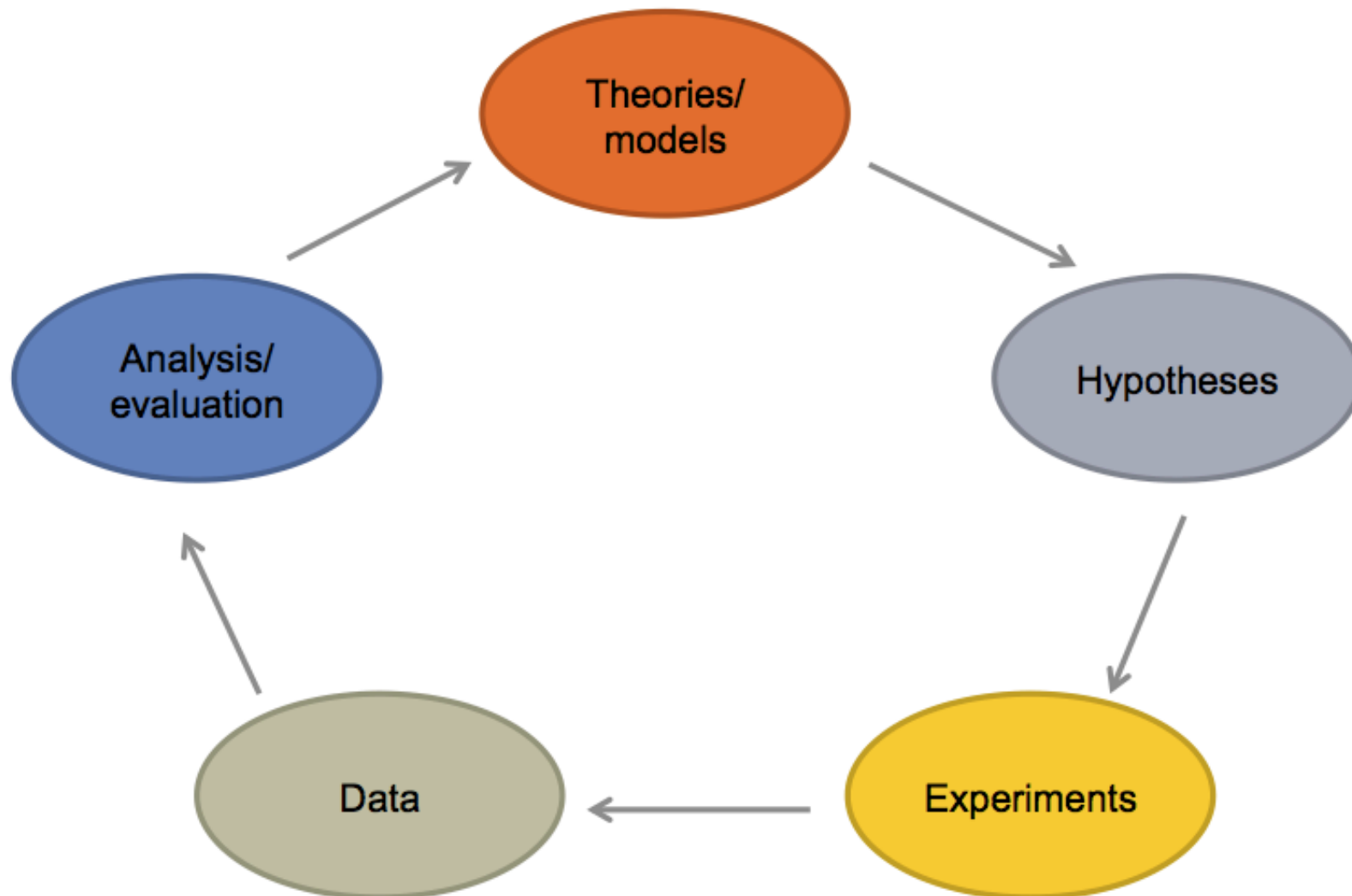**Meetings**

- **Lectures**:   Monday, 10:15-11:45   Room U15, C7.1
                  Wednesday, 10:15-11:45   Room U15, C7.1

- **Lab sessions** also in U15 or in 1.05, C7.4 Eyetracking lab

No textbook

- Resources will be posted on the course website

Course Content

Course Content

Lectures:

- Common experimental paradigms and techniques
- Best practices in experimental design
- Hypothesis testing (statistics)
- Reporting results (APA style)

Labs:

- Design course experiment
- Prepare and pre-test materials
- Program experiment presentation software
- Collect data (run subjects)
- Prepocess, visualize, and analyze data (using R)
- Report results (APA style)

Course Webpage

- Look here for announcements, assignments, readings, and helpful links
- Use discussion board for coordinating lab activities amongst colleagues

For next time…

Please fill out this online survey:

https://goo.gl/forms/3ivjhm0NELoyRN583

Introductions

Introduce yourself and answer the following

- Name
- Year in the MSc program
- Native language
- German fluency
- Prior degree or area of interest/specialization
- Any previous experience with experimental design, experimental methods, statistical analysis?

Course Evaluation

Credits

- 6 points

Evaluation

- **20% - Active participation in lectures and labs**
    - Tutorials, exercises, quizzes
- **40% - Experimental work**
    - Experimental design
    - Collection of data
    - Working together as a research team
- **40% - Final research report**
    - Max 3000 words (including tables and figures)
    - APA format
    - Due:: 31 March

What is psycholinguistics?

The study of the mental representations and processes that enable us to acquire, use, and understand language

- Aims at providing models of language acquisition and language processing

Language acquisition

- How do we learn language?
- What are the stages of acquisition?
- First versus second language acquisition?

Language processing

- Language production
- Language comprehension

Language processing

Mind reading!

Language production

- Conceptual structure → words, sentences, discourse
  - Grammatical and phonological encoding
  - Articulation

Language comprehension

- Words, sentences, discourse → conceptual structure
  - Lexical access
  - Syntactic parsing
  - Semantic interpretation
  - Pragmatic interpretation

Language comprehension

Syntactic processing

- Combining words into phrases based on formal rules (syntax)

Semantic processing

- Extracting the meaning of individual words and their combinations to form the "literal" meaning of a sentence

Pragmatic processing

- Going beyond the literal meaning to the inferred intent of the speaker, which may depend on
  - Physical context of the utterance
  - Pre-existing knowledge about the world
  - Pre-existing knowledge about those involved
  - Etc.

Language comprehension

Propagation across levels

Acoustic Signal

Word Segmentation

Lexical Access

Syntactic Parsing

Semantic Interpretation

Meaning

Input over time

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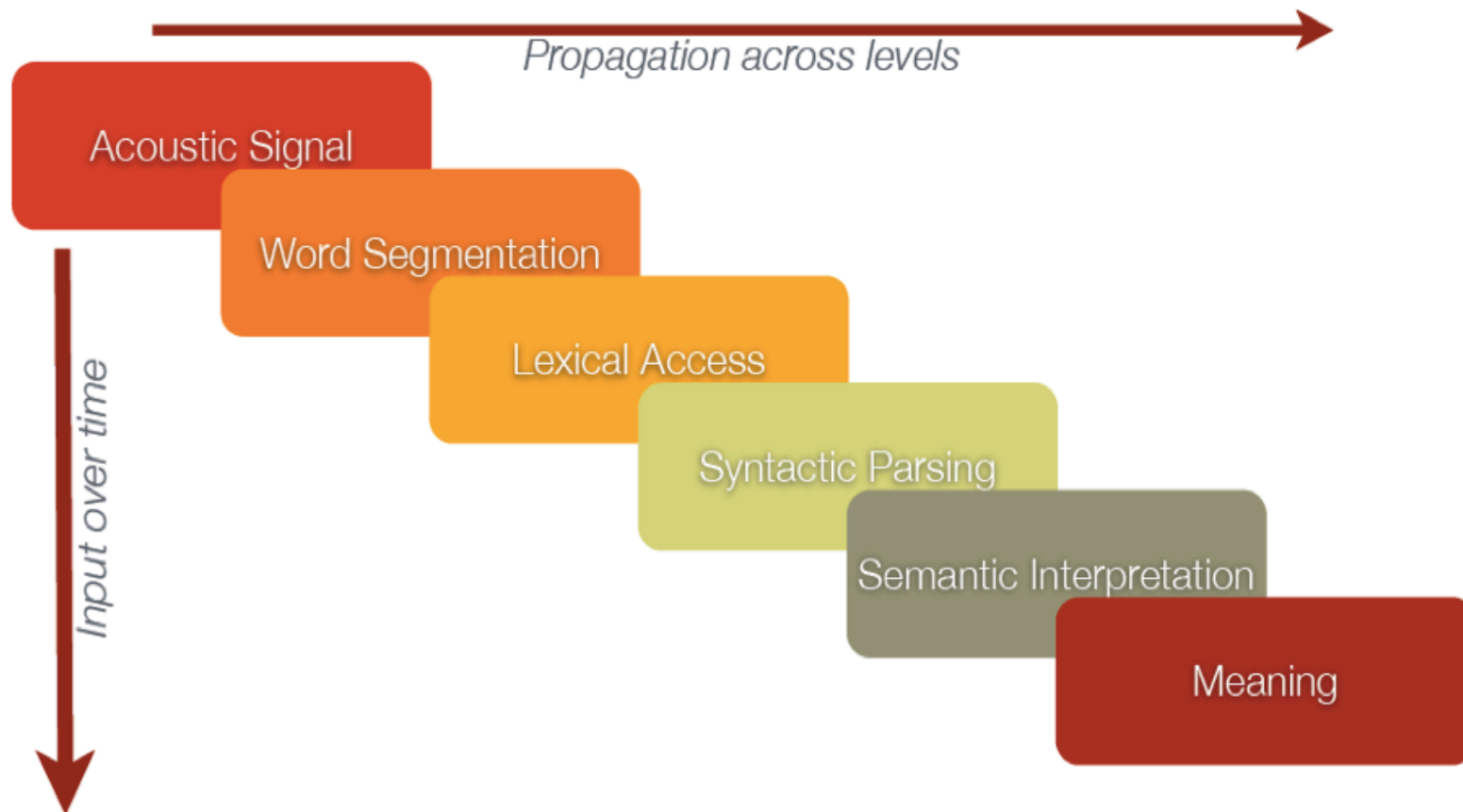
Competence vs. Performance

Linguistic competence

- The speaker's (un)conscious knowledge of his native language
- Phonological, morphological, syntactic and semantic rules

Linguistic performance

- The actual use of this (un)conscious knowledge during language comprehension and production

Competence vs. Performance

How do we know that these are different?

Production: We say things we know are wrong

- Spoonerisms

    You've missed all my history lectures → You've hissed all my mystery lectures
    You have wasted a whole term → You have tasted a whole worm

- Agreement violations
    - The key to the cabinets are in the box
    - The friend of the two girls are laughing

Comprehension: We have difficulty understanding things we know are grammatical

- Garden path sentences

    The horse raced past the barn fell.

- Center embedding

    The mouse that the cat that the dog chased bit fled

Competence vs. Performance

Theoretical linguistics (traditionally) deals with language competence

Psycholinguistics focuses on linguistic performance

- Investigates many of the issues that traditional linguists tend to avoid:
  - What makes a sentence 'hard' to understand
  - Why we make some errors and not others
  - etc.

A bit of history

Early psycholinguists engaged in testing psychological reality of linguistic rules

- Derivational Theory of Complexity (DTC)

As the field developed

- Became clear that psycholinguistic theories must consider properties of the human mind as well as the structure of language

Psycholinguistics has become its own area of inquiry

- Informed by (but not totally dependent) on linguistics
- Linguistics is increasingly informed by findings from psycholinguistics

What we know about language processing

It is fast:

- Language is understood at the rate of about 300 words per minute
- Lexical retrieval, syntactic parsing, and semantic interpretation occur in a matter of a few hundred milliseconds

It is accurate:

- We deal with massive ambiguity and indeterminacy without breaking down

It is incremental:

- We understand language incrementally (word-by-word, sound by sound)

It is subject to cognitive limitations:

- Memory, attention, inhibition, etc.

Some active research questions

Spoken word recognition

- How do we parse an acoustic stream into discrete units?
- How do we recognize those units as words of our language?

Morphological processing

- How do we recognize morphologically complex words?
- How do we mentally represent relations between morphologically-related words?

Sentence processing (syntax, semantics, pragmatics)

- How do we understand sentences (compositionality)?
- How do we build up structure incrementally?
- How do we resolve ambiguity during real-time processing?
- How do we detect and repair errors?
- How do we "read between the lines"

EXPERIMENTAL RESEARCH

Example Experiment

Instructions

- You will see a list of scrambled words
- Try to unscramble as many words as you can
- You will have 5 minutes to complete the task

facebook	youtube
wikipedia	amazon
twitter	instagram
netflix	apple
reddit	tumblr
microsoft	yahoo
linkedin	pinterest
google	craigslist

Social networking sites

facebook
wikipedia
twitter
netflix
reddit
microsoft
linkedin
google

Non-Social networking sites

youtube
amazon
instagram
apple
tumblr
yahoo
pinterest
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