EBERHARD KARLS
UNIVERSITÄT
TÜBINGEN

SfB 833
Project B4 / B7

SFB 833

Understanding the meaning of words and sentences: The role of non-linguistic processes

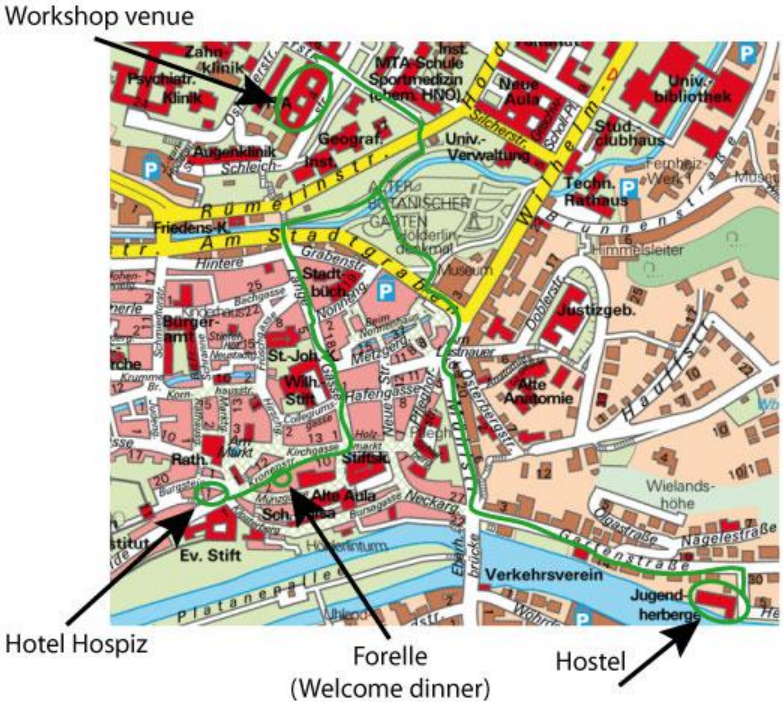
Tübingen, September 16-19, 2012

Hosted by the SFB 833 "The Construction of Meaning" at the Eberhard-Karls-Universität Tübingen funded by the DFG

Workshop venue

The workshop will take place in the newly renovated Department of Psychology (Hörsaal, Room 4.329). The walking distance from the Hotel Hospiz is about 12 minutes, from the hostel about 16 minutes.

Department of Psychology; Schleichstr. 4 (Hörsaal); 72070 Tübingen;
www.pi.uni-tuebingen.de



WIFI INTERNET ACCESS

At the Department of Psychology, your login details to WLAN Guest are

user name: siareg01

password: vb6vb5

from Monday, 17th 9 a.m. until Wednesday, 19th 9 a.m.

and

user name: siareg02

password: hy5hy8

from Wednesday, 19th 9 a.m. to 9 p.m.

Poster session

The poster session will take place in room 4.332. We will provide sticky tape. You can pin your poster either to the wall or to one of the poster boards after the first coffee break on Monday.

Coffee and snacks

You will find coffee, refreshments, and snacks during the workshop in room 4.332.

Lunch
You'll find a great variety of restaurant and snack stalls in the city center. Here are a few suggestions:

Wurstküche (Swabian cuisine) – Am Lustnauer Tor 8

Neckarmüller (with beer garden; Swabian cuisine) – Gartenstraße 4

Herrenschlosser – Metzgergasse 37

Kichererbse (Vegetarian) – Metzgergasse 2

Collegium – Lange Gasse 8

Tulsi Palace (Indian restaurant) – Wilhelmstraße 88

Saints & Scholars – Wilhelmstraße 44

Al Dente (Italian restaurant) – Clinicumsgasse 22

Manufaktur (Italian restaurant) – Vor dem Haagtor 1/2

Coffee and dessert:

il dolce – Metzgergasse 6

Tübinger Zuckerbäcker – Ammergasse 16

Punting Trip on Monday, September 17th

There will be a punting trip on the river Neckar in a traditional *Stocherkahn*, which will take approximately one hour.

Dinner and drinks on Tuesday, September 18th

We'll have a party on Tuesday, starting at 6 p.m. (there will be dinner at 7 p.m.) at the *Gästehaus Lessingweg* (Lessingweg 3).

Schedule

Sunday, 16th

19:00	Welcome Dinner (Forelle, Kronenstraße 8)
Monday, 17th	Chair: Barbara Kaup, Carolin Dudschig
10:00 – 10:15	**Welcome**
10:15 – 11:00	**Ruth Filik, University of Nottingham** *How do we understand irony? A multi-method approach.*
11:00 – 11:30	Coffee break
11:30 – 12:15	**Lars Konieczny, Universität Freiburg** *Grounding anaphora in perception and action.*
12:15 – 14:00	Lunch
14:00 – 14:45	**Daniel Bub,** **University of Victoria** *What John did with a cellphone and why: On the temporal dynamics of hand action representations evoked during sentence comprehension.*
14:45 – 15:30	**Benjamin K. Bergen,** **University of California, San Diego** *A new perspective on grammatical person.*
15:30 – 17:30	**Poster session** (with coffee and snacks)
18:00 – 19:00	Punting trip on the river Neckar Chair: Rolf Ulrich, Hartmut Leuthold

Tuesday, 18th

09:30 – 10:15	**Gerry Altmann, York University** *Objects compete with themselves: The role of non-linguistic competition during event comprehension.*
10:15 – 10:45	Coffee break
10:45 – 11:30	**Frank Durgin, Swarthmore College** *Predictive efficiency as a source of error in perception and language processing.*
11:30 – 12:15	**Pienie Zwitserlood, Universität Münster** *Identifying and naming actions: Fast uptake of visual information from action scenes.*
12:15 – 14:00	Lunch
14:00 – 14:45	**Berry Claus, Humboldt-Universität zu Berlin** *Non-linguistic processes and sentence modality: Desiderative mode and approach/avoidance actions.*
14:45 – 15:30	**Rolf Ulrich, Universität Tübingen** *Representational overlap of time and space.*
15:30 – 16:15	Coffee break
16:15 – 17:00	**Silvia Gennari, York University** *Representing time in language and cognition.*
17:00 - 17:45	**Julio Santiago, Universidad de Granada** *Reading direction effects on language comprehension: short-term versus long-term influences.*
18:00	Dinner and drinks (Gästehaus Lessingweg, Lessingweg 3)

Wednesday,19th	Chair: Claudia Maienborn
9:15 – 10:00	**Barbara Kaup, Universität Tübingen** *Meaning composition and mental simulation: Effects beyond the word level.*
10:00 – 10:45	**Eiling Yee,** **Basque Center on Cognition, Brain and Language** *Word meanings can be quite handy (and shapely!)*
10:45 – 11:15	Coffee break
11:15 – 12:00	**Rolf Zwaan, Erasmus University Rotterdam** *Mental simulation revisited: Six replication attempts.*
12:00 – 12:45	**Final Discussion**

Abstracts of the talks

Ruth Filik

How do we understand irony? A multi-method approach.

Despite the fact that irony is very common in everyday language, little is known about how people understand it. In this talk, I will present data from a series of studies investigating the cognitive and emotional aspects of irony comprehension, using a variety of methods from experimental psychology, cognitive neuroscience, and embodied cognition. Results will be discussed in relation to contemporary theories of how non-literal language is processed and understood, as well as the role of non-linguistic cognition in irony comprehension.

Daniel Bub

What John did with a cellphone and why: On the temporal dynamics of hand action representations evoked during sentence comprehension.

Words referring to everyday manipulable objects (like cellphone) automatically evoke representations of action in the motor cortex. The computational role of these representations is of great interest. I will discuss a methodology that allows the tracking in real time of two different action representations dynamically evoked by an auditory word: (i) a representation of the grasp associated with lifting and moving the object (a V-grasp) and (ii) a grasp representation associated with using the object according to its proper function (an F-grasp). The temporal dynamics of these two grasp representations are shown to be strikingly different. I then ask whether the dynamic evocation of these grasp representations can be modulated by context. For example, language can imply the intention to pick up and move an object (e.g. To clear the shelf, John lifted the cellphone) or to use an object (e.g. To notify his mother, John used his cellphone). Does the strength and time course of an F- or V-grasp depend on context? The answer is surprisingly counterintuitive and provides new insight into the nature of mental simulation during language comprehension.

Ben Bergen

A new perspective on grammatical person.

People appear to adopt particular perspectives in the embodied simulations they construct during language comprehension (Brunyé et al., 2009). In part, perspective adoption is driven by grammatical person—second person language makes comprehenders more likely to adopt an internal perspective and third person language promotes an external perspective. But not all languages obligatorily mark person in all sentences. So called "pro-drop" languages, like Spanish and Japanese, allow the subject of a sentence to be omitted if inferable from context. This raises the question: is it the explicit marking of grammatical person that drives perspective adoption, or is it knowing who the subject is (you, me, etc.). We conducted two sets of studies, in Spanish and Japanese. Participants read short paragraphs, in which we either included or omitted the subject from the final sentence. As in English, when the subject was included, participants were faster to respond to probe images taken from a compatible perspective. But when the subject pronoun was dropped, the perspective compatibility effect disappeared. This was true in both Japanese and Spanish, despite the fact that the subject was inferable from context (as determined by norming studies). We conclude that person-related perspective adoption is driven by the local and explicit marking of person on a sentence. Perspective adoption in simulation is mediated by grammatical details, which calls for a nuanced account of both the role of simulation and the mechanisms that deploy it.

Gerry Altmann

Objects Compete with Themselves: The role of non-linguistic competition during event comprehension.

Language understanding requires the ability to track multiple representations of an object as it changes state or location. On reading "The squirrel will crack the acorn" we must maintain multiple instantiations of the acorn; before it was cracked, and after. These representations are necessary components of the associated event-representation. We propose that subsequent reference to the acorn engenders conflict with respect to whether the uncracked or cracked instantiation is intended, and that a behavioral consequence of this conflict is reduced accessibility due to the interference between these distinct instantiations. Multiple instantiations of the same object, which may be inherently similar, might be particularly susceptible to similarity-based interference – hence increased conflict and reduced accessibility. If true, this would have important implications for a range of cognitive phenomena, including phenomena that have been used to track developmental change. A series of three fMRI studies, and also eye-tracking studies, confirm that multiple instantiations of the same object (reflecting the 'before' and 'after' states of that object) do in fact compete. Interestingly, the fMRI studies revealed that similarity-based interference is not what drives the effect; whereas the representations of multiple, but distinct, objects are subject to similarity-based interference, multiple instantiations of the same object in distinct states are subject to dissimilarity-based interference.

Frank H. Durgin

Predictive efficiency as a source of error in perception and language processing.

There is a long tradition in scientific psychology of using the measurement of systematic error or bias as a means of elucidating the underlying representational structure of a system. Error is common in perception, but is often treated as a sort of failure of perceptual mechanisms that is due to insufficient information. However errors or bias in perception may sometimes reflect strategic representational choices. Such representational strategies can contribute to efficient information flow and effective action control. For example, distributed modal representations of conceptual information may reflect predictive efficiencies for grounded control as well as for grounded cognition.

In my talk I will consider errors as reflections of adaptive predictive processes that provide representational advantages in a number of domains. Instances from self-motion perception and space perception are described in order to illustrate how quantitative analyses of patterns of error have revealed functional biases (coding advantages) that may underlie dramatic perceptual errors. Next we will consider task-driven biases in evaluating language. In the case of the reverse Stroop effect, the direction of interference between lexical and sensory information regarding color depends on the mode of information that is most useful for completing the task. Finally we consider the use of metaphoric language and the predictive efficiencies that speakers can use to communicate meaning. In all cases there is evidence for both separation and interaction between modal systems (including language itself) and also evidence of both stability and adaptation within these systems.

References

Chettih, S., Durgin, F. H., & Grodner, D. (2012). Mixing metaphors in the cerebral hemispheres: What happens when careers collide? Journal of Experimental Psychology: Learning Memory and Cognition, 38, 295-311.

Durgin, F. H. (2009). When walking makes perception better. Current Directions in Psychological Science, 18, 43-47.

Durgin, F. H., Doyle, E., & Egan, L. (2008). Upper-left gaze bias reveals competing search strategies in a reverse Stroop task. Acta Psychologica, 127, 428-448.

Durgin, F. H., & Li, Z. (2011). Perceptual scale expansion: An efficient angular coding strategy for locomotor space. Attention, Perception & Psychophysics, 73, 1856-1870.

Pienie Zwitserlood

Identifying and naming actions: Fast uptake of visual information from action scenes.

Data from numerous studies show that the uptake of visual information can be extremely fast and efficient, enabling the categorization of objects (Thorpe and colleagues), and the extraction of the gist of complex scenes (e.g., Henderson, Oliva, Park). We investigated the interface between visual perception and language, focusing on the contact between visual scene information and lexical information, and its time course. In this talk, I first summarize some of our earlier work on fast information uptake from briefly presented visual scenes. I then describe new studies that employed the priming technique. In a first set of experiments, we used action photos that had to be named, and photos as primes. Primes were either (a) identical to the target (mirrored photo), (b) depicted same action (but with a visually very different photo) or (c) a different action (visually similar to (b), but different action). Prime presentation was short (3 durations), and primes were always followed by a mask.

We observed faster naming of the target actions after identical as well as same-action primes, relative to different-action primes. This was the case even with the shortest prime presentation. The conclusion is that information about the actions becomes available very rapidly, and that this information minimally includes conceptual/semantic knowledge. To assess whether the information activated by the action picture is confined to semantic categorization, or also includes lexical information, we used printed words (action verbs) as targets, primed by action photos. The name of the pictured action was either the same as the target verb (a writing action, named “schreiben” in German, with target verb SCHREIBEN, to write), form-related to the target verb (an action of writing, target word TREIBEN, to drift). There was facilitation by the briefly presented action pictures when the picture name and target were identical, and interference when the picture name was form-related to the target verb. These data show that action scenes access their lexical

information very rapidly and automatically, given that no naming was required for picture stimuli in the second study.

Berry Claus

Non-linguistic processes and sentence modality: Desiderative mode and approach/avoidance actions.

There is a growing body of evidence that suggests that language comprehension is grounded in sensory-motor experience. However, comparatively little is known as to the role of non-linguistic cognition in the understanding of abstract linguistic information. In my talk, I will present a study that addressed a particular type of abstract linguistic information, namely sentence modality. More specifically, the study was concerned with the comprehension of sentences describing desired situations (e.g., Antoine wants to marry a hairdresser). The aim of the study was to explore the non-metaphorical experiential grounding of desiderative mode. A starting point was the distinction between two systems, approach and avoidance, in accounts of the regulation of behaviour: The approach system is associated with desires and goals, whereas the avoidance system is associated with fears and threats. Drawing on this, it was hypothesized that understanding sentences in desiderative mode involves activating the approach system. I will report a series of experiments that tested this hypothesis by investigating whether processing sentences in desiderative mode interacts with approach versus avoidance related motor actions.

Rolf Ulrich, Verena Eikmeier, Claudia Maienborn, & Simone Alex-Ruf

Representational overlap of time and space.

Several pieces of evidence suggest that our mental representations of time and space overlap because they share structural schemas. However, the extent of the representational overlap between these two domains has not assessed so far. We present the results of two experiments that draw on the predictions of the dimensional overlap model (Kornblum, Hasbroucq, & Osman, 1990). The stimulus and response set in this reaction time experiments were related to time or space. The size of the obtained stimulus-response congruency effects did not differ between identical stimulus-response sets (time-time or space-space) and different stimulus-response sets (time-space or space-time). These results support the view that our representations of time and space strongly overlap.

Silvia Gennari

Representing time in language and cognition.

We conceive of events as taking time. Every day we read about or watch events in the world and effortlessly understand how long they last. In watching or learning about a political rally, for example, we naturally build a mental representation of it and can judge its duration relative to other events without consulting clocks. What aspects of the actual event are retained in our mental representation? And how do we extract temporal information from it? These issues are central to human cognition, since they underlie a fundamental aspect of our mental life, namely, our representation of the passage of time.

This talk examines whether properties of the events encoded in memory shape the representation of their duration, irrespective of whether we have learned about them through language or visual perception. Evidence from reading, eye-tracking, corpus and perceptual memory studies indicates that the diversity of the event properties stored in memory, i.e., how they differ from one another, modulates our representations of event duration. These properties include the events' causal structure and the associations that they establish with other events in our experience and knowledge of the world.

What is called time in the context of representing an event in memory is not external clock time, but rather, the diversity of the memories that are associated with that event.

Julio Santiago

Reading direction effects on language comprehension: short-term versus long-term influences.

Reading and writing direction (RWD) has pervasive effects on a wide range of tasks, from low-level perceptuo-motor skills to the representation of high-level concepts such as numbers, time and events. The present study looks at the influence of RWD on the processes of mental model construction in language comprehension. Sentences like "the table is between the lamp and the TV" were auditorily presented to groups of mono- and bi-directional readers in languages with left-to-right or right-to-left scripts, and participants were asked to draw the described scene. The results revealed effects of both the language being used to describe the scenes and the degree of practice with its script. These lateral biases occurred in the context of universal strategies for working memory management.

Barbara Kaup

Meaning composition and mental simulation: Effects beyond the word level.

In our everyday experience, words are often heard in contexts in which the objects they refer to are present. Words therefore most likely get associated with the memory traces stemming from experiencing the corresponding referents. As a consequence, when the words are later seen or heard without the objects being present, then the object-related memory traces will probably be re-activated. Indeed, many authors in the literature on language comprehension nowadays assume that comprehenders understand words by mentally simulating the experience of their referents. When the words appear in larger phrases or sentences, the activated memory traces are presumably combined to yield experiential simulations consistent with the meaning of the larger phrase or sentence. Evidence for the experiential-simulations view has been found in studies employing words and sentences. However, the contribution of word- vs. sentence-based processes to these effects is not clear, as only few studies have directly looked at this distinction in sentence processing. In this talk I will present a series of experiments addressing the question whether readers indeed combine experiential traces during comprehension to yield simulations consistent with the meaning of a larger phrase or sentence.

Eiling Yee

Word meanings can be quite handy (and shapely!)

How are the meanings of words referring to concrete objects represented across sensory and motor cortex, and are sensorimotor representations truly part of word meaning? We present fMRI and behavior studies addressing these questions. First, in an fMRI study, we show that the similarity of the neural representations of two concepts in a given region reflect their similarity on a specific sensorimotor dimension. We measured the magnitude of fMRI-adaptation (our index of neural similarity) to word pairs that varied according to their similarity on shape ("bagel"-"tire") and manipulation ("key"-"screwdriver"). Degree of shape similarity was positively correlated with the magnitude of fMRI-adaptation in a region involved in visual object recognition (left posterior fusiform gyrus), whereas degree of manipulation similarity was positively correlated with adaptation in regions involved in planning and performing object-related actions (left inferior frontal gyrus, left precentral gyrus, and left inferior parietal lobule). These findings are consistent with predictions of sensorimotor theories. However, they do not address whether sensorimotor information is part of the meaning of manipulable objects, or is merely incidental. In a behavioral experiment, we show that when the hands are engaged in a task whose motions are incompatible with those used to interact with frequently manipulated objects (e.g., pencils), it is more difficult to think about those objects—but not harder to think about infrequently manipulated objects (e.g., bookcases). Critically, the amount of manual experience with the object determines the amount of interference. These findings show that brain activity underlying manual action is part of, not peripheral to, the representation of frequently manipulated objects. Further, they suggest that our ability to think about an object changes dynamically with context—depending on the match between our (experience-based) mental representation of its meaning and whatever we are doing at that moment. Together, these studies show that the meanings of concrete objects are partially encoded in sensorimotor brain regions.

Poster session

Berry Claus: *Verb gapping: John opens a juice bottle and Jim a lemonade bottle – Novel evidence for the on-line reactivation of gapped verb information?*

Juanma de la Fuente, Julio Santiago, Antonio Román, Cristina Dumitrache, & Daniel Casasanto: *Facing the past: Cognitive flexibility in the front-back mapping of time.*

Irmgard de la Vega: *Approach and avoidance: Meaning-composition processes in sentences.*

Carolin Dudschig: *Sky versus earth: The influence of words on visuospatial attention.*

Anita Eerland & Rolf Zwaan: *The influence of direct and indirect speech on mental simulations.*

Verena Eikmeier & Rolf Ulrich: *The influence of spatial priming on processing of time-related words.*

Anja Fiedler & Hannes Schröter: *Redundancy Gain for Semantic Features.*

Martin Lachmair: *A number - object word priming effect: low numbers prime "root" and high numbers prime "roof".*

Les Sikos & Frank H. Durgin: *The cost of extending vs. mixing metaphors: An ERP study.*