

Embodied & Situating Language Processing

Program



28-29 July 2009
Erasmus University Rotterdam
The Netherlands



On July 28-29, the Annual Meeting of the Embodied & Situated Language Processing will be held in Rotterdam, the Netherlands, at the Golden Tulip Hotel, hosted by the Department of Psychology, Erasmus University Rotterdam.

Organizing committee:

Pia Knoeferle (University of Bielefeld, Germany)

Diane Pecher (Erasmus University Rotterdam, The Netherlands)

Rolf Zwaan (Erasmus University Rotterdam, The Netherlands) (Chair)

Keynote speaker:

Art Glenberg (Arizona State University, USA)

Registration:

There will be on-site/cash-only registration. The fees are €40,- for students and €80,- for non-faculty.

Papers and posters

Posters are scheduled for the joint poster session with the Society for Text & Discourse (<http://research.psyweb.nl/std2009/>) on Tuesday. Posters should be in PORTRAIT format, size A0 84 x 119 cm (33.6 x 47.6 inches) max.

Papers for symposia are scheduled for 20 minutes, with an additional 5 minutes for questions and discussion.

Tourist Information Rotterdam

Musea

Cultural life is vibrant in Rotterdam. There is a broad selection of museums in Rotterdam. From modern art to historical treasures, from architecture to photography, from historical ships to exotic animals - just about anything you can imagine is displayed in a museum in the city. Prominent museums that are worth a visit.

- The Museum Boijmans van Beuningen
<http://www.boijmans.rotterdam.nl/nl/>
- The Netherlands Architecture Institute
<http://www.nai.nl/>
- The Kunsthal
<http://www.kunsthal.nl/>
- The World Arts Museum
<http://www.museum.nl/index.cfm/museum/Wereldmuseum-World-Arts-Museum/EN/true>
- The Maritime Museum Nearby the Golden Tulip Hotel
http://www.maritiemmuseum.nl/website/index.cfm?itm_id=96
- The Netherlands Photo museum
<http://www.nederlandsfotomuseum.nl/index.php?lang=en>
- The Historical Museum of Rotterdam
<http://www.okbn.nl/gids/rot01.php>

In addition, there are many interesting galleries and provocative expositions at locations such as the Las Palmas warehouse.

- http://www.benthecrouwel.nl/portal_presentation/culture/las-palmas
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Restaurants

Rotterdam is a city of many flavors like the Dutch, French, Chinese, Indonesian, Moroccan and Turkish cuisine. You name it, you can find it in Rotterdam. There are many reasonably prized restaurants but also luxurious dinner venues for an exclusive business lunch or meetings and incentives. From a simple pub, or a trendy place like the Westelijk Handelsterrein (<http://www.wht-rotterdam.nl/>) to one of the best restaurants of Holland: Parkheuvel (<http://www.parkheuvel.nl/indexengels2.html>). A restaurant such as 'Wijn of Water' (<http://www.wijnofwater.nl/>) stands apart by its experimental setting; eating and drinking from a sea container in a beautiful harbor environment. Also, the Witte de Withstraat is a good place to go to (<http://www.nlstreets.nl/EN/shopping/rotterdam/witte-de-withstraat--116/>). Tasteful restaurants and trendy stores dominate the streets atmosphere. The many cultural influences create a unique ambience and paint an accurate picture of Rotterdam's versatile lifestyle.

You can find Architecture, Hotels, Attractions, Museums, Restaurants, Theatres and Shops at: <http://www.rotterdam.info/uk/>. A map from downtown Rotterdam will be included in the welcome package and can also be downloaded from the following site: <http://www.rotterdam.info/Brochures/Citymap.asp>.

Hotel Map

Coming soon.

Program Summary

Tuesday, 28 July

- 09:00–10:40 Embodied Cognition
- 10:40–12:00 Poster Session
- 12:00–13:00 Keynote Address Art Glenberg
- 13.30-15.10 Presentation Session I (Floor/ Room)
- 15.10-15.25 Coffee break
- 15.25-17.05 Presentation Session II (Floor/ Room)

Wednesday, 29 July

- 09.00-10.40 Presentation Session III (Floor/ Room)
- 10.40-10.50 Coffee break
- 10.50-12.30 Presentation Session IV (Floor/ Room)
- 12.30-13.30 Lunch
- 13.30-15.10 Presentation Session V (Floor/ Room)
- 15.10-15.25 Coffee break
- 15.25-17.05 Presentation Session VI (Floor/ Room)

End of Conference

Tuesday, 28 July

9:00-10:40 Embodied Cognition (East Room)

East Room

Embodied Cognition (together with the Society for Text & Discourse)

Chair: Katinka Dijkstra

09:00-9:15 **Simulation in narrative comprehension: The effect of similarities and dissimilarities on personalities between readers and protagonists**

Hidetsugu Komeda, Kohei Tsunemi, Keisuke Inohara, Takashi Kusumi (ST44)

09:20-09:35 **Language Affects Effector-specific Response Force**

Lawrence Taylor, Rolf Zwaan (ST45)

09:40-09:55 **Eye Movements To White Space While Reading Highly Visualizable Text**

Brent Strickland, Rihana Williams (ST46)

10:00-10:15 **Copresence in Collaborative Music-Making**

Michelle F. Levine, Michael F. Schober (ST47)

10:20-10:35 **Implied shape and orientation: Is the match/mismatch effect word- or sentence-based?**

Barbara Kaup, Jana Ludtke (ST48)

10:40-12:00 Poster Session (next page)

Tuesday, 28 July

Poster Session

10:40-12:00

E for ESLP Posters (E47-E80)

E47: Visualizing polysemy structures using LSA and predication algorithm

G. Jorge-Batana, J.A. Léon, R. Olmos

E48: The Effect of Early Activation of Pertinent Perceptual Symbols in Language Comprehension

K. Pepera, I. Tapiero

E49: Gaze Grounds Meaning in Situated Human-Robot Interaction

M. Staudte, M.W. Crocker

E50: The representation of the temporality of events as a dynamic process: The effect of mental simulation

E. Peyroux, I. Tapiero

E51: Language about force modulates response force

L. Taylor, R. Zwaan

E52: Language independence in bilinguals during sentence comprehension

L. Vandenberg, R. Zwaan

E53: Embodiment Processes in Abstract Concept Learning

M.L. Lorusso, M. Burigo, A. Milani, L. Pigazzini

E54: "Iconic" Memory: The Effect of Spatial Iconicity and Word-Order Frequency on Relatedness Judgments and Recognition Memory

C.A. Kurby, C. Tse, F. Du

E55: Object-size and case-marking effects in the appropriateness of sentences describing scenes

E. Miyamoto, S. Tanigawa, T. Iizuka

E56: Situated Language Learning

J. Koehne, M. Crocker

E57: Attributing causality in multimodal language-graphics comprehension

C. Acarturk, C. Habel

Tuesday, 28 July

E58: Quantity in different sentence contexts: The role of Verticality

I. Boot, D. Pecher

E59: Integration of the Temporal Dimension into a Spatial Situation Model Depending on the Verb Used in a Spatial Instruction

C. Vorweg, P. Weiß

E60: Modal-Specific Load Incurs Processing Costs: Explaining Interference in the Stroop-Task

J. Weijers, D. Lakens, H. IJzerman, P. Cool

E61: How do experience and language contribute to the representation of abstract concepts?

P. Della Rosa, E. Catricalà, G. Vigliocco, S.F. Cappa

E62: Semantic domain-specific functional integration for action-related vs. Abstract concepts

M. Ghio, M. Tettamanti

E63: Representations of events are situated where the experienced changes of related states are retained

T. Welke, K. Nowack, G. Schaadt, E. van der Meer

E64: Simulating in progress and completed events

C.J. Madden, M. Hoen, P. Ford Dominey

E65: Insights into the dynamics of the interaction of language semantics, attention and perception

S. Lindsay, L. Meteyard

E66: Hands-on experience: Gestures as embodied activities

U. Sassenberg, E. van der Meer

E67: Does reading about a protagonist who is pressed for time speed up reading and response times?

B. Kaup, J. Lüdtke

E68: Manipulation and function similarity predict degree of neural overlap for objects: Evidence from fMRI-adaptation

E. Yee, D.M. Drucker, S.L. Thompson-Schill

E69: Sensory contributions to simulations

R. Becker, M. Gonzalez

Tuesday, 28 July

E70: Irony and embodiment: Evidence from the movement-compatibility effect

R. Filik, C.M. Hunter, H. Leuthold

E71: Look but don't touch: Haptic disadvantage in conceptual processing

L. Connell, D. Lynott

E72: Effects of linguistic and visuo-spatial semantic relations on pronoun interpretation

E. Kaiser

E73: Flexing versus Extending: Approach-Avoidance Actions Affect the Processing of Desiderative-Mood Sentences

B. Claus, R. Bader

E74: Visual Working Memory in Situated Language Comprehension

E. Ellsiepen, M. Crocker

E75: Unmovable physique makes unshakable beliefs? The Role of Attention in Processing Abstract Thought

M. Bos, H. IJzerman (shared 1st authorship)

E76: Does how you feel matter to how you read? The effect of mood on language comprehension

D. de Goede, P. van Alphen, E. Mulder, J. Kerstholt, J. van Berkum

E77: What does it mean to work? Examining the functional neuroanatomical correlates of verbally implied action

M. Nieuwland, T. Ditman, G. Kuperberg

E78: Understanding number names affects visual processing

A. Myachykov, M. Fischer

12.00 End of Poster Session

12:00-13:00 Keynote Address Art Glenberg (East Room)

Tuesday, 28 July

13.30-15.10 Presentation Session I

Presentation Session I

13.30-13.55 **Body-specificity of emotional valence in language, thought, and gesture.**
D. Casasanto, K. Jasmin, J. Verhagen, M. van Rees, Vellinga (ET01)

13.55-14.20 **Spatial Language and Motor Resonance**
K. R. Coventry, R. O'Ceallaigh (ET02)

14.20-14.45 **Untitled**
M. Sato, D.X. Hall, B.K. Bergen (ET03)

14.45-15.10 **Patterns of alignment in dialogue: Conversational partners do not always stay aligned on common object names**
P. Weiss, O. Pustynnikov, A. Mehler, S.M. Hellmann (ET04)

15.10-15.25 Coffee break

15.25-17.05 Presentation Session II

Presentation Session II

15.25-15.50 **Indexing neural correlates in a connectionist model of situated comprehension**
M. Crocker, M. Mayberry, P. Knoeferle (ET05)

15.50-16.15 **Updating mental simulations during sentence comprehension: a computational model**
S. Frank (ET06)

16.15-16.40 **Investigating connectionist semantic systematicity in a block microworld**
I. Farkaš, M.W. Crocker (ET07)

16.40-17.05 **Situated language acquisition and Processing in integrative connectionist models**
H. Weldle, L. Konieczny, D. Müller, S. Wolfer, P. Baumann (ET08)

09.00-10.40 Presentation Session III

Presentation Session III

9.00-9.25 Variation in the time course of visual context influences: immediate versus delayed effects on sentence comprehension
P. Knoeferle, T.P. Urbach, M. Kutas (ET09)

9.25-9.50 Linguistic and Perceptual Tasks Activate both Linguistic and Embodied Representations
M. Louwerse, P. Jeuniaux (ET10)

9.50-10.15 Concepts are not represented by imagery
D. Pecher, S. van Dantzig, H.N.J. Schifferstein (ET11)

10.15-10.40 Earlier Concrete Words and Later Abstract Ones May Ground Meaning
O. Picard, A. Blondin-Massé, Y. Gargouri, S. Harnad (ET12)

10.40-10.50 Coffee break

10.50-12.30 Presentation Session IV

Presentation Session IV

10.50-11.15 Why Your Highness Needs the People: Differences in Power are Represented in Space
D. Lakens, G.R. Semin, F. Foroni (ET13)

11.15-11.40 Left-Right Coding of Past and Future in Language
C. Maienborn, R. Ulrich (ET14)

11.40-12.05 Situated Conceptualization of Emotion and Abstract Concepts
C. Wilson, L. McDonough, L. Feldman Barrett, W.K. Simmons, L.W. Barsalou (ET15)

12.05-12.30 'To smile' means a smile: embodied grounding of emotion language processing
F. Foroni, G.R. Semin (ET16)

12.30-13.30 Lunch

Wednesday, 29 July

13.30-15.10 Presentation Session V

Presentation Session V

- 13.30-13.55** **Untitled**
S. Anderson, S. Huette, T. Matlock, M. Spivey (ET17)
- 13.55-14.20** **Fast cash and slow snakes: Selective responding to affective words**
Z. Estes, P. Thompson, M. Verges (ET18)
- 14.20-14.45** **Neural basis of match-effects – lessons learned from target processing**
G. Hirschfield, P. Zwitserlood (ET19)
- 14.45-15.10** **The force is with you... or would have been with you. An fMRI study of action language**
M. de Vega, M. Urutia, S. Gennari (ET20)

15.10-15.25 Coffee break

15.25-17.05 Presentation Session VI

Presentation Session VI

- 15.25-15.50** **The Quick and Detailed: The speed of Movements Influences the Construal Level of Goals**
M. Parzuchowski, A. Szymkow-Sudziarska, J. Chandler (ET21)
- 15.50-16.15** **Untitled**
E. Chiu, M.A. Hoover, J.R. Quan, B. Bridgeman (ET22)
- 16.15-16.40** **When do we embody language? Neural evidence for context-dependent motor resonance**
M. van Elk, H. van Schie, R. Zwaan, H. Bekkering (ET23)
- 16.40-17.05** **Motor resonance: Word or context-driven?**
R. Zwaan, F. Quist, J.W. van Strien (ET24)

End of Conference

ESLP Presentations Index

ET01: Body-specificity of emotional valence in language, thought, and gesture.

D. Casasanto

Max Planck Institute for Psycholinguistics
The Netherlands

K. Jasmin

J. Verhagen

M. van Rees Vellinga

Abstract:

According to the body-specificity hypothesis (Casasanto, 2009, JEP:G), people with different bodily characteristics should form correspondingly different concepts and word meanings. To the extent that abstract concepts and word meanings are constructed metaphorically based on perceptuomotor experiences, these too should be body-specific. A series of experiments tested whether abstract ideas with positive or negative emotional valence are represented differently in right- and left-handers, who interact with their environments more fluently on their dominant side of space. In laboratory experiments, right- and left-handers revealed contrasting associations between space and valence, each group associating positive ideas with their dominant side and negative ideas with their nondominant side. This pattern was corroborated by analyses of right- and left-handers' spontaneous speech and gesture. Finally, training experiments demonstrated that asymmetries in motor experience can create implicit body-specific mappings between valence and space in language, thought, and gesture.

ET02: Spatial Language and Motor Resonance

K.R. Coventry

Northumbria University
United Kingdom

R. O'Ceallaigh

Hanse Institute for Advanced
Studies
Germany

Abstract:

Spatial language comprehension is affected by *where* objects are in space, *what* those objects are, and *how* they interact with each other (Coventry & Garrod, 2004). In this paper we ask whether how we interact with objects affects spatial language comprehension. Across a series of studies utilising touch screen technology, participants were instructed to move objects on the screen in accordance with spatial instructions of the form 'Place object A PREPOSITION object B'. In one study participants moved the objects either using a pinch grasp consistent with afforded interaction with the object to be moved, or using the same hand position but rotated 180 degrees (an atypical interaction). Placements measured relative to the functional part of the reference object (e.g., a toothbrush) were more 'functional' when the object was moved with the typical rather than the atypical pinch grasp. This series of studies unpacks how object knowledge, motor affordance and location knowledge 'mesh' together to determine situation-specific spatial language comprehension.

ET03: Untitled**M. Sato**University of Hawaii at
Manoa
USA**D.X. Hall**University of Hawaii at
Manoa
USA**B.K. Bergen**University of Hawaii at
Manoa
USA**Abstract:**

Mental simulation often adopts particular perspectives (Borghetti et al, 2004; Brunye et al, 2008). We investigated whether simulation is perspectival even without explicit perspective markers (e.g. pronouns) in a sentence.

Experiment 1: Japanese speakers read three sentences with subject pronouns in Japanese and then decided if a depicted event was mentioned in the last sentence. The picture depicted the event from an internal or external perspective. Replicating previous work on English, responses were significantly faster when the picture matched the perspective implied by the pronouns - 2nd person facilitated internal perspective while 3rd person facilitated external perspective ($F_{s>5}$).

Experiment 2: We removed subject pronouns from the third sentence (in Japanese, contextually retrievable subjects are omissible). Though the subjects were retrievable, the absent pronouns eliminated the compatibility effect seen in experiment 1 ($F_{s<1}$). Perspective in simulation is ephemeral and subject to decay if not reinforced by immediate linguistic cues.

ET04: Patterns of alignment in dialogue: Conversational partners do not always stay aligned on common object names**P. Weiss****O. Pustynnikov****A. Mehler****S.M. Hellmann****Abstract:**

To examine communicative coordination on different linguistic levels we developed the *Jigsaw Map Game*, a flexible design permitting to investigate language processing in interactive conversation in a natural but controlled way. In an experiment on the locality of alignment effects an analysis of how partners apply object names in the course of the dialogues shows that 'easily coordinated' dialogues can lead to divergence of aligned representations: Partners sometimes get lexically aligned during conversation but later again drift apart ("anti-alignment"). Highly coordinated dialogues may under certain conditions be too easy seducing participants to introduce a greater variety of names in later stages of the conversation. We identify characteristics of smooth vs. problematic dialogues and discuss our results regarding criteria for efficient interactions. From a methodological point of view we additionally provide a quantification in terms of an alignment measure which abstracts from the operative level of linguistic alignment.

ET05: Indexing neural correlates in a connectionist model of situated comprehension**M. Crocker**Saarland University
Germany**M. Mayberry**Saarland University
Germany**P. Knoeferle**University of Bielefeld
Germany**Abstract:**

Most implemented accounts of sentence comprehension are informed by reading time behavior, failing to address how language processing mechanisms are situated both in the world and within the brain. We extend CIAnet - a simple recurrent network that models how attention shifts to linguistically relevant

scene objects during comprehension (Mayberry, Crocker & Knoeferle, in press)- to model recent ERP findings from situated comprehension (Matzke, Mai, Nager, Rüsseler & Münte, 2002). We propose a linking hypothesis that maps changes in the hidden-unit activations during the transition from word_{i-1} to word_i onto ERP components. We identify a subset of hidden units that index the P600 found in initially ambiguous German OVS sentences both at the case disambiguating second NP (no scene), and at the preceding verb region when a co-present scene provided disambiguating event information. A second, largely distinct, group of hidden units is also shown to index the sustained LAN that has been found for OVS versus SVO structures (Knoeferle, Habets, Crocker & Münte, 2008) .

ET06: Updating mental simulations during sentence comprehension: a computational model

Stefan Frank

University of Amsterdam
The Netherlands

Three fairly uncontroversial claims about sentence comprehension are:

1. A sentence's interpretation is updated after each incoming word.
2. A word's reading time depends on its impact on the interpretation of the sentence-so-far.
3. The meaning of a declarative sentence is represented by mentally simulating the described state-of-affairs.

Point 2 was formalized in 'surprisal theory' (Levy, 2008), predicting a negative correlation between reading times and word probabilities. Although this was confirmed using syntax models for probability estimation, point 3 above suggests that the reader's *world knowledge* should also affect reading times. The model by Frank et al. (2009) simulates sentence comprehension as the construction of a non-symbolic vector representation of the state-of-affairs described by the sentence. It provides all necessary ingredients for defining word probabilities based on world knowledge. I will show how the model can be extended with a dynamical process for word-by-word update of representations, leading to predictions of word-reading times in accordance with surprisal theory.

ET07: Investigating connectionist semantic systematicity in a block microworld

I. Farkaš

Comenius University
Slovak Republic

M.W. Crocker

Saarland University
Germany

Abstract:

Demonstrating systematic behavior is a continuing challenge for connectionist networks in their pursuit to become a plausible explanation of human cognition, alternative to classical symbolic models. Connectionist models of sentence comprehension must behave systematically by being able to generalize properly. Most recent connectionist models utilize propositional representations of sentences. We instead follow a path (initiated by Frank) employing situation models, motivated by the hypothesis that imagining the situation also underlies human comprehension. The situation model consists of a recurrent neural network that, reading one word at a time, maps sentences describing situations, onto representations of these situations. The situation representations, built off-line, reflect structural regularities in the microworld, and serve as targets for the recurrent network. After training, the model must understand new sentences, describing either known or new situations. We test the model in a simplified microworld consisting of various blocks in different positions, and investigate potential modifications of the model to enhance comprehension performance.

ET08: Situated language acquisition and Processing in integrative connectionist models

H. Weldle
University of Freiburg
Germany

D. Müller
University of Freiburg
Germany

P. Baumann
University of Freiburg
Germany

L. Konieczny
University of Freiburg
Germany

S. Wolfer
University of Freiburg
Germany

Abstract:

We present a series of connectionist simulation studies for the integrated acquisition of syntactic knowledge and meaning. In one study, networks were simultaneously trained with linguistic input, i.e. sequences of words, and dot patterns on a visual retina. The networks learned a. to identify a small number of objects in the dot patterns, b. their spatial relation to each other on the retina, showing up in a condensed prototypical image of the retinal input in the imaginal output layer, c. produce such images from language input only, d. focus on only those elements in the input that are mentioned in the language input, e. produce language that reflects the visual input. The second model used extended SRNs to successfully simulate reference binding and anaphora resolution processes. We explore the role of holistic parallel training regimens forcing networks to develop integrative representations giving rise to syntactic bootstrapping and situated inference mechanisms.

ET09: Variation in the time course of visual context influences: immediate versus delayed effects on sentence comprehension

P. Knoeferle
University of Bielefeld
Germany

T.P. Urbach
University of California at San
Diego
USA

M. Kutas
University of California at San
Diego
USA

Abstract:

Numerous studies have shown that visual context can influence online language comprehension already 200 ms after an object has been mentioned, and existing theories typically assume visual context is rapidly used during comprehension. It is unclear, however, whether rapid scene influences are invariant across individual participants or oftentimes delayed (e.g., for participants with low visual and / or verbal working memory). Across participants, we replicated existing findings of immediate influences of recent visual context on sentence interpretation. Crucially however, the time course of visual context influences differed as a function of participants' verbal working memory: high verbal working memory scores in a participant coincided with immediate visual context effects during sentence processing while participants with low verbal working memory used visual context with considerable delay.

In sum, predictions about the time course of visual context influences on comprehension must be qualified with verbal working memory capacities.

ET10: Linguistic and Perceptual Tasks Activate both Linguistic and Embodied Representations

M. Louwerse
University of Memphis
USA

P. Jeuniaux
University of Memphis
USA

Abstract:

Recent theories of cognition have proposed that cognition is fundamentally embodied, thereby reacting against theories that proposed cognition is fundamentally symbolic. In previous work we have argued that both linguistic and embodied representations are activated, each more prominently under different

conditions. Four reaction time experiments were conducted to determine these conditions. Participants performed semanticity or iconicity judgment tasks on either linguistic or pictorial stimuli. Mixed-effect regression models using word-order frequency (linguistic) and iconicity ratings (perceptual) as factors showed that linguistic factors explained RT better for linguistic stimuli than pictorial stimuli, with the opposite result for embodied factors. Moreover, linguistic factors explained RT better in the semantic task than the iconicity task, with the opposite for embodied factors. These findings support the view that cognition is both symbolic and embodied, with a bias dependent on the task at hand.

ET11: Concepts are not represented by imagery

D. Pecher

Erasmus University Rotterdam
The Netherlands

S. van Dantzig

H.N.J. Schifferstein

Abstract:

Concepts are represented by modality specific processes that are similar to the processes that are involved in perception (van Dantzig, Pecher, Zeelenberg, & Barsalou, 2008). We investigated whether this phenomenon can be explained by perceptual imagery. Participants filled out questionnaires to assess the vividness of their imagery (QMI) and the extent to which their imagery was object oriented and spatially oriented (OSIQ). They also performed a mental rotation task. One week later they performed a verbal property verification task. In this task, involvement of modality specific systems is evidenced by the modality switch effect, the finding that performance is better if the previous trial had a property from the same modality than if it had a property from a different modality. Results showed a modality switch effect, but there was no relation between imagery scores and modality switch. We conclude that mental imagery is not fundamental to conceptual representation.

ET12: Earlier Concrete Words and Later Abstract Ones May Ground Meaning

O. Picard

Université du Québec à
Montréal
Canada

Y. Gargouri

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S. Harnad

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Abstract:

Word meanings are encoded in our dictionaries and embodied in our brains. You can learn a word from a dictionary, but a definition is just words too: meaning can't be words all the way down. This is the symbol grounding problem. We have algorithmically reduced dictionaries to a unique "grounding kernel" (GK) of about 10%, from which the remaining 90% can be reached through definition alone. The GK is significantly more concrete and learned younger, but if we partial out age, the GK residual is significantly more abstract. The GK is unique, but not minimal. Another algorithm is further reducing the GK toward "minimum grounding sets" MGS: Intermediate GSs – smaller than GK but not yet minimal – are also more concrete and learned younger than the rest of the dictionary, but partialling out age does not reverse their residual correlation with concreteness, it just makes it zero. MGS(s) may be a more concrete core

and the rest of the GK a more abstract surround, acquired later, and jointly able to ground the rest of our mental lexicon.

ET13: Why Your Highness Needs the People: Differences in Power are Represented in Space

D. Lakens
University of Utrecht
The Netherlands

G.R. Semin
University of Utrecht
The Netherlands

F. Foroni
Free University of
Amsterdam
The Netherlands

Abstract:

An embodied cognition approach to abstract thought relies on the assumption that abstract concepts are grounded in concrete sensory-motor experiences. Schubert (2005) has argued that power is represented in vertical space: UP activates the concept powerful, DOWN activates the concept powerless. We propose a reversed underlying process: Differences in power activate vertical representations of the powerful above the powerless. If so, the powerful is UP representation should occur only in the context of powerless groups. Five studies revealed that power ratings and vertical placement of words describing powerful groups were influenced by the presence of powerless groups, but not vice versa. People translated powerful words above chance by Chinese ideographs presented on the top of the screen. This effect disappeared when power was manipulated between participants. These studies support the view that differences in power are expressed in vertical space, whereby people with power are placed above the rest.

ET14: Left-Right Coding of Past and Future in Language

C. Maienborn
R. Ulrich

The 'grounded cognition' approach emphasizes that abstract concepts, like time, are represented in terms of concrete dimensions such as space. Particularly strong support for such a link between temporal cognition and spatial experience comes from recent response time studies reporting congruency effects between the dimensions of time and space. These studies suggest a mental timeline which runs from left to right. We will report the results of two experiments that examined this congruency effect when participants processed past- and future-related sentences. The first experiment showed that response time was shorter when past-related sentences required a left-hand response and future-related sentences a right-hand response than when this mapping was reversed. This is consistent with the idea that time is mentally represented from left to right. The activation of these space-time associations, however, appears to be non-automatic as shown by the results of our second experiment.

ET15: Situated Conceptualization of Emotion and Abstract Concepts

C. Wilson
Emory University
USA

L. Feldman Barrett
Emory University
USA

L.W. Barsalou
Emory University
USA

L. McDonough
Emory University
USA

W.K. Simmons
Emory University
USA

Abstract:

The dominant approach to studying emotion attempts to identify a diagnostic biological pattern for experiences that can be categorized using the same linguistic label, like “fear.” Evidence increasingly suggests, however, that situational content, such as setting, event, and thematic information, shapes concepts dynamically. We investigated the role of situational content in two neuroimaging experiments. Participants processed four concepts (fear, anger, plan, observe) in physical danger vs. social evaluation situations. In Experiment 1, they received a situation, heard a mental state word, and then rated to the ease of experiencing the mental state in the situation. In Experiment 2, participants heard a mental state word, received a situation, and then rated the situation’s typicality. We predicted that different activation patterns would occur for the same mental state concept across the two situation types. Results support these predictions, indicating that conceptualizing an emotion is a context-sensitive, dynamic process.

ET16: ‘To smile’ means a smile: embodied grounding of emotion language processing

F. Foroni
Free University Amsterdam
The Netherlands

G.R. Semin
Utrecht University
The Netherlands

Abstract:

Embodied grounded models of cognition and language processing suggest that concepts such as a smile and the verb ‘to smile’ are grounded in simulations of actual experiences with instances in sensory-motor systems. It is known that this is true for visual stimuli (e.g., Dimberg, Thunberg, & Elmehed, 2000). We predicted and revealed that this applies also to language: verbal stimuli that map emotional expressions (verbs of action, e.g., ‘to smile’) give rise to the same muscle resonance (i.e., facial muscle activity). Language that unambiguously maps affective facial expressions is not amodal but bodily grounded. We also tested whether this muscle resonance guides our judgment. We show that indeed our judgment is shaped by *verbal stimuli* that map facial expressions. As expected, this effect is present only when our muscles are free to synchronize and not when muscle activation is blocked. The results support the notion that language processing is embodied.

ET17: Untitled**S. Anderson**

University of California at
Merced
USA

T. Matlock

University of California at
Merced
USA

S. Huettenlocher

University of California at
Merced
USA

M. Spivey

University of California at
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USA

Abstract:

Negated statements like “The eagle is not in the sky” have been argued to involve a multi-stage process with the core being an affirmative proposition, and there is evidence to suggest that readers generate perceptual simulations of the affirmative version of the event. In two experiments, we explored whether constraining the number of possibilities can facilitate perceptual simulation and memory of the correct event.

In Experiment 1, preceding contexts constrained the number of possible interpretations of negated propositions. The results are consistent with previous research, with binary contexts not significantly improving memory for negated propositions. In Experiment 2, the sentences described binary situations (i.e., if a coin is not heads up, it is necessarily tails up). Our results are consistent with earlier findings for the increased complexity of negation, but they also indicated that a negated sentence can be perceptually simulated.

ET18: Fast cash and slow snakes: Selective responding to affective words**Z. Estes**

Warwick University
USA

P. Thompson

Warwick University
USA

M. Verges

Warwick University
USA

Abstract:

Negative words such as “spider” and “coffin” tend to elicit slower responses than positive words such as “kitten” and “cradle” in most cognitive tasks, including color naming and lexical decision. This has led some researchers to speculate that negative stimuli induce a generalized motor suppression akin to the freezing response observed among many other species. We report a series of experiments demonstrating that, under certain conditions, negative stimuli actually elicit faster responding than positive stimuli. In particular, negative words elicit slower responses when the valence of a word is irrelevant to responding. But when valence is relevant, then negative words elicit faster responses. These results indicate that negative stimuli do not induce a generalized motor suppression. Rather, humans respond selectively to affective words.

ET19: Neural basis of match-effects – lessons learned from target processing**G. Hirschfield**

University of Münster
Germany

P. Zwitserlood

University of Münster
Germany

Abstract:

Several studies showed that sentential-semantic information affects reaction times to matching vs. mismatching visual targets. To investigate at which level this comes about, we conducted two studies on picture processing in a sentence-picture verification task, as used by Zwaan and colleagues. Our first study, with MEG, found very early (125 ms post target-onset) modulations of extrastriate visual

processing areas as a function of sentential context. Specifically, we found increased activation for matching stimuli, while decreased activation due to repetition suppression might have been expected. In the second study, we used spatial filters to test the hypothesis that top-down feedback mechanisms based on low spatial-frequency information are essential for these early effects. Preliminary results indicate that highpass-filtered targets do not exhibit a match effect, while lowpass-filtered targets do. Taken together, these results highlight the role of feedback processes that take place during target processing for theories of embodied language processing.

ET20: The force is with you... or would have been with you. An fMRI study of action language

M. de Vega

University of La Laguna
Spain

M. Urutia

University of La Laguna
Spain

S. Gennari

University of York
United Kingdom

Abstract:

Healthy right-handed participants read sentences describing actions in a factual or counterfactual format while their brain activation was recorded in an fMRI event-related design. The degree of effort in the sentences was manipulated by using verbs with objects differing in weight (e.g., raising the cup vs. raising the bride). Control sentences involved one of the objects with non-action verbs (e.g., admiring the bride). High-effort sentences activated premotor and parietal areas implicit in action execution to a larger extent than low-effort and control sentences. Counterfactuals, in addition, activated specific regions in the precentral gyrus, the medial prefrontal gyrus, and the anterior cingulate region, probably related to the complexity of their dual meaning processing. Finally, factuais activated specific subcortical regions in the basal ganglia (putamen and caudate nucleus), especially for high-effort sentences. The results support an embodied approach to sentence meaning modulated by syntactic structure.

ET21: The Quick and Detailed: The speed of Movements Influences the Construal Level of Goals

M. Parzuchowski

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A. Szymkow-Sudziarska

Warsaw School of Social
Psychology
Poland

J. Chandler

University of Michigan
USA

Abstract:

People must manage many competing goals as they navigate through the world. As one goal nears completion, other goals feel more imminent. Anticipating and preparing for future goals is essential for successfully navigating a complex world functioning. A number of different cues may signal that goals are close to completion including thoughts, feelings and body movements. Specifically, quick progress towards a goal is strongly correlated with how soon we will complete it. As a consequence of this association, fast movement that is directed towards a goal should lead people to believe that they are closer to completing the goal and lead them to represent information relatively more concretely. Study 1 demonstrates that people use the speed of their pace to make estimates about how much time remains in a walking task. Study 2 conceptually replicates this finding by demonstrating that completing a movement quickly leads cognitive processes in preparation for subsequent goals. Study 3 identifies a boundary condition: the proximity of a goal is only influenced by movements compatible with its completion.

ET22: Untitled**E. Chiu**University of California at Santa Cruz
USA**M.A. Hoover****J.R. Quan****B. Bridgeman****Abstract:**

Hills are judged to be steeper with a verbal measure than with a motor measure. Traditionally, studies of slope estimation have used relatively long distances. Recently studies found verbal estimates greatly overestimated slopes and these overestimates fit a log function as distance increases. Based on these initial findings, the current study further examined the relation of slope perceptual sensitivity across predetermined distances. The study replicated the effects of distance and type of measure on predetermined logarithmic distances but did not reproduce the interaction effect. Consistent with previous work, motor estimates were more accurate at all ranges. These results can be interpreted as modulation of the individual's implicit slope by depth cues available at near distances that are not available at further distances. We conclude that geometric layout of the world interacts with effort required for interacting with the world, but more strongly for verbal than for motor measures.

ET23: When do we embody language? Neural evidence for context-dependent motor resonance**M. van Elk**Radboud University
Nijmegen
The Netherlands**R. Zwaan**Erasmus University
Rotterdam
The Netherlands**H. van Schie**Radboud University
Nijmegen
The Netherlands**H. Bekkering**Radboud University
Nijmegen
The Netherlands**Abstract:**

An intriguing question is how we represent the meaning of language. Classic linguistic approaches have emphasized the idea that meaning is represented in amodal semantic networks, whereas more recent studies suggest that language understanding involves the recruitment of sensory-motor systems. In the present study it was investigated how subjects processed the meaning of action verbs in relation to semantic context. Subjects read sentences that presented action verbs in a human context (e.g. "The athlete jumped over the fence") or in an animal context (e.g. "The deer jumped over the stream") and subjects' EEG was recorded relative to verb onset. A stronger N400-effect was found for verbs presented in a human context compared to an animal context, likely reflecting that human noun-verb pairs had a lower cloze probability than animal noun-verb pairs. In contrast, a stronger desynchronization was found in the mu- and beta-frequency bands for verbs presented in an animal compared to a human context, likely reflecting increased motor resonance for verbs presented in an animal context. These findings suggest that motor resonance in language processing is dependent on linguistic context. Furthermore, the suggestion that motor resonance may facilitate the understanding of language describing actions beyond the own motor repertoire opens interesting avenues for future research.

ET24: Motor resonance: Word or context-driven?**R. Zwaan**Erasmus University
Rotterdam
The Netherlands**F. Quist**Erasmus University
Rotterdam
The Netherlands**J.W. van Strien**Erasmus University
Rotterdam
The Netherlands**Abstract:**

Language about actions evokes activation in the brain's motor system. One important question is whether this activation is driven by action words or whether it can be overridden if an action word appears in a non-action context, e.g., in a figurative context. Recent fMRI studies have provided conflicting results, with some showing no motor activation during the comprehension of figurative sentences, whereas others do. This conflict might be due to the low temporal resolution of fMRI. To provide a better test of the hypothesis, we used an EEG measure, suppression of the μ -rhythm, which is associated with activity in the motor cortex. Pairs of critical sentences ended with the same verb, but one member of the pair had a literal context and the other a figurative one. Thus, we were able to assess motor activation evoked by verbs as they were being interpreted in a literal vs. figurative context.

ESLP 2009 Posters Index

E47: Visualizing polysemy structures using LSA and predication algorithm

G. Jorge-Batana
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Spain

J. A. León
University of Madrid
Spain

R. Olmos
University of Madrid
Spain

Abstract:

Context is a determinant factor in language and plays a decisive role in polysemy words. Some psycholinguistic based algorithms has been proposed to emulate the management of the context that humans do in the assumption that the value of a word is evanescent and take sense when interact with other structures (e.g., Kintsch, 2001, uses a vector representation of the words that produce LSA for dynamically simulating the comprehension of predications). The objective of this study was predict unwanted effects that could be present in the vector-space models when extracting different senses to a polysemy word (Predominant content flood, Accurate-less and Low-level definition) using a Spanish corpus). The results support the idea that this human-based computational algorithm as Predication can take into account features that ensures more accurate representations of the structures we want to extract.

E48: The Effect of Early Activation of Pertinent Perceptual Symbols in Language Comprehension

K. Pepera
University of Lyon
France

I. Tapiero
University of Lyon
France

Abstract:

We studied the early activation of the most pertinent perceptual symbol depending on the type of contextual background within which objects were located. We compared the activation of the shape of objects situated in concrete-typical contexts to that of abstract-neutral contexts. Pictures of the objects were presented at the end of sentences replacing their names. Their action implied all possible shapes of the objects depending on the type of situated contexts. Results showed that immediately after subjects read the contextual actions, they initiated a perceptual simulation of the most likely implied shape. We observed a match-mismatch effect depending on the type of contextual background. When the action was situated in an abstract-neutral context, subjects were much slower in simulating the objects within a specific experiential background. The results were interpreted within the theoretical assumptions of perceptual symbol systems.

E49: Gaze Grounds Meaning in Situated Human-Robot Interaction**M. Staudte**Saarland University
Germany**M.W. Crocker**Saarland University
Germany**Abstract:**

Gaze during situated language production and comprehension is tightly coupled with the unfolding speech in a manner that provides relevant on-line information about intended referents. In a series of eye-tracking experiments exploiting several tasks, we investigate whether people similarly exploit such gaze when listening to a robot make statements about the shared visual environment. Our findings suggests that (a) that people's visual attention is influenced on-line by both the robot's gaze and speech, (b) that temporally aligned and congruent (to mentioned objects) gaze facilitates comprehension, and (c) that robot gaze does indeed influence what listeners think the robot intended to say. This supports the view that spoken interaction with robots benefits when those agents exhibit real-time gaze behaviour that is aligned with their speech, and highlights the importance of such real-time non-verbal cues for grounding situated communication.

E50: The representation of the temporality of events as a dynamic process: The effect of mental simulation**E. Peyroux**University of Lyon
France**I. Tapiero**University of Lyon
France**Abstract:**

According to the theory of Grounded Cognition, simulation is the core form of computation in the brain. In line with this theory, the goal of our study was to investigate the effects of the temporality of events in narrative texts on the construction of mental models. Forty participants read 8 narrative texts that described the temporality of a specific event. The temporal information could be either explicit or implicit and the event could be described with a long duration or a short duration. At the end of the reading of each story, a picture depicting an event presented (or not) in the text was displayed. Subjects' task was to answer if the picture corresponded to a "stage" of the specific event. Our main results showed that the temporality of an event is "coded" in the reader's mental model and confirmed the relevance of the mental simulation to characterize temporal representations.

E51: Language about force modulates response force**L. Taylor**Erasmus Universiteit
Rotterdam
The Netherlands**R. Zwaan**Erasmus Universiteit
Rotterdam
Netherland**Abstract:**

Comprehension of language about action is associated with motor activation. Two experiments address two novel aspects of this phenomenon and incorporate the concept of motor parameterization from the action planning literature into the study of embodied sentence processing. The experiments address whether response force can be affected by the understanding sentences that imply a high or low degree of biomechanical force. Finding affirmative evidence for this hypothesis, the results are discussed in terms of action parameterization and language comprehension and in light of the extant literature.

E52: Language independence in bilinguals during sentence comprehension

L. Vandenberg

Erasmus Universiteit
Rotterdam
The Netherlands

R. Zwaan

Erasmus Universiteit
Rotterdam
The Netherlands

Abstract:

We set out to test whether parallel processing of languages could be demonstrated during language comprehension in spoken sentence processing. In an experiment using the Visual World Paradigm we tracked the eye movements in bilinguals who were presented with English sentences that included interlingual homophones. In a pilot experiment, we assessed phonological overlap among interlingual homophones.

Preliminary results of the eye tracking study show that while making a decision to the English target picture in the homophone condition (e.g., mice), bilinguals were distracted by Dutch nontarget pictures (e.g., corn, Dutch form MAIS) more often than by unrelated filler pictures. The findings support the language independent view of lexical access, since bilinguals show co-activation of both languages during sentence comprehension in their second language.

E53: Embodiment Processes in Abstract Concept Learning

M.L. Lorusso

M. Burigo

A. Milani

L. Pigazzini

Abstract:

Embodiment processes have been indicated as a critical cognitive mechanism for the establishment of conceptual representations; in fact, there is evidence that concepts are largely determined by the form of the human body and shaped by its interaction (physical and perceptual) with the environment. The present study aimed to test the role of embodiment processes in the acquisition of novel abstract concepts by children of different ages. The novel concepts were presented by series of positive and negative examples, comparing two modalities: embodied (visual) or non-embodied (verbal) presentation. Each series was repeated twice. Children's descriptions of the novel concepts were collected after each series, and quantitative as well as qualitative analysis were carried out. Results show that verbal descriptions overall lead to better learning as compared to visual scenes. This suggests that the role of linguistic abstraction in concept acquisition is predominant over embodied experience.

E54: "Iconic" Memory: The Effect of Spatial Iconicity and Word-Order Frequency on Relatedness Judgments and Recognition Memory

C.A. Kurby

Washington University
USA

C. Tse

Washington University
USA

F. Du

Washington University
USA

Abstract:

Perceptual simulation of the relative spatial relations between two words, termed spatial iconicity, has been shown to influence judgments for their semantic relatedness. Recent evidence suggests that linguistic variables, such as word-order frequency, show equal ability to predict semantic relatedness judgments between those same word pairs. We examined whether spatial iconicity, a perceptual simulation of the typical location of objects (e.g., sky at the top and ground at the bottom), has long-lasting effects on episodic memory of orientation, and to what extent the word-order frequency accounts for those effects. The current experiment shows that word-order frequency, but not spatial iconicity,

predicted semantic relatedness judgments, but that spatial iconicity, but not word-order frequency, predicted memory performance. This suggests that linguistic and perceptual representations influence cognition at different time scales. Linguistic representations influence cognition in a more immediate fashion than perceptual simulations do.

E55: Object-size and case-marking effects in the appropriateness of sentences describing scenes

E. Miyamoto
S. Tanigawa
T. Iizuka

Abstract:

Judgments on whether a statement appropriately describes a scene are commonly fed into models to guide robot-like agents. We report two experiments in Japanese indicating that subtle differences (relative size of the objects depicted; case markings) require more careful consideration. First, an object (e.g., a red ball) was judged to be closer if it was larger than the reference (the blue ball in “from the point of view of the blue ball, the red ball is near”; $P_s < .05$). This is expected if distance perception is affected by how large the object looms ahead viewed from the reference. Second, nominative-marked subjects in Japanese can carry an exhaustive reading (“it's the red ball, and no other, that's big”) and their felicitousness degrade when a more appropriate object (a larger ball) is present. This was indeed the case compared to topic-marked subjects, that do not have an exhaustive reading ($P_s < .01$).

E56: Situated Language Learning

J. Koehne
Saarland University
Germany

M. Crocker
Saarland University
Germany

Abstract:

Words are often embedded in both linguistic and visual contexts. For language learners who try to understand the meanings of the single sentence parts and the language's structure, it is a challenge that both are intertwined. However, it is also a chance - various kinds of bootstrapping effects help the learner analyse. The visual context is necessary but confusing: While providing a direct way to establish world-word mappings it is very noisy.

Our study reflects an integrative account of word and grammar learning assuming cross-situational word learning (CSWL). Like in other CSWL studies, the visual noisiness is mimicked. However, additionally, we present words embedded in a natural way, in sentences. Preliminary results indicate that words are learned. Moreover, an interesting bootstrapping effect due to verb restriction seems to take place.

World-word-mapping pairs are presented in varying combinations and learned over trials by analysing the co-occurrences of words and referents.

E57: Attributing causality in multimodal language-graphics comprehension

C. Acarturk
University of Hamburg
Germany

C. Habel
University of Hamburg
Germany

Abstract:

In understanding language-graphics documents the ‘visual world’ perceived during comprehension is an ‘abstract world’, e.g. of line graphs in time and value domain depicting states, events and processes. Building up a coherent model of the document's content is mediated by multimodal conceptual representations accessible both from graphical and from linguistic entities that provide temporal-spatial characteristics of both modalities. In an eye tracking experiment we explored the role of annotation

position and shape of graph lines on causal attributions concerning the relation between annotation events (i.e. events presented by the annotation text) and the processes and states represented by process-lines (increases / decreases) or state-lines (no-change). Different positions of linguistic annotations on graph lines resulted in systematically different patterns in judgments for causal attributions. The findings support the view that differences in the perceptual world results in different comprehension characteristics.

E58: Quantity in different sentence contexts: The role of Verticality

I. Boot

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The Netherlands

D. Pecher

Erasmus University
Rotterdam
The Netherlands

Abstract:

We examined the metaphor QUANTITY-IS-VERTICALITY in the context of metaphorical language. Participants read sentences in which the quantity was a little or a lot in the context of that sentence and made a decision over the location a letter p or q was presented at the top or bottom of the screen. Letters were identified better at the top of the screen when they read a sentence in which the quantity was a lot compared to a little, whereas performance was better on letter at the bottom of the screen when they had read a sentence in which the quantity was a little. This suggests that the image schema (VERTICALITY) got active during comprehension of non-metaphorical sentences about quantity.

E59: Integration of the Temporal Dimension into a Spatial Situation Model Depending on the Verb Used in a Spatial Instruction

C. Vorwerg

Bielefeld University
Germany

P. Weiß

University of Karlsruhe
Germany

Abstract:

Previous research has shown that the interpretation of spatial prepositions, such as in front of or behind, in the dynamic context of a moving car can be influenced by the verb used in a spatial placement instruction. To address the question of what components of the contextually activated verb meaning give rise to this variation, we conducted experiments with additional verbs and compared the results obtained for six different verbs used in the placement instruction.

The findings indicate that the semantic aspect of motion interruption associated with some verbs leads to a higher proportion of deictic interpretations, resulting in an inconsistent interpretation of the prepositions. This verb effect can be explained by an activation of the temporal dimension through stop-implying verbs, which is integrated into the spatial situation model of the perceived dynamic scene, making the deictic frame of reference more compatible.

E60: Modal-Specific Load Incurs Processing Costs: Explaining Interference in the Stroop-Task**J. Weijers**Utrecht University
The Netherlands**H. IJzerman**Utrecht University
The Netherlands**D. Lakens**Utrecht University
The Netherlands**P. Cool**Utrecht University
The Netherlands**Abstract:**

An array of research demonstrates that cognitive representations are grounded in sensorimotor, modal-specific systems. Perceptual Symbols System (PSS, Barsalou, 2008) calls for a re-examination of classical paradigms on the basis of these theories. We examined the classical Stroop-paradigm to investigate the underlying process explaining these effects. We found that increased interference on a Stroop-task is more strongly associated with a modal-specific (visual) load than with a non-modal-specific (verbal) load in incongruent conditions. The visual load consisted of three tertiary colors. The verbal load consisted of two nonsense words. The Stroop-trials were congruent (e.g. "blue" written in blue), incongruent (e.g. "blue" written in red) or neutral ("XXXX" written in either color). Additionally, we found that a verbal load reduces Stroop-interference, contradicting other social cognitive theories on processing goals. These results also support theories that words describing colors are processed using visual working memory.

E61: How do experience and language contribute to the representation of abstract concepts?**P. Della Rosa****E. Catricalà****G. Vigliocco**University of London
United Kingdom**S.F. Cappa****Abstract:**

Reference to physical entities is considered as the main factor distinguishing concrete concepts from abstract ones. We attempt to revise this oversimplistic view through the introduction of a new construct, mode of acquisition (MoA). MoA refers to the way in which concepts are acquired: through experience, through language or through both.

We asked 250 participants to rate 420 words on 7 dimensions: age of acquisition, concreteness, familiarity, context availability (CA), imageability, and two new dimensions: MoA and abstractness. We found that abstract words (as defined on the concreteness dimension) are mostly rated as learnt through language, whilst concrete ones are learnt through experience.

However only CA and MoA explain the variation of perceived abstractness for abstract concepts. Finally, 104 concepts were selected from 3 abstract domains: the only factor explaining this classification is MoA. In conclusion, MoA appears to play an important role in the conceptual representation of abstract words.

E62: Semantic domain-specific functional integration for action-related vs. Abstract concepts**M. Ghio**

Vita-Salute San Raffaele
University
Italy

M. Tettamanti

Scientific Institute San
Raffaele
Italy

Abstract:

Reference to physical entities is considered as the main factor distinguishing concrete concepts from abstract ones. We attempt to revise this oversimplistic view through the introduction of a new construct, mode of acquisition (MoA). MoA refers to the way in which concepts are acquired: through experience, through language or through both.

We asked 250 participants to rate 420 words on 7 dimensions: age of acquisition, concreteness, familiarity, context availability (CA), imageability, and two new dimensions: MoA and abstractness.

We found that abstract words (as defined on the concreteness dimension) are mostly rated as learnt through language, whilst concrete ones are learnt through experience. However only CA and MoA explain the variation of perceived abstractness for abstract concepts.

Finally, 104 concepts were selected from 3 abstract domains: the only factor explaining this classification is MoA.

In conclusion, MoA appears to play an important role in the conceptual representation of abstract words.

E63: Representations of events are situated where the experienced changes of related states are retained**T. Welke**

Humboldt University
Germany

K. Nowack**G. Schaadt****E. van der Meer****Abstract:**

If event representations are situated, the inherent experienced temporal order should affect conceptual processing. To test this hypothesis we presented a context event (e.g., to cook) and subsequently two adjectives denoting the beginning and the end states related with the event (cold – hot). Participants decided whether the two adjectives belonged together or not (cold – white). We varied (1) whether the antonyms were semantically related or unrelated with the event (e.g., cook: black – white) and (2) whether the presented order of the event-related antonyms corresponded to the chronological order of the states or not (cook: cold – hot vs. hot – cold). Although participants were instructed not to incorporate the context event into their decision, reaction times were shortest when antonymous adjectives were related to the context and when the order corresponded to the chronological order. We conclude that representations of events are situated where the experienced changes of related states are retained.

E64: Simulating in progress and completed events

C.J. Madden

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The Netherlands

M. Hoen

Stem Cell and Brain Research
Institute
France

P. Ford Dominey

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France

Abstract:

Embodied theories predict that descriptions of events activate dynamic simulations, and that pictures of instruments in use (burning match) better match readers' simulations than instruments not in use (burnt match). Previous research (Madden & Therriault, in press) confirmed this prediction, showing stronger effects for ongoing events (imperfective aspect) rather than completed events (perfect aspect). In the current study, we test not only the acting instrument, but also the resulting recipient of the action. Participants read imperfective (was playing) and perfect (had played) event descriptions with the critical instrument word replaced by a picture of that instrument in use or not in use, and the critical patient word replaced by a completed or uncompleted picture of that object (cigarette lit or unlit). ERP recordings suggest that both aspects activate a simulation of the event, but that the imperfective focuses on the ongoing action, whereas the perfect focuses on the completed result.

E65: Insights into the dynamics of the interaction of language semantics, attention and perception

S. Lindsay

L. Meteyard

Abstract:

Studies in embodied cognition have shown that the semantics of single nouns and sentences can interfere with the discrimination of targets in the upper or lower visual field. One explanation is that language semantics influences the deployment of attention, and leads to the activation of a perceptual simulation which then disrupts perception. We investigated the influence of language on the orientating of attention more directly using a lower level attentional task of visual detection. Participants saw English verbs that are associated with upwards (e.g. rise) downwards motion (e.g. descend), along with non-directionally associated controls. We expected that the directional verbs would orient attention but not lead to perceptual interference, as single verbs devoid of a linguistic context would not cause a detailed perceptual simulation to be run. To examine the time course of influences on attention and possible simulation, targets appeared at varying SOAs from visual word onset (100ms, 200ms, 400ms and 800ms). Our results provide insights into the dynamics of the interaction of language semantics, attention and perception.

E66: Hands-on experience: Gestures as embodied activities

U. Sassenberg

Humboldt University
Germany

E. van der Meer

Abstract:

People gesture when they talk. These gestures have been recently proposed to arise from simulated actions (Hostetter & Alibali, 2008). To test if gestures are embodied representations of actions, we asked 30 participants to describe four everyday activities: two activities – when performed – involve more hand manipulation (making coffee, changing batteries in an alarm clock), and two involve less hand manipulation (ordering pizza, travelling by bus). As expected, participants accompanied their descriptions with more gestures when describing the activities that involve more hand manipulation compared to the

other activities. In particular, they made pantomimes with their dominant hand that expressed the manipulation. Conversely, when describing activities with less manipulation participants made more rhythmic gestures that are similar to filler words. We combined quantitative and qualitative analyses to specify how gestures might be a product of simulated actions and to integrate the findings in the embodied cognition framework.

E67: Does reading about a protagonist who is pressed for time speed up reading and response times?

B. Kaup

Technical University of Berlin
Germany

J. Lüdtke

Free University Berlin
Germany

Abstract:

In this research we were interested in whether a reader can be put into a hurried tune by reading about a protagonist who is severely pressed for time, and accordingly carries out certain tasks in a speedily manner. If so, we might observe faster reading and response times during and/or after reading such a story as compared to a condition in which the same protagonist is not pressed for time and slowly carries out these tasks. In four experiments we measured reading times for sentences that were the same in both versions, as well as response times in subsequent tasks. We did not find evidence for a general speed-up of reading and response times. Rather, reading times in the hurried version were only faster for sentences that anaphorically referred back to the fast/slow events. Similarly, response times in the hurried version were only faster for tasks that require taking into account the story just read (e.g., probe-recognition task).

E68: Manipulation and function similarity predict degree of neural overlap for objects: Evidence from fMRI-adaptation

E. Yee

University of Pennsylvania
USA

D.M. Drucker

University of Pennsylvania
USA

S.L. Thompson-Schill

University of Pennsylvania
USA

Abstract:

We used fMRI adaptation to test sensorimotor-based theories of semantic memory, measuring brain activation as participants read pairs of words related via sensorimotor (manipulation, shape) and abstract (function) features. We found that the degree of manipulation similarity was correlated with the degree of adaptation in left premotor cortex and in left intraparietal sulcus – regions involved in performing or guiding actions. We also found three regions in which function (but not manipulation) similarity was correlated with the degree of adaptation: two in the left temporal lobe (left medial temporal lobe, left middle temporal gyrus) which has been hypothesized to play a role in multimodal integration, and one in the left superior frontal gyrus. Unexpectedly, objects similar in shape showed increased activation (rather than adaptation) in left premotor cortex and left intraparietal sulcus. Overall, results suggest that objects that share semantic features (sensorimotor or abstract) have overlapping representations.

E69: Sensory contributions to simulations

R. Becker

Wilfried Laurier University
Canada

M. Gonzalez-Marquez

Cornell University
USA

Abstract:

One tenet of embodiment theory is that knowledge is grounded in perception and action. Research has shown that areas of the brain active when perceiving an event are also active when remembering or simulating it. Little is known however, about the contribution of a given sense to a simulation. For

example, it is possible to hear a nail being nailed to a wall as well as to see it. How do vision and audition help build the simulation for 'nailing a nail to a wall'? In this study we begin to address this issue by asking whether there might be processing differences stemming from simulating sentences about different sensory experiences. Preliminary findings indicate that this may well be the case. This talk will discuss these findings and their implications for embodiment theory.

E70: Irony and embodiment: Evidence from the movement-compatibility effect

R. Filik

The University of Glasgow
United Kingdom

C.M. Hunter

The University of Glasgow
United Kingdom

H. Leuthold

The University of Glasgow
United Kingdom

Abstract:

We investigated the influence of irony on readers' mental simulation of a piece of text using a cognitive-embodied approach. We hypothesised that if people immediately construct a mental model consistent with an ironic interpretation, the movement-compatibility effect, which relates to faster pushing movements with negative than positive words and pulling movements with positive than negative words, would be reversed. Participants read statements appearing in contexts which made it apparent that the target sentence should be either interpreted literally, or ironically. The target sentence was presented word-by-word. The intended interpretation became apparent on the final word, which changed to one of two colours after 250 ms. Participants had to indicate, by pushing or pulling a lever, which colour the final word had changed to. As hypothesised, movements were faster when the required action was compatible with the ironic intention of the comment (positive-push, negative-pull), suggesting that non-literal language is also 'embodied'.

E71: Look but don't touch: Haptic disadvantage in conceptual processing

L. Connell

University of Manchester
United Kingdom

D. Lynott

University of Manchester
United Kingdom

Abstract:

Recent neuroimaging research has shown that perceptual and conceptual processing share a common, modality-specific neural substrate, while work on modality switching costs shows that they appear to share the same attentional mechanisms. In three experiments, we employed a modality identification task that displayed modality-specific object properties (e.g., unimodal shrill, warm, crimson or bimodal jagged, fluffy) for extremely short display times and asked participants to judge whether each property corresponded to a particular target modality (auditory, gustatory, haptic, olfactory, or visual). Results show that perceptual and conceptual processing share a haptic disadvantage: people need more time to identify expected information regarding the sense of touch than any other modality. These findings support embodied assertions that the conceptual system uses the perceptual system for the purposes of representation and suggest that the haptic disadvantage emerges for linguistic stimuli due to the evolutionary adaptation of endogenous attention to incoming sensory stimuli.

E72: Effects of linguistic and visuo-spatial semantic relations on pronoun interpretation

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Abstract:

This research investigates (i) the representations underlying pronoun resolution and (ii) the cognitive representations of causality and similarity, in particular their domain-specificity/-generality. We used a

novel paradigm (visual-world eye-tracking+priming) to investigate the causality and similarity representations triggered by linguistic primes and visuo-spatial/nonlinguistic primes. We tested whether semantic relations in primes (causality//similarity) influence interpretation of ambiguous pronouns in targets. Pronouns allow us to test for activation of causality and similarity representations; they are sensitive to this distinction (Wolf et al'04, Kehler et al'08). Eye-movements showed ambiguous pronoun interpretation was influenced by the causality//similarity manipulation. Crucially, this was significant with linguistic and visuospatial primes. Representations triggered by primes influenced target processing, suggesting: (i) effects of semantic relations on pronouns result from non-pronoun-specific representations; (ii) the causality/similarity representations influencing language comprehension are represented/encoded in a domain-general way. We connect these findings to other studies we conducted, and discuss broader implications for anaphors and semantic representations.

E73: Flexing versus Extending: Approach-Avoidance Actions Affect the Processing of Desiderative-Mood Sentences

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Abstract:

This study is concerned with the comprehension of sentences describing desired situations. It is an extension of previous work that suggests that processing such desiderative-mood sentences facilitates approach actions compared with avoidance actions. The present experiment addressed the reversed effect, i.e., an effect of action on comprehension. Participants had to maintain either an approach-related arm posture (flexing) or an avoidance-related arm posture (extending) and simultaneously had to judge the sensibility of auditorily presented sentences (by pressing a key with their "free" hand). Response times for factual-mood control sentences (e.g., Lisa has rested in a hammock) did not differ between the two arm-posture conditions. In contrast, responses to desiderative-mood sentences (e.g., Lisa wants to rest in a hammock) were significantly faster in the approach condition compared with the avoidance condition. This result provides further support for the assumption that comprehending sentences in desiderative mood involves an activation of the approach system.

E74: Visual Working Memory in Situated Language Comprehension

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Abstract:

Spoken language and visual attention have been shown to rapidly influence each other: While language guides referential and anticipatory gaze in a scene, the acquired information from the scene may conversely help in resolving ambiguities in the utterance. Scenes used in influential studies (e.g. Tanenhaus et al. 95, Altmann&Kamide 04, Knoeferle et al. 05), however, usually include only four to five co-present scene entities. We investigate the extent to which richer visual contexts are used in language comprehension, and the influence of visual working memory. Participants saw seven entities in sequence, and the display was then made blank prior to sentence onset. We observed that anticipation of referents still occurred in restrictive verb contexts, and also that the order in which those entities were presented influenced gaze behavior. These results can be used to integrate the notion of working memory in models of situated language processing.

E75: Unmovable physique makes unshakable beliefs? The Role of Attention in Processing Abstract Thought

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Abstract:

Research shows that abstract phenomena are grounded in experiential domains. Recent criticism however has focused on the role of attention in grounding abstract thought. For example, people who (literally) carry more weight are regarded to be less moveable – physically, but also in their attitudes. We argue here that this is only occurs under a specific set of circumstances on the basis of the specific, adaptive needs of the perceiver. In the current set of studies, we demonstrate that (1) participants view heavier people to be less moveable physically; this effect is carried over to attitudes only for (2) heavier females, who (3) agree with the perceiver's opinion.

E76: Does how you feel matter to how you read? The effect of mood on language comprehension

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Abstract:

Many aspects of cognition, such as memory retrieval, decision-making, and the use of stereotypes, have been found to be sensitive to mood, the diffuse, objectless affective state the person is in. Although the exact mechanisms are hotly debated, the evidence suggests that people in a happy mood are more inclined to rely on heuristic processing strategies than people in a sad mood. Here we use ERPs to investigate whether mood also affects the use of heuristics (or 'educated guesses') to anticipate upcoming language as a sentence unfolds. Our findings show that mood can indeed modulate language comprehension, and can selectively make a heuristics-dependent P600 effect come and go. Such findings testify to the importance of studying the language-affect interface in psycholinguistics: it is not just that language, once understood, can change one's feelings and emotions -- the latter can alter the mechanisms by which we come to understand language in the first place.

E77: What does it mean to work? Examining the functional neuroanatomical correlates of verbally implied action

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Abstract:

In this ongoing fMRI study we test the embodied view of language comprehension by examining whether modulations of activity in motor-strip regions are also observed when people comprehend sentences wherein certain actions are only implied. Based on stimulus ratings, occupation nouns were selected that are strongly and specifically associated with arms/hands or face/mouth or not strongly associated with

specific body movements at all. Using a 3 by 2 factorial design, we will compare BOLD responses to sentences that imply movement of arms/hands, face/mouth or no specific body parts as part of these occupations (e.g., "The lumberjack/newscaster/home inspector is working...") with responses to sentences without implied movement ("The lumberjack/newscaster/home inspector is waiting..."). In order to constrain the analysis of the functional data, we will obtain a localizer scan to identify the relevant motor-strip regions on an individual subject basis. Data from approximately 15 subjects will be presented.

E78: Understanding number names affects visual processing

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Abstract:

Seeing smaller digits (1, 2) improves visual target detection in the left visual field while seeing larger digits (8, 9) provides similar facilitation in the right visual field (Fischer et al. 2003; 2004). This and similar findings support the existence of perceptually grounded number representations. Two new experiments investigated how understanding number names affects spatial biases. In Experiment 1, participants listened to number names while fixating a central cross. Eye position drifts reflected spontaneous magnitude processing with consistent shifts to the left after hearing a small number and to the right – after hearing a larger number. In Experiment 2, participants saccaded to lateral visual targets that appeared at variable delays after auditorily presented number names. A similar facilitation pattern was observed with leftward saccades initiated faster after hearing smaller numbers but only after longer (1200 ms) delays. Together, these results support the existence of largely embodied number representations and clarify the role of covert and overt attention in number processing.
