First Sino-German Fall School
of the
International Research Training Group (IRTG)
“Adaptive Minds: Neural and Environmental Constraints on Learning and Memory”

October 11-17, 2009, Beijing, China

http://www.adaptive-minds-fall-school.de.vu/
Fall School 2009 in Beijing

Partner Institutions of the IRTG “Adaptive Minds”:

- Departments of Psychology and Neuroradiology, Saarland University, Saarbrücken, Germany (http://www.adaptiveminds.de)
- Institute of Psychology, Chinese Academy of Sciences (IP-CAS; http://www.psych.ac.cn/EN/)
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1. Programme of the Fall School

Sunday, October 11

8:30   Arrival at Airport Beijing
10:00  Check-In at the Xiedao Village Resort
16:00  Visit at the Institute of Psychology, Chinese Academy of Sciences
18:00  Opening of the Fall School (Buffet)

Monday, October 12

9:30-12:00  Speaker 1: Tatia M.C. Lee, Laboratory of Neuropsychology, University of Hongkong

http://www3.hku.hk/psychodp/people/tatialee.htm

“Emotion Regulation”

Suggested reading: Lee et al. (2005, 2008, 2009a, 2009b); Mak et al. (2009, in press)

12:00-15:00  Lunch break

15:00-19:00  Speaker 2: Dirk Wentura, Cognitive Psychology Unit, Saarland University


Sequential Priming Paradigms: A „Window to the Mind”

-  Talk 1: Semantic Priming as a Tool to Reveal the Functional Architecture of Semantic Memory
-  Talk 2: Response Priming as a Tool to Reveal Automatic Categorisations

Suggested reading: Wentura & Degner (in press a); Wentura & Degner (in press b); Wentura & Frings (2005)

19:30  Dinner
Tuesday, October 13

9:00-13:00  Speaker 3: Tim Curran, Department of Psychology and Neuroscience, University of Colorado at Boulder

http://psych-www.colorado.edu/~tcurran/

“Human Learning and Memory: Perspectives from Event-Related Brain Potentials (ERPs)”
- Talk 1: Perceptual Expertise as a Model of Visual Category Learning
- Talk 2: The Contribution of Familiarity and Recollection to Recognition Memory

Suggested reading: Rugg & Curran (2007); Scott et al. (2009)

13:00-15:00  Lunch break

15:00-19:00  Speaker 4: Edward L. Wilding, School of Psychology, Cardiff University

http://www.cf.ac.uk/psych/contactsandpeople/lecturing/wilding-edward-dr-overview_new.html

- Talk 1: Refining Functional Accounts of the Left-Parietal Event-Related Potential (ERP) Old/New Effect
- Talk 2: Interference, Retrieval Monitoring and Late Frontal Event-Related Potential (ERP) Old/New Effects

Suggested reading: Hayama et al. (2008); Wilding & Herron (2006)

19:30  Dinner

Wednesday, October 14: STUDENTS' DAY

entire day  Talks and posters of PhD students

09:00-09:35  Talk 1: Julia A. Schneiders: The differential role of modality-specific working memory training in learning Chinese as a second language

09:35-10:10  Talk 2: Jing Zhao: Left-lateralized N170 for Chinese logographic characters

10:10-10:45  Talk 3: Huiming Sun: Visual complexity does not influence visual short term memory consolidation
10:45-11:05  Break

11:05-11:40  **Talk 4: Hanyu Shao**: *The effect of unitization on familiarity-based associative memory*

11:40-12:15  **Talk 5: Heike Weber**: *Predicting school success: The role of working memory capacity, intelligence and motivation*

12:15-12:55  **Talk 6: Kalina Petrova**: *Attentional Capture by Biologically Relevant Stimuli: The Role of Eye Movements*

12:55-14:00  Lunch Break

14:00-16:30  **Poster Session**

  - **Poster 1: Anna Marie Arend**: Effects of load and incentives on contralateral delay activity and slow potentials in a visual working memory task
  - **Poster 2: Shuang Chen**: Relationship between the representation before and after updating a situation model
  - **Poster 3: Teresa Halsband**: Reward-motivated learning and memory retrieval
  - **Poster 4: Olga Kukina**: Cross-cultural differences in conceptual system and associative memory
  - **Poster 5: Susanne Lehner**: Cross-cultural differences in memory strategy development
  - **Poster 6: Heinrich R. Liesefeld**: The advantage of mentally rotating clockwise
  - **Poster 7: Liping Lu**: Maternal, teacher and children predictors of Chinese children’s school achievement
  - **Poster 8: Melanie Schmitz**: If the target primes the prime: Reversing the affective priming effect
  - **Poster 9: Kathrin Utz**: Neuroanatomy and modulation of visuospatial disorders
  - **Poster 10: Lamei Wang**: Cross-cultural action acquisition and representation for children
- **Poster 11:** Sirui Wang: Affective priming effect in the non-alphabetic Chinese language

- **Poster 12:** Ying Wang: Decompose the temporal structure of memory in dynamic 3D object learning and recognition

16:30-17:00 Break

17:00-17:35 **Talk 7:** Katja Umla-Runge: Action representations in memory – Means versus ends

17:35-18:15 **Talk 8:** Fan Yang: Cure the low prevalence effect

18:15-18:50 **Talk 9:** Ai-Shi Jiang: The time course of inconsistent emotional words processing

18:50-19:25 **Talk 10:** Kerstin Unger: Effects of self-relevant failure on performance monitoring: An electrophysiological investigation

19:30 Dinner

**Thursday, October 15**

9:00-13:00 **Speaker 5:** Hua Shu, State Key Laboratory for Cognitive Neuroscience and Learning, Beijing Normal University

- **Talk 1:** Acquisition of Orthography, Phonology and Semantic Knowledge in Chinese Writing System

- **Talk 2:** Language Learning, Impairment and the Underlying Cognitive and Neural Mechanisms

Suggested reading: Bi et al. (2007); Shu (2003); Yang et al. (2009); Zhao et al. (in press)

13:00-15:00 Lunch break

15:00-19:00 **Speaker 6:** Shihui Han, Department of Psychology, Peking University

http://www.psy.pku.edu.cn/en/han.html

“Culture and Self – A Social Cognitive Neuroscience Approach”
Friday, October 16

9:00-18:00  Sightseeing Tour (Badaling Great Wall and Forbidden City)

18:00  Good-bye Party

Saturday, October 17: Transfer and departure

2. Important Information on the Fall School

Important notes:
- The participating doctoral students are strongly requested to read the papers suggested by the guest speakers in order to allow fruitful discussions with our guests. All papers referred to in this programme are available as downloads on the website of the Fall School (see below).
- Each talk of the PhD students should have a duration of not more than 20 min. + 15 min. for discussion. Templates for the PowerPoint presentations are available on the website of the Fall School (see below).
- The poster session will include guided tours in which each poster will be presented orally in a short 5-minutes talk by the PhD student. Templates for the posters are available on the website of the Fall School (see below).

Websites:
- Homepage of the Fall School: http://www.adaptive-minds-fall-school.de.vu/
- Location of the Fall School: http://www.xiedao.com/ (Xiedao Village Resort)

Contact addresses for questions:
- Theo Jaeger from Saarland University: t.jaeger@mx.uni-saarland.de
- Yuan Deng from IP-CAS: dengy@psych.ac.cn
3. Abstracts of the Guest Speakers
People learn and remember things in a variety of different ways that tap into several distinct neurocognitive processes. A shopper trying to remember the contents of a grocery list mistakenly left at home relies on memory processes that are much different from those of a bird watcher who, based on years of experience, recognizes a scarlet tanger in flight. Our laboratory uses human, scalp-recorded, event-related brain potentials (ERPs) to try to understand the characteristics of these memory processes. In the first talk I will discuss how expertise in visual object recognition (e.g., bird watchers) leads to changes in early (less than 300 milliseconds) visual cortical processes. In the second talk, I will discuss how memory for more recently (and less frequently) encountered information (e.g., a grocery list), on the other hand, depends on later-occurring (400+ milliseconds) processes, including those that elicit feelings of familiarity and others that result in the recollection of specific information.

**Talk 1: Perceptual expertise as a model of visual category learning**

**Talk 2: The contribution of familiarity and recollection to recognition memory**

Culture and self – A social cognitive neuroscience approach

Shihui Han
Department of Psychology, Peking University, China

I'll talk about cultural difference in self-concept that has been discussed by philosophers and further demonstrated by social and cultural psychological findings.

In addition, I'll present recent cultural and social cognitive neuroscience studies that aim to investigate the neural substrates of self-related processing and how cultures influence these neural substrates by showing evidence from studies of adults with East Asian and Western cultural backgrounds and of adults with different religious beliefs. I'll also present some ideas about how self-concept as the core of human personality may influence other cognitive processes and the potential neural mechanisms.
Emotion, emerged in the course of evolution, helps us survive various challenges. For example, “fear” protects us against danger; “joy” facilitates bonding between people offering nurturance to each other. Emotional impulses could also be associated with many forms of socially inappropriate behaviors. Hence, efficient and effective emotion regulation mechanisms must be in place for production of adaptive and goal-directed behaviors. “Emotion regulation”, as defined, is the process via which emotions are being labeled; and our experience and hence expression of these emotions is being executed. It remains unknown whether neural correlates of emotion regulation are valence-shared or valence-specific. To address this question, we employed functional magnetic resonance imaging methodology to monitor the neural activity of the participants while viewing and/or regulating their emotions evoked by the emotional pictures presented. Both behavioral and neuroimaging data suggest that regulation of positive emotion was associated with strong and extensive activation in the left dorsal prefrontal regions and decreased activation in the left insula, the amygdala, the right rolandic operculum, and the lingual gyri. In contrast, regulation of negative emotion was associated with brain activity in the left orbitofrontal gyrus, the left superior frontal gyrus, the anterior cingulate gyrus, the left middle occipital gyrus, and the right precuneus. Findings of our study indicate that there are shared as well as distinct brain regions for regulating positive and negative emotions.

References: Lee et al. (2005, 2008, 2009a, 2009b); Mak et al. (2009, in press)
Talk 1: Acquisition of orthography, phonology and semantic knowledge in Chinese writing system

Experimental evidence has shown that an understanding of the nature of the correspondence between print and sound, print and meaning is crucial in learning to read Chinese. To grasp how print words represent language, a child must determine what linguistic units are represented by the elements of written language. This talk will report the important features of Chinese writing system and their relation with children’s acquisition of orthography, phonology, and semantic knowledge in Chinese.

Talk 2: Language learning, impairment and the underlying cognitive and neural mechanisms

What is the underlying cognitive and neural mechanism of visual word reading in Chinese and how it is shaped by language experience? The converging evidence from impaired and normal reading processing, typical and disordered reading development, brain mechanism and corpus studies will be reviewed in the talk.

References: Bi et al. (2007); Shu (2003); Yang et al. (2009); Zhao et al. (in press)
Cognitive psychology lives on its basic experimental paradigms – be it the Stroop-task, the Simon task, visual search, or the negative priming paradigm, to name just a few. These paradigms are associated with replicable, robust, and non-trivial effects. Researchers share the strong belief that the family of these paradigms are suited to reveal essential truths about the functional architecture of our cognitive system. Thus, in some sense they are considered as “windows to the mind.”

One especially prominent twin pair in this family is the sequential priming paradigm. Since their introduction in the early seventies (semantic priming) and mid-eighties (response priming) of the last century, priming studies have become increasingly popular in cognitive psychology. The defining characteristic of these tasks is a common experimental procedure: Participants work through a sequence of trials in which two stimuli are subsequently or simultaneously presented but only one – the target – has to be processed with regard to a basic feature (e.g., it had to be named) while the other – the prime – is task-irrelevant. Starting from this procedural commonality, the twin pair splits into two dominant branches separated by the kind of relation between prime and target and the kind of target processing task implemented.

When it is the participants’ task to classify letter strings as words or non-words (lexical decision task) and primes and targets vary according their semantic relatedness, we describe a variant of a semantic priming paradigm. A typical semantic priming effect consists in faster reaction times for targets that are preceded by related primes. It reflects prima facie encoding facilitation of the target by a related prime.
When it is the participants’ task to categorize targets as positive vs. negative (evaluation task) and primes and targets vary according their evaluative congruence, we describe a variant of a *response priming paradigm*. A typical response priming effect consists in faster reaction times for targets that share their response category with the prime. It reflects prima facie automatic categorisation of the task-irrelevant prime.

**Part One: Semantic priming as a tool to reveal the functional architecture of semantic memory**

- Theories and basic findings
- Automatisms vs. strategies
- Challenging questions (1): The case of center-surround inhibition
- Challenging questions (2): The moderating role of context

**Part Two: Response priming as a tool to reveal automatic categorisations**

- Theories and basic findings
- Masked priming: the case of subliminal processing
- Evaluative priming as an indirect measure of attitudes
- Challenging questions (1): Encoding facilitation by valence-congruent primes?
- Challenging questions (2): Emotion priming

References: Wentura & Degner (in press a); Wentura & Degner (in press b); Wentura & Frings (2005)
Talk 1: Refining functional accounts of the left-parietal event-related potential (ERP) old/new effect.

The left-parietal ERP old/new effect has been identified as an electrophysiological correlate of recollection. One recent account holds that the effect is a reflection of the on-line maintenance of recovered information, falling at the intersection between working memory and long-term memory. I will present data that is consistent with this account, based upon the outcomes in studies where we have linked the magnitude of the effect with estimates of working memory capacity (WMC). This approach is likely to be a fruitful one to pursue in order to understand not only the functional significance of the left-parietal ERP old/new effect, but also the links between WMC and the control of retrieval. The question of how control over retrieval is implemented has been the focus of recent ERP research.

References (please read the article marked with an asterisk for preparing this talk): Vilberg & Rugg (2009); *Wilding & Herron (2006)

Talk 2: Interference, retrieval monitoring and late frontal event-related potential (ERP) old/new effects.

Frontally distributed ERP old/new effects have been observed in numerous retrieval tasks, but consensual accounts of their functional significance remain elusive. Providing accurate accounts of these effects is important, because doing so offers a means of contributing to dynamic characterisations of the processes that the pre-frontal cortex supports during memory judgments. I will describe some of our recent attempts to address these issues, focusing on the role of interference in memory retrieval, as well as the links between these electrophysiological effects and processes that operate on the products of retrieval in service of task goals.

References (please read the article marked with an asterisk for preparing this talk): Cruse & Wilding (in press); *Hayama, Johnson, & Rugg (2008)
4. Abstracts of the PhD Students
Effects of load and incentives on contralateral delay activity
and slow potentials in a visual working memory task

Anna Marie Arend

Department of Psychology, Saarland University, Saarbruecken, Germany

Visual working memory is a limited resource that holds up to four items. ERPs measured during the retention interval of a change detection task have been shown to reflect this limitation. We were interested how incentives modulate the memory performances and their electrophysiological correlates. Subjects performed a change detection task (visual hemifield-paradigm) under standard instructions and a condition in which they could enhance their earnings by increasing their performances. Slow waves and the contralateral delay activity (CDA) were measured over occipito-parietal brain areas. We observed effects of memory load and incentives on performances as well as on bilateral slow waves. CDA was not influenced by incentives. Memory performance maximally reached by a participant correlated with slow waves but not with the CDA.

In the hemifield-paradigm, used to measure the CDA, there is one hemifield containing relevant and one containing irrelevant (not-attended) items. The observed bilateral slow wave effects could be partly caused by items in the irrelevant hemifield entering working memory. In the hemifield-paradigm this cannot be decided because the same number of items is presented in both hemifields. Therefore, we orthogonally varied the number of relevant and irrelevant items in experiment two. In the behavioral data and the CDA we found effects of the relevant items only. In the slow waves however, there was an additional irrelevant-items-effect when subjects maintained just one relevant item.
The comprehension process during reading involves the continual integration of incoming information. This integration process may update an existing situation model or create a new one to accommodate the newly acquired information. What's the relationship between the representations before and after updating in these two conditions? The coherence of existing situation model and incoming information in texts is manipulated to create conditions: (1) revision of existing situation model and (2) integration of new information into existing situation model. It is predicted that the revision condition will induce retrieval interference. A retrieval-induced forgetting paradigm is used to explore this retrieval interference. There are two phases: reading and retrieval practice, and the final test phase. The interval between the two phases is 20 min. After reading a text sentence by sentence, subjects are required to retrieve content of the text which may be the information before or after updating process of the situation model. Retrieval-induced forgetting is expected to occur only in the revision condition.
Successful retrieval of episodic memories implies the capability to flexibly adapt to alternating retrieval demands. One possible adaptation (the so-called retrieval orientation (Rugg and Wilding, 2000)) initiates relevant cognitive processes in response to a retrieval cue. Event-related potentials (ERPs) elicited by correctly classified new items in the test phase of a recognition memory task differ according to the sought-for information in memory (e.g. pictures versus words) and are assumed to be a neural correlate of retrieval orientation.

Furthermore, reward anticipation during learning supports memory formation (Adcock et al., 2006). The connection between the mesolimbic circuit involved in reward anticipation and the medial temporal lobe memory system, may account for this interaction.

Our investigation focuses on the impact of high and low reward during learning on episodic memory retrieval. Subjects encoded a mixed list of pictures and words preceded by reward cues in a study phase. 24 hours later, they performed an intentional memory exclusion task with words as test items, requiring responses selectively to old items belonging to one of the two studied item groups and equal responses to remaining study items and new items.

We predicted that ERPs to correctly rejected new (unstudied) words during test would be more negative when pictures rather than words are probed for. Reward would modulate picture- or word-induced retrieval orientation.

Preliminary results point in that direction. Recognition accuracy was greater for high-reward than low reward items. ERPs were more negative when pictures were the target material.
The time course of inconsistent emotional words processing

Ai-Shi Jiang

Institute of Psychology, Chinese Academy of Sciences, Beijing, China

The present study investigated the interaction of prosodic emotion and semantic emotion during oral emotional comprehension, as well as the effect of attention resource in it. Participants listened to happy, angry and neutral words that were spoken with a happy, angry and neutral prosody by a professional actor, producing consistent emotional words and inconsistent emotional words. The present study differs from the previous studies in that participants attended both the prosodic emotion and semantic emotion at the same time, by judging whether both prosodic emotion and semantic emotion of the two words that appeared in succession were completely consistent. Behavioral results revealed that women responded more quickly and correctly than men. However, there is no difference between consistent emotional words and inconsistent emotional words. ERP result revealed no sex difference, and found a smaller N400 for words that were spoken with happy prosody as compared to words spoken with angry words. Furthermore, the prosodically happy words had a smaller N400 tendency for semantically angry words as compared to happy words; the prosodically angry words had a smaller N400 tendency for semantically happy words as compared to angry words. That is to say, consistent emotional words had a smaller N400 tendency as compared to inconsistent emotional words.
Cross-cultural differences in conceptual system and associative memory.

Olga Kukina

Department of Psychology, Saarland University, Saarbruecken, Germany

Cross-cultural research on categorization showed that while Westerners prefer taxonomic groupings (e.g., policeman-postman), East-Asians tend to form thematic ones (e.g., policeman-uniform). These results indicate differential weighting of the taxonomic/thematic relations in the conceptual system of Westerners and Asians. We assumed that these differences might influence episodic memory. Westerners (Germans) should benefit from their conceptual system when it comes to forming and retrieving taxonomic associations, while Asians (Chinese) should have advantage for thematically related associates. Moreover, for Germans, retrieval of thematically-related associations should be rather demanding and therefore mostly relying on a slow mnemonic process, called recollection. In contrast, retrieval of taxonomic associates should be additionally supported by a fast automatic process, termed familiarity. The opposite should hold for Chinese.

It is possible to monitor the relative involvement of familiarity and recollection during memory retrieval using event-related potentials (ERPs), in that familiarity and recollection are associated with distinct ERP-components. We conducted an ERP-experiment in which German participants memorized a list of taxonomically/thematically-related and unrelated word-pairs and subsequently tested their associative memory by asking whether the presented word-pair was old, rearranged or new. We expected an early mid-frontal effect (correlate of familiarity) to be present for correctly recognized taxonomic but not for thematic word-pairs. In contrast, the late parietal effect (correlate of recollection) is predicted for both taxonomic and thematic associates. Preliminary behavioral results indicate a higher recognition accuracy for old taxonomic than thematic associates.

Subsequent experiment will be conducted with Chinese participants to enable the crosscultural comparison.
Cross-cultural differences in memory strategy development

Susanne Lehner

Department of Psychology, Saarland University, Saarbruecken, Germany

Recent studies point to changes from a visual strategy in short-term visual stimulus recall, to a strategy using visual and verbal codes, to a verbal recoding strategy during childhood (Clerc & Courbois, 2005; Henry, 2008; Palmer, 2000). Further evidence suggests that naming stimuli promotes recall and verbal strategy use in young children (e.g. Hitch et al., 1991; Johnston & Conning, 1990).

The present study investigates cross-cultural differences in strategy changes and effects of naming. Pilot studies on stimuli (black-and-white-drawings), with 5-year-olds and adults in each culture, ensure a strong name agreement as well as equivalence in familiarity, complexity, and age of acquisition. In the experiment, 5-6-, 7-8- and 9-10-year-olds remember objects (list length differs with age; cf. Hulme, 1987) under five conditions: naming objects; phonological suppression: repeating an unrelated word; a secondary motor task: foot tapping; visual suppression: additional scrambled pictures; and no additional task/interference. The strength of the negative impact of phonological suppression and visual suppression indicate the utilization of a verbal vs. visual encoding strategy; foot tapping controls for general suppression-related cognitive demands.

We expect universal strategy changes, although cultural factors (e.g., differences in the writing system) may influence the age of occurrence. Naming should enhance recall performance in young Western children and be less effective or deleterious in older children with internal recoding strategies and Asian children in which culture verbal utterances are not as favoured (e.g., Kim 2002, 2008). Pilot study and preliminary experiment data will be presented.
The advantage of mentally rotating clockwise

Heinrich R. Liesefeld

Department of Psychology, Saarland University, Saarbruecken, Germany

The time to decide, whether a character is shown in its mirror or normal version, increases approximately linearly with the character’s angular departure from upright. This well-known and often replicated effect of “mental rotation” is usually interpreted in the following way: Subjects rotate a mental representation of the tilted character into congruence with their upright oriented memory representation of the same character, i.e. they perform a rotation in clockwise direction for characters tilted counterclockwise and a counterclockwise rotation for characters tilted clockwise. After rotation is finished they can directly compare the two representations. In earlier studies, prolonged reaction times for clockwise tilts were reported inconsistently. We argue that effects of rotational direction are often disguised (therefore the inconsistency), because subjects normally employ a mixture of the strategy described above and a second one: It is also possible to rotate an upright representation built from long-term memory into congruence with the tilted character for comparison. Using this strategy direction of rotation matches the direction of character tilt. The paradigm employed here, was specially designed to force rotations either into or out of the canonical, upright orientation. We measured EEG slow wave activity to obtain an online-measure of mental rotation. For both conditions analysis of the rotation-related slow wave activity and reaction times led to the same result: Mental rotation is easier in clockwise than in counterclockwise direction.
Children’s school achievement is an important forecast of their life success. This study attempts to find primary factors to predict children’s school achievement from 3 aspects: maternal factors (parenting styles and expectancy towards their children’s achievement), teacher factors (teacher support and teacher’s evaluation) and children factors (cognitive abilities, motivation & temperament). The Chinese and mathematics test scores and questionnaire responses of 170 children in grade 4 are being collected. Our anticipated result is that both of teacher support and parents’ expectancy are related to children’s school achievement. We also hypothesize that parenting styles, children’s cognitive abilities and their motivations to study well will highly predict their school achievement. Our study paves the way to advising better developmental and educational environment for young children, and will significantly help find better educational strategies in future.
Attentional Capture by Biologically Relevant Stimuli: 
The Role of Eye Movements

Kalina Petrova

Department of Psychology, Saarland University, Saarbruecken, Germany

Early detection of danger in the environment as well as effective response to it are of vital importance for humans. From an evolutionary, functional perspective, it is, therefore, reasonable to assume that all humans are prewired to automatically orient their attention towards potential threat. In a start-up experiment of the current doctoral project, the dot-probe paradigm – a widely used paradigm for investigation of the attentional processes involved in orienting towards threat – was used. In this paradigm, a face pair consisting of one neutral and one emotional face is presented for a brief period of time followed by a probe that participants have to categorize (e.g., Fox, 2002). Since the stimulus onset asynchrony usually used in this paradigm allows eye movements to occur, it is unclear whether the reaction time (RT) bias towards threat typically found in such experiments is solely due to covert attentional processes or is biased by overt eye movements. Results showed a positive RT bias towards threat in the trials in which participants made no eye movements during the face pair presentation but no RT bias in the trials in which subjects shifted their gaze during that time. Although participants made eye movements in a certain number of trials, the overall RT bias was still positive, thus reflecting primarily covert shifts of attention. The results emphasize the importance of recording participants’ eye movements in future studies on attention.
Affective priming (i.e., faster response to a target following a valence-congruent prime compared to an incongruent prime) is an important paradigm to examine the representation of the evaluative components of semantic concepts. Interestingly, affective priming was not only found in the evaluation task but even in semantic priming tasks. Whereas in the evaluation task prime and target are assumed to be simultaneously activated and to compete for responses, in the semantic tasks the prime is supposed to support the encoding of the target and to be substituted by it (as described, e.g., in distributed memory models).

We aim to develop a model of valence representation that integrates both perspectives –parallel activation of prime and target with the potential of response interferences as well as encoding facilitation. The clue to an empirical test is the additional hypothesis that, if a valence-congruent prime facilitates the encoding of a target, a valence-congruent target may support the maintaining of the prime activation, which therefore has an enlarged potential to interfere with the target-related response.

In three experiments, we used a negative stimulus onset asynchrony to minimize target-encoding facilitation and maximize prime-maintenance. In Experiments 1 and 2 using a semantic categorisation task, significantly higher response conflicts in valence-congruent compared to incongruent prime-target combinations reflect prolonged prime-maintenance. Correspondingly, in the naming task (Experiment 3) we found reversed affective priming because valence-congruent primes compete more strongly for a naming response.
The differential role of modality-specific working memory training in learning Chinese as a second language

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Logographic and alphabetic languages differ in aspects of phonology and orthography, which results in differences in neural networks involved in reading Chinese characters and alphabetic words. Whereas previous research has shown a systematic relationship between phonological working memory (WM) capacity and second language proficiency for alphabetic languages, for Chinese as a second language visuo-spatial WM should be a better predictor of second language proficiency due to the greater visual complexity of Chinese characters.

We investigated the differential impact of visuo-spatial and auditory WM training (n-back training paradigm) while Germans learned Chinese as a second language. The language learning paradigm allows to assess orthographic and phonological proficiency and the two-week WM training was either performed with visuo-spatial or auditory stimuli. Additionally, training induced changes in language-related brain networks were examined using functional magnetic resonance imaging (fMRI). Behavioral data show that the training of visuo-spatial WM leads to larger transfer effects in orthographic proficiency as compared to auditory and no WM training. Consistent with the behavioral results preliminary fMRI analyses suggest that both training groups showed activity in the left visual word form area (VWFA) in the pretest orthographic task. Crucially, only training of visuo-spatial WM leads to decreased VWFA activation indicating more efficient processing of Chinese characters. The results suggest that, consistent with our predictions, the training of visuo-spatial WM leads to higher proficiency in logographic Chinese and to training induced decreased activity in language related brain structures.
Retrieving episodic memory involves two processes: familiarity and recollection. Although associative recognition is traditionally viewed to be largely dependent on recollection, recent research suggests a role for familiarity if to-be-remembered associations between stimuli are perceived as unitized. In this study, we used the Remember/Know paradigm to examine the effect of pre-experimentally existing unitization and experimentally induced unitization on familiarity-based associative recognition. Participants studied word pairs containing a unitized association (intra-item association) or a non-unitized association (inter-item association), under either unitized encoding or relational encoding. At test, participants were required to first make judgment for the old/rearranged word pairs, and then made judgment of remember/knowing for their decision. The results showed that the overall recognition performances were matched between unitized encoding and relational encoding by manipulating the presentation times. When compared between the tasks, the contribution of familiarity was greater after the unitized encoding than that after the relational encoding for both intra- and inter-item associations, whereas the contribution of recollection was greater for inter-item associations after the relational encoding. Moreover, when compared between the two types of pairs, the contribution of familiarity was larger for intra-than inter-item associations under the unitized condition, whereas the contribution of recollection was greater for inter-than intra-item associations under the relational condition. Taken together, these results suggested that both experimentally induced unitization and pre-experimentally existing unitization have effect on the familiarity-based associative recognition.
Visual complexity does not influence visual short term memory consolidation

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Although visual complexity seems to be a limiting factor for visual short term memory (VSTM) capacity, nothing is known about its roles in VSTM consolidation, a process transforming transient perceptual representations into durable VSTM representations. We investigated the influence of physical (number of strokes) and perceived complexity (familiarity with the material) on consolidation. We presented Chinese Characters, pseudo characters, and novel symbols to experts (Chinese readers) and naïve people (Germans) in a change detection paradigm. We manipulated consolidation time by presenting a mask after stimulus offset within different delays. In Experiment 1 and 2, the absolute level of performance decreased if perceived or physical complexity increased. We also observed consolidation. Performances increased with SOA. However, consolidation was not influenced by complexity. In Experiment 3, we ruled out different perceptual speeds as explanation. In a visual search paradigm with the same SOA, performances varied with complexity but not with SOA. These data suggest that VSTM consolidation does not operate on individual features but on perceptual units available at stimulus offset. In Experiment 4, we tested whether these units are spatially organized (retinotopic) or they are abstract units competing for representation in VSTM. Masks interfered only when they appeared in the same location as the memory items. We conclude that consolidation is probably a consequence of attentional selection operating on integrated perceptual units within a retinotopically organized structure.
Action representations in memory – Means versus ends

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Recently, action representations have been linked with inferior frontal and inferior parietal regions. However, working and long term memory have been studied separately and the amount of overlap in action-specific processing is unknown. In a first fMRI study, we investigated working and long term memory processing of action and size information within one sample. As working memory task, we used an S1-cue-S2 paradigm. As long term memory task, a source memory task was applied. Conjunction analyses yielded action specific activations in left inferior frontal, parietal and STS regions. The results suggest that long term and working memory rely on the same action representations.

In a second fMRI study, we elaborated on the type of action representation. Analogous to studies on perception, we expected differential regions to be active during working memory retention of the means and ends of actions. Our data show that regions which are important for visual analysis and motor control were significantly more activated for means as compared to ends information. Furthermore, the differential influence of motor similarity between target and encoding stimulus in the two tasks was analyzed. The results suggest a hierarchical organization of action representations. We necessarily represent the ends of an action whereas its means can be optionally encoded.

Currently, we are conducting a study which focuses on the differential familiarity of some actions in China and Germany. We hypothesize that unfamiliar actions require the representation of means whereas familiar actions do not. I will give a brief overview on the respective paradigm.
The aim of this study is to examine the role of motivational influences on subsequent learning by means of an electrophysiological approach. Specifically, we are interested in the impact of identity-relevant failure on earlier and later stages of performance monitoring in error-induced learning situations.

Research on performance monitoring has identified distinct electrophysiological correlates of error processing, the error-related negativity (ERN or Ne), the feedback-related negativity (FRN), and the error positivity (Pe) that have been linked to separate, though related, functions of detecting and evaluating action outcomes. Given the modulation of the ERN (FRN) by motivational and affective variables, it has been suggested that the ERN (FRN) may not only relate to cognitive but also to motivational and emotional facets of error processing. The Pe has been proposed to reflect error awareness and/or emotional assessment of errors.

Subjects received either no feedback or strong negative feedback while performing a visual search task described as diagnostic of intellectual abilities. Before and after this manipulation, all participants performed a probabilistic learning task in which we manipulated the validity of feedback in order to examine performance monitoring in error-induced learning situations.

Preliminary findings show that (a) the ERN is reduced, (b) FRN is only marginally affected, and the Pe is increased after failure instruction, suggesting that self-relevant failure modulates early and late stages of error monitoring processes.
Neuroanatomy and modulation of visuospatial disorders

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Visuospatial disorders frequently occur after right-hemispheric lesions (Perennou, et al., 2008). They encompass for instance difficulties in line orientation judgements (De Renzi, Faglioni, & Scotti, 1971) or length and distance estimation (Kerkhoff, 2000) and predict an adverse rehabilitation outcome (Kaplan & Hier, 1982). By now only few data exist on the underlying neuroanatomy as well as the treatment of visuospatial disorders. Hence, study 1 deals with the identification of typically lesioned brain areas in patients with different visuospatial deficits. Patients with unilateral vascular right-hemispheric lesions will conduct several visuospatial tasks. Performance will be correlated with the lesion overlap of the patients´ structural MRI-/CT-Scans applying MRicro software (Rorden & Brett, 2000).

A counterclockwise tilt of the subjective visual and haptic vertical is a prevalent deficit after right-hemispheric lesions (Kerkhoff & Zoelch, 1998). Saj et al. (2006) showed modulatory effects of the subjective visual vertical in the roll plane in right-brain-damaged patients by galvanic vestibular stimulation (GVS). GVS is a noninvasive technique that modulates cortical excitability via application of weak direct currents. In study 2 we thus aim to investigate the modulation of the subjective visual and haptic vertical in the sagittal plane by GVS under different stimulation conditions. Additionally after-effects of GVS will be measured 120 minutes after the end of stimulation. Patients with visuospatial deficits due to unilateral right-hemispheric lesions will be compared to right-brain-damaged patients without visuospatial deficits and age-matched healthy persons.
In this research, we take familiarity and complexity as two main features of action, and try to find out how they affect action acquisition and representation for preschool children in two different cultures. According to the two-route models, familiar actions are stored in long-term memory, and interpreted through a lexical-semantic i.e. indirect route; while unfamiliar actions are interpreted through a sublexical i.e. direct route, which pose greater demands on working memory, as they must rely on online processing without stored representation. Furthermore, compare with simple actions, complex actions demand more cognitive processing resources. Finally, many previous researches assume that imitation is goal directed and actions are represented by ends. But most of them only use known and simple actions such as reaching and grip in experiments. Here we hypothesize that familiar and simple actions are represented by ends, while unfamiliar and complex actions are represented by means.

We will test preschool children in both cultures with elaborate action video materials, using recognition memory paradigms to test action acquisition and imitation paradigms to test action representation. In pilot study, we recruited kindergarten teachers and children to rate our carefully chosen actions for grouping. In the first study, four sets of actions combined by familiar and unfamiliar actions with simple and complex actions will be examined. Poorer performance on unfamiliar and complex actions is expected. Study 2 follows to check whether there is experimental dissociation in the cross-culture different actions between Chinese and German children. In study 3, means and ends of the actions will be manipulated. We anticipate that children in both cultures will concentrate on means for familiar and simple actions, and on ends for unfamiliar and complex actions.
The affective priming effect indicates that a valenced target is responded to faster after the presentation of an affectively congruent prime than after an affectively incongruent prime. Such effect has been confirmed by using alphabetic words and pictures as primes and targets, in spite of the disagreement in its underlying mechanisms. The present doctoral dissertation emphasizes on this affective priming effect and its mechanisms in the context of a non-alphabetic language, i.e., the Chinese language. With its ideographic nature, Chinese characters add a new means in the affective priming field. In Experiment 1, using two-character words as primes and targets, we found the usual priming effect in the evaluation task (i.e., participants categorize targets as either positive or negative), thereby establishing the basic phenomenon for the Chinese language. For Experiment 2, simple and left-right structured complex characters (with semantic and phonetic radicals) were selected. Remarkably, we failed to obtain priming effects. On the contrary, we found evidence for reversed effects. This result might indicate that response interference explanations of affective priming are too simplistic.
Decompose the temporal structure of memory in dynamic 3D object learning and recognition

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This study was set up to explore the process of motion in dynamic object recognition from two perspectives: 1) we examined the effect of an important perceptual constraint, named sequence smoothness, on the dynamic object recognition task; 2) we tried to take a scrutiny into the memory structure by isolating different dynamic features under specific perceptual conditions. The paradigm we used was modified from the classical reversal paradigm (Stone, 1998), which was considered to be sensitive to the process of direction cue. And we manipulated the sequence dynamics to generate spatiotemporal unsmooth sequences with available directional features of different time scales.

In a series of five experiments, we demonstrated that sequences’ smoothness was not a perceptual constraint for people to encode and use the motion direction for recognition. The remarkable ability of perceptual adaptation under cognitive organization made the observers perceived the sequences as rotating in a regular way most of the time, despite the various physical scramble manipulations we had used. We also revealed that the temporal structure of dynamic object memory was decomposable by isolating dynamic features of different temporal scales. We discussed these results in a frame of cognitive organization which interacted with the perception of 3D objects. Tolerance of certain dynamic variation made it possible for human to recognize object moved in different manner. At the same time, the automatic organization of view sequence required some dynamic features, such as temporally global and local dynamics, to be extracted.
Predicting school success: 
The role of working memory capacity, intelligence and motivation

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The main goal of the present study is to determine the relative contribution of cognitive (intelligence, working memory) and non-cognitive variables (motivation, parenting, and involvement) to the prediction of school success. Whereas the importance of general intelligence regarding school success is well documented, less is known about the role of working memory capacity as a major cognitive predictor in the school context. Motivation, as one of our main non-cognitive variables, can contribute beyond cognitive factors to individual differences in school success (Spinath et al., 2005; Steinmeyer & Spinath (2009)). The simultaneous assessment of working memory capacity and non-cognitive variables in the same empirical study, however, is a new approach aimed at identifying factors which influence school success in young children.

Our sample consists of 290 German primary school children between 9 and 10 years of age. The assessment of working memory capacity and intelligence took place in the classroom. All non-cognitive variables were measured via questionnaires answered by children and parents at home.

At the IRTG Fall School 2009, we will report results from regression analyses and communality analyses demonstrating the incremental validity of motivation over and above working memory and intelligence.

Working memory and intelligence explain a significant and similar amount of variance, but motivational variables also contribute to the prediction of school success, even when cognitive influences are controlled.
Cure the low prevalence effect

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Airport X-ray luggage screening is a socially important visual search task with very low target prevalence. Wolfe J M., et al (2005) found that miss errors increased markedly when target prevalence was low in X-ray luggage screening tasks, which is the low prevalence effect, and they proposed that it was caused by shifts of decision criteria. But Mathias S. Fleck and Stephen R. Mitroff (2007) found that misses were often due to response-execution errors, not perceptual or identification errors, if they corrected their responses, the low prevalence effect could be cured. Author’s precious study showed that observers’ decision criteria didn’t change as the prevalence decreased in low visual complexity. This study was aimed to find out the main influence factors of the low prevalence effect and the means to cure it.

First, the author would repeat Mathias S. Fleck’s experiment; however we will use ERP to find ERN (Error-related negativity). This experiment has two blocks, one is that Observers could corrected their response, and the other they could not.

Second, we would insert pseudo-target to increase the prevalence.

Third, the observers’ payoff would be related to their performance, they will get very much if their hit the target many times, on the contrary, they get little.

The influence of low prevalence effect is very complex, but if we could find out the main factors and cure the effect, the airport may be safer.
In skilled readers of alphabetic language, written words consistently evoke left-lateralized N170, which is thought to reflect process of visual word form. It remains debated whether the left-lateralized N170 effect for alphabetic words would extend to logographic characters. In the present study, the N170 evoked by Chinese characters were compared to other visual control stimuli, namely stroke combinations, faces, and line drawings of common objects. To minimize the task modulation effects, participants were required to perform a content-irrelevant one-back color matching task. The amplitude of the N170 evoked by Chinese characters was significantly larger than that by stroke combinations, and the peak latency was much shorter. More importantly, this effect was especially evident over the left hemisphere and was observed only for characters but not for faces or line drawings. These findings together indicate that the left hemisphere plays a dominant role in early specialized visual processing of Chinese logographic characters.