Background

- Sleep is beneficial for the consolidation of memories

**Encoding**

**Consolidation**

**Retrieval**
Sleep architecture

REM
S1
S2
S3
S4
Wach

EOG
EEG

S1  S2  SWS  REM

Spindle  K-Komplex  Slow Wave  REM
Sleep benefits memory consolidation

Meta-Analysis Sleep and Memory

- Betreuer: Michael Munz
- Marvin Helbing, Marcel Eicher, Gabrielle Zbären
- Diekelmann et al., 2009, Sleep Medicine Reviews
  - The whats and whens of sleep-dependent memory consolidation
Sleep and Memory: experimental studies

- Does the degree of depth of encoding before sleep effects the memory-benefit of sleep?
- Levels of processing approach, D. Craig
Sleep and Memory: experimental studies

- Sleep and levels of processing
  - Michael Munz

EEG / Nap study

<table>
<thead>
<tr>
<th>Time</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 p.m. (EEG)</td>
<td>Learning</td>
</tr>
<tr>
<td></td>
<td>Immediate Recall</td>
</tr>
<tr>
<td>Nap (N = 30)</td>
<td>vs. Wake (N = 30)</td>
</tr>
<tr>
<td>3 p.m. (EEG)</td>
<td>Delayed recall (12h)</td>
</tr>
</tbody>
</table>
Literature

- Diekelmann et al., 2009, Sleep Medicine Reviews
  - The whats and whens of sleep-dependent memory consolidation


  - Levels of processing: past, present... and future? Memory, 10, 305–18.

  - Processing approaches to cognition: The impetus from the levels-of-processing framework. Memory, 10, 319-332.
Sleep and vocabulary learning

- Reactivation of word-pairs during sleep
  - Dutch-German
Sleep and vocabulary learning

Schreiner & Rasch, *Cerebral Cortex*, 2014

Correctly remembered words

Sleep control  Active waking  Passive waking

Schreiner & Rasch, *Cerebral Cortex*, 2014

**
Sleep and Memory: experimental studies

- The effect of sleep on Dutch vocabulary learning in German and French native speaker
  - Effect of Cross-linguistic similarity
    - Prior language knowledge
  - Hypothesis: More similar words profit more from sleep
Sleep and Memory: experimental studies

- Sleep and cross-linguistic similarity
- 50 young and healthy participants (18 – 35 years)
- Procedure
  - Sleep group (N = 5 German speakers, 5 French speakers)
    - Data of 15 G and 15 F already available
  - Wake group (N = 20 German speakers, 20 French Speakers)

### Sleep group
- **Learning**
- **Immediate Recall**
- **Sleep (at home)**
- **Morning (7:00 – 10:00)**
- **Delayed recall (12h)**

### Wake group
- **Morning (7:00 – 10:00)**
- **Learning**
- **Immediate Recall**
- **Wake (normal daily activities)**
- **Evening (19:00 – 22:00)**
- **Delayed recall (12h)**
References

- **Supervisor:**
  - Thomas Schreiner
    - thomas.schreiner@uzh.ch

- **References:**
  - Schreiner & Rasch 2014, Cerebral Cortex
    - Boosting Vocabulary Learning by Verbal Cueing During Sleep.
  - Gaskel et al., 2014, Psychological Science
    - Sleep Underpins the Plasticity of Language Production.
    - A complementary systems account of word learning: neural and behavioural evidence.
  - Marlieke et al., 2012, Trends in Neuroscience
    - How schema and novelty augment memory formation
  - Diekelmann et al., 2009, Sleep Medicine Reviews
    - The whats and whens of sleep-dependent memory consolidation
Milestones

- **16. September 2014**
  - Introduction, start reading,
  - write abstract, hypothesis, procedure (1 page, english or german)
    - Must be finished before data collection, latest 31. October 2014

- **Ca. 15. October 2014**
  - Start of data collection

- **Ca. 28. February 2013**
  - End of data collection

- **10. April 2014: First version of bachelor thesis**
  - Feedback within 10 days

- **12. Mai 2014 Final version**
  - Absolute deadline
Bachelor-Thesis

- 30-40 pages, English or German
  - Including references, not including supplemental material
  - Times New Roman 12 pt., 1.5 line spacing
- Content (see “Leitfaden Bachelorarbeiten”)
  - Abstract
  - Introduction
  - Methods
  - Results
  - Discussion and Outlook
  - References
  - Supplement

- Printed and bound (no spirals)
  - + pdf on CD
  - CD must also contain all original data, preprocessed data and all analyses
    - All excel sheets, SPSS / R data, experimental material (Questionnaires etc.)
Overview Bachelorthesis

- **Meta-analysis Sleep and Memory: Michael Munz**
  - Marvin Helbing, Marcel Eicher, Gabrielle Zbären

- **Sleep and levels of processing: Michael Munz**
  - Sarah Diezig, Remy Lachelin, Fabien Carruzzo, Laura Wachtl, Samira Schaufler

- **Sleep and cross-linguistic similarity: Thomas Schreiner**
  - Joelle Schweizer; Eva Silberschmidt
Learning by doing nothing - not a dream!