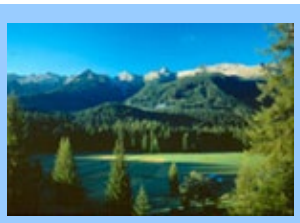


Home

Registration

Schedule

Attendees & Sessions

Abstracts

Travel & Lodging

Activities

Contact

ASIC 2004

Third Annual Summer Interdisciplinary Conference

Sunday, June 27 -- Friday, July 2, 2004
Cavalese, Val di Fiemme, Dolomiti, Italy

Announcing ASIC 2004!

The Third Annual Summer Interdisciplinary Conference (ASIC 2004) will be held at Hotel Grunwald, in Cavalese, Val di Fiemme, Italy (in the Dolomites). Richard M. Shiffrin of Indiana University-Bloomington, and Marco Zorzi of the University of Padova, are co-organizers. Official correspondence should be directed to Richard Shiffrin and CCed to Marco Zorzi. You can address them automatically by clicking here.

The conference uses the very successful format of previous ASIC and AIC conferences: Days are free for leisure activities and the talks are in the later afternoon/early evening, followed by dinner. The date has been chosen to make it convenient for attendees from the United States to bring family/friends. The conference is open to all interested parties, and an invitation is NOT needed to attend. However, the limited time for talks means that the organizers will select the speakers from those arranging sessions or desiring to give individual talks. The subject is interdisciplinary, within the broad frame of Cognitive Science.

Invitation

The conference is open to all scholars who fit the very general theme of the conference, and their family and friends. An individual invitation is NOT needed. We encourage you to send the conference information to friends and colleagues.

Do not delay in making your own arrangements for participation. Even if you are planning only to attend, and not talk, hotel rooms may be booked early, so you should make your reservations soon.

If you are thinking of attending and/or participating let the organizers know at once.

Conference Aims

The conference will cover a wide range of subjects in cognitive science, including:

- **neuroscience, cognitive neuroscience**
- **psychology (including perception, psychophysics, attention, information processing, memory and cognition)**
- **computer science**
- **machine intelligence and learning**
- **linguistics**
- **philosophy**

We especially invite talks emphasizing theory, mathematical modeling, and computational modeling (including neural networks and artificial intelligence). Nonetheless, we require talks that are comprehensible and interesting to a wide scientific audience. Speakers will provide overviews of current research areas, as well as of their own recent progress.

For information on submitting proposals for presentations (speaking or posters), see our attendees and sessions page.

Conference Format

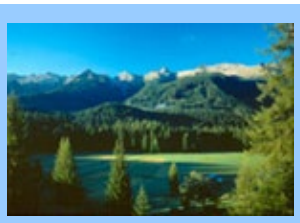
The conference will start with a reception on the first evening, Sunday, June 27, at 4 PM, followed by a partial session.

Each of the next five evenings, poster sessions will run from 4:00 to 4:30 PM. Drinks, light refreshments and snacks will be available during poster sessions, and at the midway break. Talks will begin at 4:30 PM; there will be about 8 talks each evening, as well as a mid-session break. Talks are expected to finish at about 8:45 PM each day. A banquet will be held following the final session of the conference, on Friday, July 2.

There are no parallel sessions.

It will not escape the careful reader that this conference format frees most of the day for various activities with colleagues, family, and friends. We expect all scientific attendees and participants to attend all sessions. The time frame will allow day trips to nearby sites in the Dolomites, and even to some nearby cities in Northern Italy, but travel to other and more distant sites should be arranged for days preceding and following the conference.

Website designed and maintained by Krystal Klein. Best viewed with Internet Explorer 6.0.



Home
Registration
Schedule
Attendees & Sessions
Abstracts
Travel & Lodging
Activities
Contact

ASIC 2004

Third Annual Summer Interdisciplinary Conference

Registration Information for ASIC 2004

Registration Forms

To attend the conference, you may either register online or fill out the printable registration form (requires Adobe Acrobat Reader) and send it with a check for the registration fee by regular mail to:

ASIC 2004, c/o Prof. Richard Shiffrin
Psychology Department
Indiana University
Bloomington, IN 47405

Online registration is available, but payment must be sent via regular mail regardless of whether registration is submitted online or by mail.

Fees

The registration fees are:

$120 USD for early registration (Before Jan 1, 2004);
$150 USD for regular registration (After Jan 1, 2004 but before the conference);
$175 USD for on-site registration.

All fees must be by check (no credit cards) payable to Annual Summer Interdisciplinary Conference (or ASIC 2004) and sent to the organizer at the address above.

Checks sent from attendees from countries other than the US should be drawn on a US bank, or be in the form of an international cashier's check, or the equivalent.

The registration fee includes the opening night reception, the food, drink, facilities for all sessions, and the final banquet. This fee must be paid by those attending the sessions, and/or those partaking of the food and drink at the sessions (at the start or at the break). Extra tickets are available for the opening reception for $10 USD/person, and for the final banquet for $25 USD/person.

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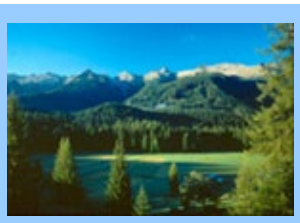

ASIC 2004

Third Annual Summer Interdisciplinary Conference

- Home
- Registration
- Schedule
- Attendees & Sessions
- Abstracts
- Travel & Lodging
- Activities
- Contact

ASIC 2004 Schedule

(as of May 18, 2004)

Sunday, June 27	
16:00 - 17:30	Opening Reception and Registration
17:30 - 19:00	Session I: *Number Processing* | **talks** |
19:00 - 19:15	Break
19:15 - 20:45	Session II: *Time and Recency Perception* | **talks** |
20:45	Dinner
Monday, June 28	
DAYTIME	Group Excursion Sponsored and Funded by TICS
16:00 - 16:30	Drinks, snacks, and Poster Session I | **posters** |
16:30 - 18:00	Session III: *Multiple Categorization and Memory Systems* | **talks** |
18:00 - 18:20	Break
18:20 - 20:30	Session IV: *Categorization and Memory* | **talks** |
20:30	Dinner
Tuesday, June 29	
16:00 - 16:30	Drinks, snacks, and Poster Session II | **posters** |
16:30 - 18:00	Session V: *Semantic and Conceptual Representation I* | **talks** |
18:00 - 18:15	Break
18:15 - 19:15	Session VI:*Semantic and Conceptual Representation II* | **talks** |
19:15 - 20:15	Session VII: *Induction of Meaning and Language* | **talks** |
20:15	Dinner
Wednesday, June 30	
16:00 - 16:30	Drinks, snacks, and Poster Session III | **posters** |
16:30 - 18:00	Session VIII: *Reasoning, Inference, Judgment I* | **talks** |
18:00 - 18:15	Break
18:15 - 20:45	Session IX: *Neural Bases of Cognition* | **talks** |
20:45	Dinner
Thursday, July 1	
16:00 - 16:30	Drinks, snacks, and Poster Session IV | **posters** |
16:30 - 18:30	Session X: *Perception and Information Processing* | **talks** |
18:30 - 18:45	Break

18:45 - 20:15	Session XI: *Complex Systems* **| talks |**
20:15 - 20:40	Business Meeting; Planning ASIC 2005
20:40	Dinner
Friday, July 2	
16:00 - 16:30	Drinks, snacks, and Poster Session V **| posters |**
16:30 - 18:30	Session XII: *Multiple Systems of Memory* **| talks |**
18:30 - 18:45	Break
18:45 - 20:45	Session XIII: *Memory* **| talks |**
20:45	Closing Banquet

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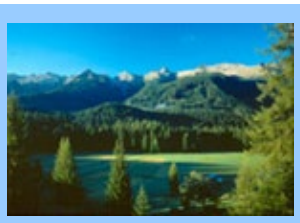

Home
Registration
Schedule
Attendees & Sessions
Abstracts
Travel & Lodging
Activities
Contact

ASIC 2004

Third Annual Summer Interdisciplinary Conference

Abstracts

Those abstracts which have been submitted are listed below alphabetically by presenter. First author listed is the presenter except where another author is starred.

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

ARE THERE MULTIPLE FORMS OF IMPLICIT CATEGORY LEARNING? ***F. Gregory Ashby and Michael B. Casale, University of California, Santa Barbara*** **-- We review evidence for two qualitatively distinct implicit category learning systems. One uses procedural learning and is mediated primarily within the basal ganglia, and one uses perceptual learning and is mediated primarily within visual cortex. The procedural learning system is especially important in information-integration category learning tasks. It learns response positions and is especially sensitive to the nature and timing of feedback. The perceptual learning system is especially important in (A, not A) prototype distortion tasks. It does not require feedback, but it is sensitive to the nature and timing of stimulus presentation. Two experiments are described that test critical predictions of this hypothesis.**

COMPUTATIONAL FUNCTIONS OF NEUROGENESIS IN THE HIPPOCAMPUS. ***Sue Becker, McMaster University*** **-- The hippocampus supports rapid learning of novel environments, discrimination between highly similar episodes, and retention of newly learned information which may last months or perhaps even years. I will present a computational account of coding in the hippocampus, and discuss several hypotheses regarding the role of neurogenesis in memory formation and retrieval.**

CONCEPTS AND AFFORDANCES. ***Anna Borghi, Universita' di Bologna*** **-- Recent studies suggest that seeing an object potentiates the affordances associated with it (Tucker & Ellis, 1998; 2001). In addition, recent evidence suggests that words referring to manipulable objects may automatically elicit motor information, particularly information relevant for simple interactions with objects, as those involved in reaching and grasping them (Borghi, Glenberg & Kaschak, in press). I will present experiments performed with 2 different paradigms: object-nouns categorization tasks and sentences sensibility evaluation tasks. These studies suggest that concept nouns referring to manipulable objects automatically elicit reaching and grasping responses. In categorization tasks concept-nouns referring to manipulable objects lead to faster responses with the dominant hand, whereas with concept-nouns referring to not manipulable objects there is no effect of hand dominance. The preferential activation of the dominant hand occurs also in sensibility evaluation tasks when a concept-noun (e.g. apple) is preceded by a verb referring to a manual action (e.g. grasp), while there is no preferential activation of one hand when the verb preceding the noun refers to an action to perform with the mouth (e.g. eat). I will discuss the implications of these studies for theories according to which concepts are grounded in sensorimotor activity (Barsalou, 1999).**

MAPPING SOCIAL DIFFUSION PATTERNS. ***Katy Borner, Indiana University*** **-- A data analysis and visualization tool set that maps the evolution of three dimensional virtual environments, the distribution of their virtual inhabitants over time and space, the formation and diffusion of groups, the influence of group leaders, and the environmental and social influences on chat and diffusion patterns for small (1-100 participants) but also rather large user groups (more than 100 participants) will be presented. The tool set can be**

applied to improve our understanding of the diffusion of tangible (objects, people, etc.) and/or intangible (ideas, activation levels, etc.) entities across geographic, semantic, or constructed space.

RETRIEVING AND USING ASSOCIATIVE MEMORIES: PREFRONTAL AND POSTERIOR CORTICAL CONTRIBUTIONS. *Sylvia Bunge, University of California, Davis* **-- Meaningful stimuli that we encounter in our daily lives trigger the retrieval of associations: links that we have previously made between these stimuli and potential responses, heuristics for responding, other stimuli, or rewards. One line of research in my laboratory focuses on how we use these associations to select a course of action. Neuropsychological and neuroimaging studies implicate the prefrontal cortex in forming and retrieving each of these types of associations. In this talk, I will argue that different subregions of prefrontal cortex are preferentially involved in processing particular types of associations. I will present fMRI data gathered while subjects are 1) retrieving and maintaining cue-rule associations online, 2) retrieving stimulus-stimulus associations and selecting a response on the basis of these associations, and 3) processing higher-order associations between pairs of stimuli. Although prefrontal cortex is involved in storing and retrieving associative memories and using them to control behavior, it is unlikely to be the long-term repository of these memories. I will discuss experiments underway in the laboratory to test hypotheses regarding the types of associations stored in temporal and parietal cortices.**

BEHAVIORAL AND ELECTROPHYSIOLOGICAL EVIDENCE FOR CONFIGURAL PROCESSING IN FINGERPRINT EXPERTS. *Thomas A. Busey, Indiana University; John R. Vanderkolk, Indiana State Police Laboratory* **-- Visual expertise in fingerprint examiners was addressed in one behavioral and one electrophysiological experiment. In an X-AB matching task with fingerprint fragments, experts demonstrated better overall performance, immunity to longer delays, and evidence of configural processing when fragments were presented in noise. Novices were affected by longer delays and showed no evidence of configural processing. In Experiment 2, upright and inverted faces and fingerprints were shown to experts and novices. The N170 EEG component was reliably delayed over the right parietal regions when faces were inverted, replicating an effect that in the literature has been interpreted as a signature of configural processing. The inverted fingerprints showed a similar delay of the N170 over the right parietal region, but only in experts, providing converging evidence for configural processing when experts view fingerprints. Together the results of both experiments point to the role configural processing in the development of visual expertise, possibly supported by idiosyncratic relational information among fingerprint features.**

FUNCTIONAL ANATOMY OF NUMERICAL PROCESSING. *Brian Butterworth, University College London* **-- I will outline the key elements of the domain of numerical processing, including the familiar skills of estimating, counting and arithmetic, and explore their neural basis, taking evidence from both neuroimaging and patient studies. The focus will be to use neuroanatomy to show how the domain of number is organised and how it is related to other cognitive domains.**

STATISTICAL LANGUAGE LEARNING: ANALYSIS OF AN IDEAL LANGUAGE LEARNER. *Nick Chater and Paul Vitanyi, University of Warwick* **-- Language acquisition has often been viewed as facing a "logical" problem, because the learner appears to be primarily, and perhaps solely, dependent on positive examples of sentences of the language, with no access to negative examples (i.e., ungrammatical sentences, labelled as such). How then can be learner prune overgeneral grammars, which contain all the sentences of the language, but many more? Mere non-occurrence of a sentence is clearly not good evidence for its ungrammaticality--- because the learner can only have encountered a finite subset of the infinite set of grammatical sentences. This uses results from the mathematical theory of Kolmogorov complexity to show that there is, nonetheless, enough information in mere positive examples to learn, under fairly general conditions, to: make**

grammaticality judgments; learn to produce language; and map between form and meaning. We also discuss a concrete application of this approach, to learning specific, and apparently puzzling, linguistic structures; and consider the relevance of this work for theories of language acquisition.

AUTOMATIC CORRECTION IN AFFECTIVE PRIMING. ***Woo Young Chun and David E. Huber, University of Maryland*** **-- In the domain of social cognition, it has been reported that the priming of affective responses is assimilative when individuals are unaware of the priming event, but lead to judgments that are contrasted from the prime when they are aware of the prime (Higgins, Rholes, & Jones, 1977; Martin, Seta, & Crelia, 1990; Newman & Uleman, 1990; Starck, Schwarz, Bless, Kubler, & Wanke, 1993). These findings suggest that contrast priming is due to a conscious judgment strategy. In our studies, we tested an alternative hypothesis in which contrast priming can take place automatically, and is the natural byproduct of highly processed prime information (we term this "saturation"). We evidence these claims with a lexical decision task that is unrelated to affective responses, and we test situations where there is insufficient time for strategic correction.**

DUAL MODES OF INFORMATION INTEGRATION. ***Andrew Cohen, Jerome Busemeyer, and Richard Shiffrin, Indiana University*** **-- The goal of this research is to uncover the fundamental mechanisms by which a judgment is fashioned from multiple sources of information. Whereas an assumption of suboptimal integration of information tends to dominate areas such as judgment, an assumption of optimal information integration is common in other fields such as categorization, memory, and perception. Although the conventional wisdom in these fields differs, the empirical results are actually quite similar: findings of both optimal and suboptimal information integration are found in all of these areas. Despite these similarities, research in these domains seems to proceed almost independently, an independence fostered by wide differences in experiment paradigms. This project will attempt to bridge a number of these areas, judgment, perceptual categorization, memory, and perception, through use of a common experimental paradigm and uniform methods of analysis and modeling. One compelling possibility is that differences in processing mode might lead to differences in task performance. Stimuli that require intentional integration of information, such as the linguistic and quantitative stimuli commonly found in judgment studies, may lead to suboptimal performance. Optimal integration might be much more likely for stimuli that invite automatic processing, such as the images and sounds often used in perceptual research. This possibility will be investigated within a shared framework by manipulation of images to encourage intentional integration of information in some conditions and automatic integration in others.**

VISUAL EXPERTISE DEPENDS ON HOW YOU SLICE SPACE. ***Garrison Cottrell, Brian Tran, and Carrie Joyce, University of California, San Diego*** **-- Previous studies using fMRI have found that the Fusiform Face Area (FFA) responds selectively to face stimuli. More recently however, studies have shown that FFA activation is not face-specific, but can also occur for other objects if the level of experience with the objects is controlled. Our neurocomputational models of visual expertise suggest that the FFA may perform fine-level discrimination by amplifying small differences in visually homogeneous categories. This is reflected in a large spread of the stimuli in the high-dimensional representational space. This view of the FFA as a general, fine-level discriminator has been disputed on a number of counts. It has been argued that the objects used in human and network expertise studies (e.g. cars, birds, Greebles) are too "face-like" to conclude that the FFA is a general-purpose processor. Further, in our previous models, novice networks had fewer output possibilities than expert networks, leaving open the possibility that learning more discriminations, rather than learning fine-level discriminations, may be responsible for the results. To challenge these criticisms, we trained networks to perform fine-level discrimination on fonts, an obviously non-face category, and showed that these font networks learn a new task faster than networks trained to identify letters. In addition, all networks had the same number of output options, illustrating that visual expertise does not rely on number of**

discriminations, but rather on how the representational space is partitioned.

DISSIMILAR REPRESENTATIONS: MODELING ASSOCIATIONS AND ITEMS. *Amy Criss and Richard Shiffrin, Indiana University* **-- What is the representation of pairs in memory? Some models make the simple assumption that a pair is represented as the two component items bound together in time. Other models assume emergent pair information that goes beyond the information contained in each singleton. In fact, my research has shown that neither of these assumptions will suffice. Using a task where participants must discriminate between two items studied together and two items studied as members of different pairs, we found that discrimination fell as the number of pairs of the same type rose, but the number of pairs of other types had little effect (Criss & Shiffrin, in press). That is, we find a list length effect within but not between classes of stimuli, when we define the classes of stimuli to be word-face, word-word, and face-face pairs. The model types described above were unable to account for this pattern of data. A different set of models were developed to account for such data. A test of the new models was carried out in another empirical setting using two successive lists, with some items and associations repeated between lists. This design required that associations and items in the recent list be distinguished from associations in the previous list. The results showed that between list confusions only occurred for associations of the same type, even when the same word was repeated across lists, confirming the previous conclusions and model. The simulation model developed to handle the first paradigm proved capable of predicting the new results in quantitative detail.**

THRESHOLD-BOUND, DRIFT-RATE, OR TWO-STAGE PROCESSING? EVALUATING DIFFUSION MODELS FOR MATCHING TASKS. *Adele Diederich, International University Bremen* **-- Three sequential sampling models, hereafter labelled {\it threshold--bound hypothesis}, {\it drift--rate--change hypothesis} and {\it two--stage--processing hypothesis}, are fit to data from a perceptual discrimination task. The task is performed under different response deadlines and different payoffs presented prior to each individual trial. The effects of payoffs on response bias has rarely been examined within the sequential sampling framework and the purpose of the present research is to show how the three different hypotheses incorporate response biases into the approach and to test the effects of payoffs on the sequential sampling decision process. The hypotheses differ greatly with respect to predicted choice probabilities.**

THE ROLE OF ATTENTIONAL CONTROL AND WORKING MEMORY IN HYPOTHESIS GENERATION AND PROBABILITY JUDGMENT. *Michael Dougherty, University of Maryland* **-- This research examined the role of individual differences in WM-capacity and divided attention in a hypothesis generation and probability judgment task. Participants were given a judgment task that required them to generate relevant alternative hypotheses (and inhibit irrelevant hypotheses) in order to form an overt probability judgment. Concurrent with making their probability judgment, participants were given a divided attention task. We predicted that only high-span participants would be influenced by the divided attention task and that high-span participants would show an increasing tendency for subadditivity as WM-load increased. In addition, under low divided attention conditions, we predicted that high-span participants' judgments would be less subadditive than low-span participants'. The results supported our predictions, but only for participants who spontaneously generated many irrelevant alternative hypotheses.**

A STRONG INFERENCE TEST OF THE SIGNAL-DETECTION INTERPRETATION OF REMEMBER-KNOW JUDGMENTS. *John C. Dunn, University of Western Australia* **-- The signal-detection interpretation of remember-know (RK) judgments holds that R and K responses simply reflect high and low confidence in recognition. In contrast, the dual-process interpretation holds that R and K responses reflect the contributions of qualitatively different memory retrieval processes. Several tests have been proposed to adjudicate between the two accounts but each has been shown to suffer from a logical flaw (Dunn, Psychological Review, in press). Recently, Rotello, Macmillan & Reeder**

(Psychological Review, in press) have proposed that the (one-dimensional) signal-detection interpretation can be ruled out through examination of zROC slopes (an estimate of the ratio of the standard deviations of the strengths of new and old items). However, this argument is also not conclusive since variability in the R-K criterion may lead to the same effect. Despite this, the signal-detection interpretation can be decisively refuted based on a test fulfilling the criteria of "strong inference" (J. R. Platt, Science, 1964). That is, it is based on a qualitative outcome which, if observed, would decisively refute the theory in question (in this case, all possible versions of the signal-detection interpretation). The relevant outcome is sought in data from 52 published studies that used the remember-know or remember-know-guess paradigms. Although every possibility exists for the outcome to be observed, according to the dual-process interpretation, in none of the studies is it found. As a result, the opportunity still remains to observe data that decisively refute the signal-detection interpretation of remember-know judgments.

COGNITIVE IMPAIRMENT AND SUBJECTIVE TIME IN SCHIZOPHRENICS. *Anna Eisler, Stockholm University* **-- There is evidence that sense of time and temporal perspective are fundamental integrative cognitions of human experience. Accordingly temporal disintegration of the relation between past, present and future indicate a disrupted timeline and induce depersonalization. Schizophrenia is in general regarded as a disorder of cognition (Bleuler, 1911; Spitzer et al., 1978). Much of the research on time perception claims that schizophrenics have a disturbed sense of time, and that the schizophrenic's ability to estimate time is disrupted. Minkowski stated as early as 1927 that extreme distortion of subjective time was the central symptom of schizophrenia. An experimental study (Eisler et al., 2001) was conducted to compare time perception of short durations, including intra- and interindividual variability of subjective duration judgments, in schizophrenic and in healthy males. The psychological methods of reproduction, and of verbal estimation in subjective seconds, were used. It was found 1) that the means of the reproductions do not differ between the two groups, 2) the schizophrenics verbally estimated all durations longer and less veridical than the healthy subjects, 3) the variability of the estimates between, as well as within, subjects is much greater in schizophrenics than in the healthy group, 4) also the estimates by the schizophrenic group showed an approximately linear function of responses vs. the reference durations in log-log coordinates, in agreement with Stevens' power law. Schizophrenics are described in terms of distraction and of chaotic and disorganized behavior. This important aspect of schizophrenic symptomatology typically results in cognitive impairment. The impairment may be at the root of the deviant, though fairly consistent, estimations by the schizophrenic subjects. This vulnerability entails that the schizophrenics seem to be unable to translate perceived time into numbers (seconds) probably because of their general difficulty in being able to quantify. To be more specific, it appears that the better understanding of the cognitive processes and the vulnerability factors of experiencing time and of time-structuring behavior is important knowledge as to how the schizophrenics individuals orient themselves in time and space. The conclusion is that our result does not support the view of general time distortion as such in schizophrenia.**

THE LANDSCAPE OF GLOBAL RISKS. *Anna Eisler and Hannes Eisler, Stockholm University; Mitsuo Yoshida, Otemae University* **-- The environment that we are living in today is uncertain, complex and changing. The international expansion and the trend of globalization, with further increases in technology transfer, drastically lead to even more global risks problems. Many people are having difficulties in understanding and interpreting risk probabilities, especially when the probability is small and the risk involved is unfamiliar. They tend to be insensitive to uncertainty and the validity of available information. It is also recognized that culturally based attitudes and values can influence general orientation toward risk and uncertainty. Thus people in different cultures select different risks to be concerned about. Our aim in this paper is to study in a human ecological perspective how global risks are perceived nowadays and how the cognitive representation and orientation toward these risks is framed and interpreted. In the present**

study subjects living in the Stockholm area completed a survey (Yoshida, 2000) containing 54 global risk factors. The result revealed that growing gap between the rich and the poor, terrorism, air pollution, corruption and religious fanaticism were judged as high global risk factors. Gender differences were also obtained. Generally, the female subjects perceived the global risks as more serious than did the male subjects, with the exception of religious fanaticism. Systematic risk analysis has been identified as long ago as 3200 B. C. (Covello & Mumpower, 1985). What may be different today in the perceived landscape of global risks? The differences today are that the risks, being global, are more difficult to manage because of their non localized nature. In the past, risks were more perceptible and thereby more easy to identify. The results suggest the potential role of research in global risk perception with applying cultural theory since the cultural norms and values play an important role how people perceive and evaluate risky options.

TWO SENSORY REGISTERS ALLOW THE MEASUREMENT OF PERCEIVED TIME. *Hannes Eisler, Stockholm University* **-- In comparisons of experienced (subjective) duration in the second range between different conditions a typical result is that one condition entails an over- or underestimation. Besides the ambiguity of the terms over-, resp. underestimation, a result just pointing out a difference in subjective duration seems unsatisfactory. However, subjective duration follows Stevens' power function Y = k(F - F0)b , a fact that makes it possible to pinpoint which of the three parameters k, F0, and b lies behind empirical differences. In our experiments on time perception the preferred psychophysical method was duration reproduction. The parallel-clock model which assumes two sensory registers ("clocks") in parallel, one starting to accumulate subjective duration units from the start of the standard until the end of the reproduction, the other accumulating subjective duration units during the reproduction, allows the computation of (psychologically interpretable) parameter values. For instance, it was shown in recent work that F0 can be interpreted as defining the moment in time when the subject experiences the start of a duration.**

A DYNAMIC DISTRIBUTED MODEL OF SHORT-TERM MEMORY. *Simon Farrell, University of Bristol; Steve Lewandowsky, University of Western Australia* **-- Farrell and Lewandowsky (2002, PB&R) introduced a dynamic distributed model of serial recall that handled several benchmark serial recall phenomena. Two key features of the model are that learning is dependent on previous experience (termed "similarity-sensitive encoding"), and that it naturally accounts for recall latency data. We present experiments and modelling that address these two features and provide additional support for the model. In particular, we show that the model handles the mixed-list advantage for dissimilar items reported by Farrell and Lewandowsky (2003, JEP:LMC) and that it captures the pattern of transposition latencies reported by Farrell and Lewandowsky (in press, JML).**

REPRESENTATION OF NUMBERS IN ANIMALS AND HUMANS. *Wim Fias and Tom Verguts, Ghent University* **-- In a series of behavioral experiments we uncovered a number of findings that are not consistent with current theories of how numerical magnitude information is mentally represented. From these results we inferred new assumptions about how numerical information is represented and incorporated them in an explicitly defined neural network model. We showed how these representational assumptions can explain human performance in a variety of symbolic number processing tasks, without being subject to the problems encountered by previous models. Based on subsequent modeling studies, we were able to show how these assumed representational characteristics can develop from number-selective neurons (described in macaque monkey by Nieder et al., 2002) when being exposed to symbolic input. This finding presents a concrete proposal on the linkage between higher-order numerical cognition in humans and more primitive numerical abilities, and generates specific predictions on the neural substrate of number processing.**

CLASSIFICATION IMAGE WEIGHTS CAN DISCRIMINATE BETWEEN PROTOTYPE AND EXEMPLAR CATEGORY REPRESENTATIONS. *Jason M. Gold, Andrew L. Cohen, &*

Richard Shiffrin, Indiana University -- **A fundamental aspect of pattern recognition is the ability to form categories. According to prototype models, an observer's category representation consists of a single summary abstraction that is the central tendency of the individual members of the category. Classification decisions are then based on the similarity of an individual test item to the category prototypes. According to exemplar models, individual members of a category are stored and classification decisions are based on the separate similarities of a test item to each of the stored items. We show that these two classes of models often make different predictions as to the relative weighting of stimulus features in classification images that are conditioned upon the item presented. We then use these predictions to determine the category representations used by human observers in a set of simple visual spatial categorization tasks.**

GROUP PATH FORMATION. *Robert L. Goldstone, Andrew Jones, and Michael E. Roberts, Indiana University* -- **When people make choices within a group, they are frequently influenced by the choices made by others. We have experimentally explored the general phenomenon of group behavior where an early action facilitates subsequent actions. Our concrete instantiation of this problem is group path formation where people travel between destinations with the travel cost for moving onto a location inversely related to the frequency with which the location has been visited by others. We compare the resulting paths to optimal solutions (Minimal Steiner Trees - MST) and models of pedestrian motion from biophysics. There were systematic deviations from beeline pathways in the direction of MST. These deviations showed asymmetries (people took different paths from A to B than they did from B to A), and varied as a function of the topology of the destinations, the duration of travel, and the absolute scale of the world.**

A RATIONAL ACCOUNT OF CAUSAL INDUCTION. *Tom Griffiths, Stanford University* -- **I will present a statistical framework for analyzing the problem of causal induction - identifying the existence of a relationship between a potential cause and effect - using Bayesian networks. This approach reveals that the leading rational accounts of causal induction correspond to parameter estimation in a fixed causal structure, neglecting the question of whether or not a causal relationship exists. I will describe a new model of causal induction, based on a Bayesian measure of the evidence a set of observations provides for a causal relationship.**

MIDAZOLAM AMNESIA AND COGNITIVE SPECIFICITY. *Elliot Hirshman, George Washington University* -- **Intravenous administration of the benzodiazepine, midazolam, prior to the presentation of a study list produces dense anterograde amnesia. This amnesia may reflect a specific effect on encoding processes in episodic memory. Alternatively, it may reflect more general effects on cognitive, affective and arousal processes. The broad distribution of benzodiazepines receptors throughout the brain makes it very unlikely that midazolam only affects episodic memory. Similarly, the use of benzodiazepines in psychiatry and anesthesiology suggests that midazolam has general effects on affect and arousal. On the other hand, the greater density of benzodiazepines in brain regions (e.g., hippocampus) responsible for episodic memory raises the possibility that, at appropriate doses, midazolam may have its primary effects on episodic memory. We examined the effect of a .03 mg/kg of bodyweight dose of midazolam administered 5 minutes or more before the beginning of cognitive testing on tasks that are hypothesized to reflect: 1) episodic memory processes; 2) implicit memory processes; 3) short- term memory processes; 4) semantic memory processes; and 5) meta-memory processes. Our results demonstrate that midazolam has large and dramatic effects on tasks hypothesized to reflect episodic memory tasks, smaller effects on tasks hypothesized to reflect implicit memory processes, and minimal or no effects on tasks hypothesized to reflect short-term memory, semantic memory and meta-memory processes. These results are consistent with the hypothesis that, at appropriate doses, midazolam can have specific effects on cognitive processes. Implications for the use of midazolam in testing cognitive theories, with illustrative examples, will be discussed.**

ELECTROPHYSIOLOGICAL MEASURES OF REPETITION PRIMING. *David Huber, University of Maryland* **-- We present the results of three experiments that measured electrophysiological responses (ERPs and MEGs) to novel words as compared to immediately repeated words. Behavioral results are explained with a neural network that assumes brief primes integrate with the target item whereas neural accommodation causes a separation between prime and target with long prime durations. Our ERP results support these claims, yielding a robust reduction in early perceptual components with short duration primes, but little effect, or even a reversal of the effect, with long duration primes. A critical test of the neural network is obtained by using its dynamics to drive equivalent dipoles, thereby explaining both spatial and temporal aspects of the electrophysiological measures.**

LEARNING FUNCTION CONCEPTS FROM OTHER SUBJECTS' TRANSFER RESULTS. *Michael Kalish, University of Lousisina* **-- Iterated learning is a procedure derived from Bartlett's (1932) serial reproduction, and inspired by Kirby & Hurford's (2002) exploration of language evolution. In essence, families pass knowledge of input-output transfer functions through generations of learners. The process exposes underlying biases in the learners, which Bartlett called conventionalization. A recent examination of function learning has highlighted the role pre-experimental biases appear to play in the learnability of various function concepts. By applying an iterated learning method to function concepts, converging evidence about function concept biases is obtained.**

RECENCY JUDGMENTS AND LIST CONTEXT. *Krystal A. Klein, Amy Criss, and Richard Shiffrin, Indiana University* **-- Most memory experiments require participants to remember what events occurred, indirectly providing a measure of context availability. A more direct approach requires participants to remember when events occur. In Judgment of Recency (JOR) paradigms, participants study a list of stimuli and are asked to judge the recency of items from the list. In this study, three experiments using a study-test variant of the forced-choice judgment of comparative recency paradigm (Flexser & Bower, 1974) shed light on the manner in which temporal context evolves in the course of list-learning experiments.**

PERCEPTUAL CATEGORIZATION OF EVENTS. *Koen Lamberts, University of Warwick* **-- Current theories of perceptual categorization are very good at explaining how people categorize or identify static objects, but they have little to say about how people categorize events (which can involve objects or properties that change). This is an important limitation, because many objects in our environment have dynamic properties. I will present a new theory of perceptual categorization that covers static objects and events. The theory generalizes an exemplar model of perceptual categorization, by assuming that events can be represented as trajectories in perceptual space, and that similarity between events is a function of total distance between trajectories. The theory explains experimental data on event categorization, identification and recognition.**

SIMPLICITY AND PROBABILITY IN EXPLANATION. *Tania Lombrozo, Harvard University* **-- Scientists and philosophers have often and eloquently expressed the idea that all else being equal, simpler explanations are more likely to be true. While this intuition is widely shared, there is little consensus about the best way to formalize and justify a preference for simplicity. In a series of empirical studies, I explore whether people in fact prefer simpler explanations, and whether they justify this preference through a belief that simpler explanations are more likely to be true. I quantify simplicity in terms of the number of causes invoked in an explanation, and find that participants require a disproportionate amount of evidence in favor of a complex explanation before they will favor it over a simpler alternative. I also find that participants who commit to a simpler explanation when it is unlikely to be true commonly justify the preference by appeal to probability, and systematically overestimate the frequency of causes that would render their explanation more probable. The results suggest that people do prefer simpler explanations, and may believe that simpler explanations are more likely to be true just in virtue of being simple. I briefly consider the relationship between this work and formal metrics of simplicity, like**

Kolmogorov complexity, Minimum Description Length, and the Akaike information criterion.

INFANTS, AMNESIACS, AGING, AND THE MTL. ***Brad Love, University of Texas at Austin*** **-- Recently, there has been a great deal of interest in the cognitive neuroscience of category learning. One interesting question is how existing models of category learning from cognitive psychology align with new findings from cognitive neuroscience. In this talk, aspects of SUSTAIN (a clustering model of human category learning) will be related to regions of the brain. The focus of the talk will be on SUSTAIN's cluster recruitment mechanism. SUSTAIN recruits new clusters in response to surprising events, such as an error in supervised learning or an unfamiliar stimulus in unsupervised learning. A functioning hippocampus is hypothesized to be necessary to form new clusters (i.e., conjunctive codes). Clusters support gradual cortical learning. This simple account is supported by a wide range of data from fMRI, animal lesion, amnesic, and infant learning studies. Further predictions of this account are tested and confirmed in a category learning study of young and older adults.**

A MODEL OF REMEMBERING AND KNOWING. ***Kenneth J. Malmberg, Iowa State University*** **-- In this talk, I'll show that the Retrieving Effectively from Memory model (Shiffrin & Steyvers, 1997; Malmberg, Zeelenberg, & Shiffrin, 2004) can readily account for the effects of repetitions, study time, list-strength, list length, normative word-frequency, and midazolam amnesia on remember-know judgments, as well as the form of both the ratings and remember-know ROCs. The subject of future competitive hypothesis testing, predictions generated by the present model may be compared to behavior in a variety of settings, perhaps leading to greater insights into the nature of recognition memory.**

SERIAL ORDER EFFECTS IN SHORT-TERM MEMORY: AN OVERVIEW. ***Bennet Murdock, University of Toronto*** **-- This will be a fairly general coverage of the serial-order area where I will try to highlight some of the important data in this field. I will also review some of the theoretical notions that have tried to serve as explanatory concepts, and will end with a brief overview of some of the current models.**

A COMPARATIVE ANALYSIS OF QUALITATIVE PERFORMANCE OF ALCOVE AND RULEX. ***Jay Myung, Dan Navarro, and Mark Pitt, Ohio State University*** **-- Research in category learning over the last decade has resulted in a proliferation of formal models that modelers find it increasingly difficult to tell apart. In this paper we introduce a Markov Chain Monte Carlo method for examining the global behavior of a category learning model, by identifying all data patterns the model can describe. Applying the method, we compared performance of ALCOVE and RULEX in their accounting for the Shepard, Hovland & Jenkins's (1961) six-curve data. Among a total of 4,863 possible data patterns, the simulations identified 56 patterns for ALCOVE and 26 for RULEX, with an overlap of 15 shared patterns, which includes the empirical pattern observed with human subjects. This result suggests that ALCOVE is more complex than RULEX despite the fact that the former has fewer parameters than the latter (4 vs. 5). Results from a finer grain analysis of the ALCOVE and RULEX patterns to gain further insights into qualitative differences between the two models will also be reported.**

TESTS OF RESPONSE TIME MODELS OF PERCEPTUAL CLASSIFICATION AND RECOGNITION. ***Robert Nosofsky, Indiana University*** **-- Speeded perceptual classification experiments were conducted to distinguish among the predictions of exemplar-retrieval, prototype, and decision-boundary models. The key manipulation was that, across conditions, individual stimuli received either probabilistic or deterministic category feedback. Regardless of the probabilistic feedback, however, an ideal observer would always classify the stimuli by using an identical linear decision boundary. Subjects classified the probabilistic stimuli with lower accuracy and slower response times than they classified the deterministic stimuli. These results were in accord with the predictions of the exemplar model and challenged the predictions of the prototype and decision-bound**

models.

CATEGORIZATION AND AMNESIA. *Thomas Palmeri, Vanderbilt University* **-- I discuss the controversy regarding whether amnesics exhibit normal categorization and category learning. Such results have important theoretical implications for understanding the potential role of the hippocampal complex in category learning and for understanding the relationship between knowledge of categories and memory for events. I review results over the past few years as well as describe new results examining this controversy. I also describe potential strategies amnesics could employ to demonstrate significant category learning performance without having any long-term learning or memory.**

MODALITY EFFECTS IN CONCEPTUAL REPRESENTATIONS. *Diane Pecher and Rene Zeelenberg, Erasmus University Rotterdam; Lawrence Barsalou, Emory University* **-- An intriguing question is how people represent the world in their mind. According to the embodied view of cognition (e.g., Barsalou, 1999), sensory-motor simulations underlie the representation of concepts. According to this view people represent a concept, for example APPLE, by simulating perceptual and motor experiences with the concept. A strong claim is that the neural systems that are used for perception and action are also used for these simulations. In actual perception there is a cost associated to modality shifts. We showed that this also holds for conceptual representations. In a property verification task in which all stimuli were words a critical trial (e.g., EGGPLANT- purple) was preceded by a trial from the same modality (GEMSTONE-glittering) or a different modality (MARBLE-cool). Responses were slower after a modality shift, supporting the view that sensory-motor simulations play a role in the representation of concepts. We also obtained evidence that representations are affected by recent experiences with a concept. Concept names (e.g., APPLE) were presented twice in a property verification task with a different property on each occasion. The two properties were either from the same perceptual modality (e.g., shiny, green) or from different modalities (e.g., shiny, tart). Verification times and error rates for the second presentation of the concept were higher if the properties were from different modalities than if they were from the same modality.**

PARTS, WHOLES, AND THE CONJUNCTION INDEX. *Denis Pelli* **-- Some objects can be recognized by detecting a single feature, but to recognize most objects we must detect a combination of several features, a "conjunction". The long-standing question of whether an object is recognized as a whole or by parts distinguishes a single global conjunction from a combination of several separate conjunctions computed over distinct regions of the object. Taking a "part" to be a conjunction reduces the "by parts" problem to counting conjunctions, which is now easy because of recent advances in understanding of crowding. It seems that in evaluating conjunctions, human vision always includes features over a minimum area - the "conjunction field" - that depends solely on eccentricity. Once the object size or eccentricity is adjusted to a criterion threshold for recognition, then the number of necessary conjunctions can be estimated as the ratio of object area to conjunction area. We call this the conjunction index K. Values of K = 0 or 1 indicate recognition as a whole; values of 2 or more indicate recognition by parts. In a preliminary survey all objects recognized holistically (K = 0 or 1) are simple shapes like a vase or letter. Most objects, including faces and words, are recognized by parts (K " 2). Parametric measurements of the effects of size, spacing, and eccentricity for faces and words confirm that both are recognized by parts.**

AN INDIVIDUAL DIFFERENCES APPROACH TO EXPLORING DISSOCIATIONS BETWEEN MEMORY SYSTEMS IN CATEGORY LEARNING TASKS. *Alan Pickering and Ian Tharp, Goldsmiths College, University of London* **-- Individual differences offer cognitive scientists another tool for exploring possible dissociations between memory systems. In past work, we have used standard personality trait measures in student participants in an attempt to find dissociations between potentially different forms of category learning (CL). Measures of extraversion were ssociated with information integration CL task performance, but not with CL tasks learned as item-category paired-**

associates; and the complementary pattern of correlations was found for other trait measures (assessing impulsive antisocial sensation seeking). Subsequent findings will be presented which suggest that the correlation between rule-based CL task performance and impulsive antisocial sensation seeking measures can be positive or negative, depending on whether the optimal task solution requires attention to one or both of the two stimulus dimensions present. Results from a final study will also be presented. Here, we looked at matched information integration and rule-based CL tasks and will report the correlations between CL performance and measures of working memory taken from the same participants. Working memory is hypothesized to be more important for (and so should correlate more strongly with) rule-based than information integration CL task performance.

DISSOCIABLE CORRELATES OF FAMILIARITY AND RECOLLECTION WITHIN THE MEDIAL TEMPORAL LOBES. *Charan Ranganath, University of California at Davis* **-- Accumulating behavioral and neuroscientific evidence has suggested that recognition memory may be supported by at least two processes: the assessment of an item's familiarity and the recollection of the context in which an item was encountered. However, the functional nature of these processes and their neural substrates remain unclear. I will present results from studies using scalp-recorded event-related brain potentials demonstrating that recollection and familiarity are supported by independent neural systems at the time of encoding as well as retrieval. Next, I will report evidence from functional magnetic resonance imaging (fMRI) studies suggesting that these two processes differentially depend on encoding processing within different regions within the human medial temporal lobes. Finally, I will show that regions in the prefrontal cortex (PFC), thought to play a critical role in the control of memory activations, contributes to both familiarity and recollection.**

MODELING RESPONSE SIGNAL AND REACTION TIME PROCEDURES. *Roger Ratcliff, Ohio State University* **-- Response signal and regular reaction time data are fitted jointly using the diffusion model (Ratcliff, 1978) and the leaky competing integrator model (Usher & McClelland, 2001). The data modeled were obtained from a signal detection task in which subjects participated in both a regular reaction time task with both speed and accuracy instructions and in a response signal procedure using the same stimuli. In the response signal paradigm, a test stimulus is presented and following one of a number of experimenter determined times, a signal to respond is presented. Most response signal data are modeled by taking one condition as a control condition and scaling the others against it to provide d' as a function of time. Old versions of sequential sampling models assumed that the decision boundaries are removed and that subjects make a positive decision if it is above the starting point and a negative decision if it is below the starting point. In the response signal procedure, at long lags, subjects have already made a decision to respond and are waiting for the signal. In this article, response signal data is modeled by a mixture of processes that have terminated and by processes that have not terminated that are based on partial information or on guesses.**

PICKING UP THE GAUNTLET: REPLY TO MALMBERG, HOLDEN & SHIFFRIN. *Heekyeong Park and Lynne Reder*, Carnegie Mellon University* **-- The effect of similarity of a studied item to a new item affects the recognition pattern of words of varying normative word frequency. Contrary to the claim of Malmberg, Holden and Shiffrin (2004), the dual process recognition model, SAC, not only predicts the higher false alarm rates for low-frequency, similar unstudied items but also accounts for the reversed false alarm pattern for similar lures with a recollection process. Higher false alarms for low-frequency items tend to be based on a recollection process of an incompletely specified episodic trace, and not to be based on the error-prone familiarity process. Using this SAC account, we made a novel prediction that the encoding instructions could affect an episodic trace and thereby change the pattern of false alarms among similar lures of different frequencies. The present experiment investigated whether study instructions would change the pattern of word frequency effects on similar lures and whether false alarms for low-frequency similar items are based on the recollection process. The results showed that higher false alarm rates for**

low-frequency similar items over high-frequency similar items disappear when participants bother to encode the critical features of studied items, and the change in the false alarms is related to the change in remember responses. The results support the SAC account that the reversed false alarm rates to similar lures are based on the recollection process.

AN ALTERNATIVE ACCUMULATOR MODEL. ***Adam Reeves, Northeastern University*** **-- It is possible to formulate a simple, intuitive and tractable random-walk-style single accumulator model for reaction times on each type of trial (hit, cr, fa, and miss) assuming that progress towards a 'Yes' or 'No' boundary occurs deterministically along a single ray on each trial, but varies across trials according to one's favorite distribution. Very long RTs are curtailed at a third 'guess' boundary. Three constraints on the percentiles of the RT distribution must be met before the model can be applied; I will illustrate data that do, and do not, meet these constraints.**

ON THE FLEXIBILITY OF REMEMBER-KNOW DECISION BOUNDS. ***Caren M. Rotello, University of Massachusetts*** **-- In the remember-know paradigm for studying recognition memory, subjects report the subjective basis for their "old" response to a test probe to be either recollection of specific details ('remembering') or just familiarity ('knowing'). Remember-know judgments are most often requested after an "old" response, but are sometimes collected in a trinary remember-know-new paradigm. Distinct response patterns in these two task variants can be understood within a two-dimensional signal-detection model that combines global and specific information about test items. The standard two-part judgment is based on the sum and difference of these variables (STREAK, Rotello et al. 2004) whereas the trinary decision uses process-pure decision bounds (SAC, Reder et al. 2000).**

STRATEGIES IN SEEING WORDS WITHOUT SEEING CASE. ***Adam Sanborn, Indiana University; Ken Malmberg, Iowa State University; and Richard Shiffrin, Indiana University*** **-- The use of visual form versus word or letter codes is assessed in a perceptual identification task. In this task, a word is briefly flashed, post-masked, and a decision is made between two alternatives. The availability of visual and word codes was manipulated by varying the similarity of the alternatives. Three (mixed) choice conditions were used: word information only (e.g., PITY** **CITY), case information only (e.g., PITY** **pity), and both word and case information (e.g., PITY** **city). Observers used word information for identification and largely ignored case information when a briefly flashed word is followed by a mask, but when the mask was removed observers primarily used case information. Further experiments have manipulated observers strategies by blocking or not presenting all of the choice conditions. When the choice conditions are blocked and the target masked, observers perform equally well across choice conditions. This result suggests that strategies play a role in the mixed choice presentations. However, observers strategies are not always adaptive. In a mixed experiment in which use of case information is always useful and word information is only sometimes useful, observers prefer word information. Observers seem to attend to word information when it is available, even when form information is more useful.**

WHY FORGETTING IS A NATURAL ALLY OF HEURISTIC INFERENCE. ***Lael Schooler and Ralph Hertwig*** **-- To explore how forgetting benefits memory-based inferences, we bring together two research programs with strong ecological foundations. The program on fast and frugal heuristics (Gigerenzer, Todd, & the ABC Research Group, 1999) and the ACT-R research program (Anderson & Lebiere, 1998). While many have argued that forgetting filters out obsolete information (e.g., Bjork & Bjork, 1988), we provide new specificity to this and other benefits of forgetting. Through simulation we shown that forgetting helps to maintain systematic recognition failures that are critical to the functioning of the recognition heuristic. Our simulations of the fluency heuristic, which makes judgments based on the speed with which items are recognized, show that forgetting also helps maintain the discriminability of these judgments. These results highlight that what are often characterized as cognitive limitations, such as forgetting, may have**

unsuspected benefits.

ATTENTION, PERCEIVED ONSET, AND PERCEIVED DURATION. ***Rich Shiffrin, Indiana University; David Diller; Asher Cohen*** **-- David Diller, Asher Cohen, and I carried out a series of studies (as yet unpublished) designed to see what information is extracted from the visual environment from an unattended spatial location when all attention and all task demands are fully directed toward a different spatial location. We used an RSVP task, with frames every 300 ms. A demanding foveal task required full attention. In one study, we examined duration estimation: Occasionally, after a random number of displays, a cue signaled a switch from the central task (not a duration task) to a duration estimation task slightly in the periphery: The Os were asked to judge the duration of the signaled letter in the specified location. The duration of this letter was measured by asking the O to adjust the duration of a following, different, letter until the two appeared equal in duration. In some conditions, the letter whose duration was estimated could have been present for a full frame before the task switch. This additional duration did not increase the duration estimate. In fact the duration measurement appeared to begin at the time attention settled in the peripheral location, roughly 150 ms. after the signal to switch.**

MODELING ERP AND EPISODIC MEMORY WITH CELL DIFFERENTIATION AND SYNAPTIC DEPRESSION. ***Sverker Sikstr&#65533;m, Lund University*** **-- Reduced neural activity following stimulus repetition has been hypothesized to occur due to 'tuning' or differentiation of neural cells. This differentiation decreases activity for suppressed cells; although some cells also show enhancement or increased activity. Here the differential depression (DD) model is introduced which suggests that neural priming occurs due to a larger increase in synaptic depression of enhanced cells than decrease in synaptic depression for suppressed cells following repeated stimulus. The model is applied to episodic encoding of high and low frequency words and serial position effects. It is simultaneously fitted to the cognitive ERP components (from 200 ms poststimulus) and free recall data. Lower activity is predicted for high than low frequency words due to more efficient synaptic depression, and the first serial position is predicted to be less active than the following positions due to a less accumulated synaptic depression.**

QUANTIFYING SPATIAL ATTENTION. ***George Sperling, Joetta Gobell, and Chia-huei Tseng, University of California, Irvine*** **-- A novel search task is used to investigate the spatial distribution of visual attention, and a general model of spatial attention is derived from the data. Observers must locate a target--a large disk in an attended area-- in the presences of distractors (small disks) and false targets (large disks in unattended areas). Attended areas are defined by a square-wave grating. A target is in one of the even stripes, and ten false targets (identical to the real target) are in the odd stripes; the observer must attend the even stripes and strongly ignore the odd, reporting the location of the target. As the spatial frequency of the attend-unattend grating increases, performance declines. Variations on this task inform a model that incorporates stimulus input, a ``low pass'' attentional modulation transfer function, and an acuity function to produce a strength map from which the location with the highest strength is selected. A feature-strength map that adds to the attention map enables the model to predict the results of attention- cued conjunction search experiments, and internal noise enables it to predict the outcome of double-pass experiments and of variations in the number of false targets. The model predicted performance on a trial-by-trial basis for three observers, accounting for approximately 70% of the trials. Actual trial-to-trial variation for an observer, using the double-pass method, is about 76%. For any requested distribution of spatial attention, this general model makes a prediction of the actually achieved distribution.**

REPRESENTATIONS IN MEMORY AND LANGUAGE LOCATED IN, AND SUBTENDING, TOPOGRAPHICAL SPACE. ***Michael Spivey, Cornell University*** **-- Research in visual imagery, mental models, and image schemas have pointed to a topographical format of representation for visual processing, reasoning, and even language processing. In this talk, I will focus especially on recent evidence for the activation of spatial image**

schemas during real-time language comprehension. As evidence accrues for such analog representations in cognitive processes, the case for neurally distributed, physically embodied, and ecologically embedded accounts of cognition gain strength.

THE TOPICS MODEL FOR SEMANTIC REPRESENTATION. ***Mark Steyvers, University of California, Irvine*** **-- The topics model is a probabilistic approach to semantic cognition in which topics are represented as probability distributions over words. From a corpus of educational text documents, we were able to estimate in an unsupervised manner a large number of interpretable topics. We show how these topics can be used in a simple gist-based model for free recall to explain variability in eliciting false memories across study lists. The model assumes that study words activate a distribution of topics ("the gist") which concentrates on one or more topics depending on the number of categories/themes in the study list. At retrieval, free recall is modeled as a reconstructive process using the stored topic distribution as well as verbatim memory traces as cues. We compare this probabilistic approach to the spatial framework of latent semantic analysis where words are represented as points in a high-dimensional semantic space.**

IMAGING INFORMATIONAL CONFLICT: FMRI STUDY OF NUMERICAL STROOP. ***Joey Tang, Hugo Critchley, Ray Dolan, Daniel Glaser, and Brian Butterworth, University College London*** **-- Since the late 70's, a numerical comparison Stroop paradigm has been used to investigate informational conflict (e.g., Besner & Coltheart, 1979; Foltz et al., 1984; Girelli et al., 2000; Henik & Tzelgov, 1982). Invariably, nine numbers have been put into conflict with, at most, three sizes, so the competing dimensions were not properly matched. This meant that there were eight possible distances in the number dimension but two, at most, in the physical. This limited inferences about the amount of information available in the attended and unattended dimensions. In this study, we used nine sizes as well as nine numbers, with four equivalent "distances". Tang and Butterworth (in preparation) using this approach found the classic distance effect in both of the attended dimensions, but a significant positive linear trend of physical distance (which is the unattended dimension) in the numerical task, and no effect of numerical distance in the physical comparison task. The authors concluded that there was a discriminability mismatch - physical sizes which require processing on a perceptual level may be more discriminable than numerical magnitudes which require processing on a cognitive level, thus the former is more capable of interfering a less discriminable dimension. Here we used this fully parametric design in a brain imaging study to investigate the fronto- parietal network (see Dehaene et al., 2003) which has been associated with processing numerical information, and the roles played by inferior frontal areas and cingulate gyrus.**

SCALE INVARIANT STOCHASTIC CATASTROPHE THEORY. ***Eric-Jan Wagenmakers, Han van der Maas, Pascal Hartelman, and Peter Molenaar, University of Amsterdam*** **-- Catastrophe theory provides a general mathematical description of how continuous changes in control variables lead to sudden jumps or discontinuities in observed behavioral variable s. Fitting a catastrophe model to a noisy system constitutes a serious problem, however, because catastrophe theory was formulated specifically for deterministic systems. Cobb attempted to solve this problem by developing a stochastic counterpart of catastrophe theory (SCT) based on It stochastic differential equations. In SCT, the stable and unstable equilibrium states of the system correspond to the modes and the antimodes of the empirical probability density function, respectively. Unfortunately, SCT is not invariant to smooth and reversible transformations of the dependent variable - this is an important limitation, since invariance to transformations is a defining feature of deterministic catastrophe theory. We derive a generalized version of SCT that does remain invariant under transformation and can include Cobb's SCT as a special case. The generalized SCT can be instantiated via a simple time series techniques. We illustrate the invariance problem and its solution with practical applications.**

MODELING THE EFFECTS OF PRIME DURATION AND LOCATION IN PERCEPTUAL IDENTIFICATION. ***Christoph T. Weidemann, Indiana University; David E. Huber,***

University of Maryland; and Richard M. Shiffrin, Indiana University -- **In forced-choice perceptual-identification studies, a masked target presentation followed one or two sequentially presented (nondiagnostic) primes. Neither, one, or both of the choice words repeated a prime word. As in Huber, Shiffrin, Quach, and Lyle (2002), short prime presentations produced a preference for repeated words, whereas longer prime presentations produced a small preference against repeated words. However, if the prime was presented again shortly after a long presentation, a preference for repeated words was observed. This surprising result was quantitatively handled with the ROUSE model of Huber, Shiffrin, Lyle, and Ruys (2001), positing the offsetting components of source confusion (features from primes are confused with the target) and discounting (evidence from features known to have been in primes is discounted). In a critical condition, priming both choice words for different amounts of time, source confusion and discounting effects combined to produce the largest priming effects overall.**

INFORMATION PROCESSING DURING IMPLICIT LEARNING. *Michal Wierzchon* -- **The aim of the presentation is the analysis of the results obtained in two artificial grammar learning experiments. The presented studies show two different approaches to the problem of information processing in implicit learning. Results obtained in the first experiment indicate that there is no difference during classification phase when single and dual task is performed in the acquisition phase. The second experiment shows that the implicit learning effect occurs even in speeded presentations (500ms, 1000ms) in the acquisition phase. Thus results are interpreted in terms of low processing level demands in acquisition of implicit knowledge. The preliminary theoretical issues about processing during implicit learning are also present.**

ENEMIES AND FRIENDS IN THE NEIGHBORHOOD: ORTHOGRAPHIC SIMILARITY EFFECTS IN SEMANTIC CATEGORIZATION. *Ren Zeelenberg, Indiana University and Erasmus University Rotterdam; Diane Pecher, Erasmus University Rotterdam; Eric-Jan Wagenmakers, Northwestern University and University of Amsterdam* -- **Studies investigating orthographic similarity effects in tasks that rely heavily on semantic processing have produced inconsistent results. The present study investigated orthographic similarity effects in a semantic categorization task (animacy decision) and in contrast to previous studies we took semantic congruency into account. In Experiments 1 and 2, performance to a target (e.g., cat) was better if a previously studied neighbor (e.g., rat) was congruent (i.e., belonged to the same 'animate/inanimate' category) than if it was incongruent (e.g., mat). Experiment 3 investigated the influence of the pre-existing orthographic neighborhood structure (i.e., no primes were presented for study). Performance was better for targets with more congruent neighbors than for targets with more incongruent neighbors. Experiment 4 showed that the effect was not present in size decision, a task in which animacy congruency is irrelevant. These results demonstrate that the effects of orthographic similarity in semantic categorization are conditional on semantic congruency. This strongly suggests that semantic information becomes available before orthographic processing of the target word has been completed.**

COMPUTATIONAL MODELING OF NUMERICAL COGNITION. *Marco Zorzi, University of Padova* -- **Numerical cognition has been studied in both human and animal species for a long time. However, the computational basis of number representation and numerical skills has received very little attention, as compared with the computational basis of language processing. I will review our recent progress in developing computational (connectionist) models of numerical cognition. Our comprehensive theoretical proposal, which revolves around the notion of numerosity representations organized according to the cardinality principle, focuses on three main issues: i) development of number representations; ii) basic numerical skills (e.g., number comparison); iii) simple mental arithmetic.**

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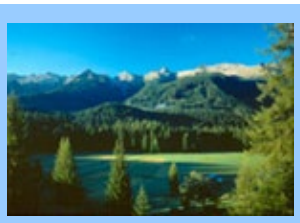

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Travel & Lodging
Activities
Contact

ASIC 2004

Third Annual Summer Interdisciplinary Conference

Travel and Lodging Information for ASIC 2004

Travel to Cavalese

Maps and other information may be found on the Hotel Grunwald website. A major superhighway, A4, runs across northern Italy, just south of the Dolomites, from Milan on the west to Venice on the east. About 2/3 of the way to Venice, another major highway, A22, heads north from Verona to the Brenner Pass, and thence to Innsbruck, Austria. Flights to any of the four cities (Milan, Verona, Venice, Innsbruck) are recommended as providing the easiest access to the conference. Attendees are advised to rent cars at the airport of entry, both to enable transport to Cavalese, and to allow easy access to leisure activities and tourism.

Map of the Val di Fiemme area (click the image to see a bigger version).

Directions to Hotel Grunwald

By car:

If one is driving east from Ora on A22, one enters Cavalese on via Trento. One first hits piazza Partigiana; aim for the city center: follow via IX Novembre a few blocks past piazza Dante and through piazza Rizzoli and piazza C. Battisti, past the tower, reaching piazza Scopoli (6 or 7 blocks/streets from Partigiana). Take a right on vialle Mendini (going through pazza Scopoli and piazza Verdi); in a few blocks one bears right on via della Pieve. In about one block take another right on via Bresadola where one finds Hotel Grunwald on the right in half a block.

By bus:

Piazza Autostazione is where I assume the buses arrive. One follows via Banco della Reson two blocks at which point it turns into via Bresadola, and the hotel

is another half block on the right. Whether this is walkable with luggage may be a stretch, but I assume some sort of taxi service is available.

Lodging

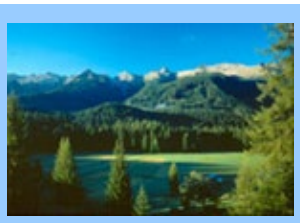
Hotel Grunwald
CAVALESE (Trento) - via Bresadola, 3
Val di Fiemme - Dolomiti - Italia
TEL 0462/340369 - 340651 - 231503 -
FAX 0462/231504
E-mail:

The conference hotel is the Hotel Grunwald. The hotel has a restaurant, sauna, Turkish Bath, heated swimming pool. There are several dining choices nearby, but the lodging reservation includes dinner and breakfast (and lunch for a small additional supplement).

We have reserved the entire hotel, which includes 56 nicely appointed and large rooms-- the room types have from one to four beds per room. If additional rooms are needed, they are available at a nearby hotel. The rooms are available at 50 Euro per person for half board, for two person occupancy. Half board includes breakfast and dinner for each person, with the exception of drinks, such as wine. Full board (i.e. lunch) is available for a supplement of 5 Euro per person/day. A supplement of 10 Euro/day is required for single room occupancy. Children staying in the same room with parents are completely free for both lodging and meals. (!) In order to better plan for the number of rooms, it would help greatly if those wishing to attend would send an email indicating the probable number of people, nights, rooms, and room types. Email to:

HOWEVER: Attendees should make their own reservations directly by calling, faxing, or emailing the hotel. Tell them you are attending ASIC 2004 to receive the conference rates. The hotel will require a deposit of 150 Euro per paying person (credit card or postal check).

Website designed and maintained by Krystal Klein. Best viewed with Internet Explorer 6.0.



ASIC 2004

Third Annual Summer Interdisciplinary Conference

Home

Registration

Schedule

Attendees & Sessions

Abstracts

Travel & Lodging

Activities

Contact

Activities in the area of Cavalese

(This page is in the process of construction--more information will be added).

Overview

For tourism during the conference, the cities of Trento and Bolzano are closest, and Verona, Vincenza, Padova, and possibly Venice are close enough for day trips that would allow return to Cavalese in time for the conference proceedings. Riva del Garda is a pleasant and accessible resort town on the northern tip of Lake Garda. However, generally speaking tours to the old cities of Northern Italy and elsewhere had best be planned for days before and after the conference.

The conference is being held in the Dolomites, a remarkable set of rocky crags in Northern Italy, with valleys typically starting about 3000 feet and peaks rising to 10,000 feet. There are many enormous sheer cliffs rising from green valleys and beautiful lakes, large numbers of sharp pinnacles and spires, hiking paths and extremely well appointed huts throughout the region, and pleasant villages everywhere. In addition to the usual hiking opportunities (which are quite dramatic and pleasant) there are Via Ferrata scattered throughout the mountains. Via Ferrata (i.e. 'iron walks') are 'paths' threaded through the cliffs and peaks of the most dramatic mountains, with cables running along the trails and iron ladders running up and down the cliffs. One hikes/scrambles along these paths with harness and quick draws that allow one to be attached to the cables at all times, making the experience the closest one can come to mountaineering and technical climbing, and the attendant scenery and exposure, while maintaining complete safety. The same feature makes these walks suitable for beginners and children. The Via Ferrata are rated for difficulty, allowing one to choose one to match one's abilities and maximize enjoyment.

There are of course numerous opportunities for rock climbing throughout the area, mostly sport climbs with bolts every few feet for protection, from one to twenty or more pitches in length. The rock is mostly Dolomitic limestone, with many interesting features for face climbing.

Adventure activities available in the general area include canyoneering, parasailing, and mountain biking. In Cavalese there is also a dedicated paved bicycle-only path that winds from the city through the countryside and mountains, and is excellent for family and other day trips. For those unable or unwilling to walk, hike, bicycle, or climb, excellent touring by car is possible, and there are also ski lifts operating in the summer to bring visitors close to or on top of the dramatic peaks. For days prior to or following the conference we also recommend highly the hut-to-hut hiking in the Dolomites. Most huts are quite plush and well maintained, relatively inexpensive, situated in startling scenery, and offer fresh meals (from menus) prepared using fresh ingredients, breads and pastries brought daily by cable from the nearest villages in the valleys.

Example Activities and Costs

We mention here a few of the possibiltiies for groups and some prices. Prices are per person (in Euro), but note that there is a minimum number of participants, varying with the activity.

Many of these activities require half day, but full day outings can also be arranged. Other activities can be arranged upon request, including climbing on any route (trad or sport) in the Dolomites.

****Guided hike (moderate to difficult). Euro 25 per person (min. 5)**
****Guided visit to natural park - easy hike. Euro 15 per person (min. 10)**
****Via Ferrata. Euro 85 per person (min. 3)**
****Rock climbing course. 1-3 days, 9 am to 1 pm, Euro 65 per person (min. 3)**
****Climb of the Marmolada glacier (all day). 90 Euro per person (min 2)**
****Canyoning (9 am-13 pm). Euro 52 per person (min 5)**

Pertinent Links

The official Val di Fiemme Website: http://www.aptfiemme.tn.it.
The Alpine Guide website: http://www.guide-alpine.it/.

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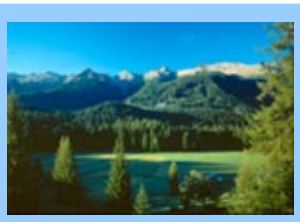

Home
Registration
Schedule
Attendees & Sessions
Abstracts
Travel & Lodging
Activities
Contact

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Webmaster/Conference Coordinator

Please direct questions concerning the website to the webmaster:

Krystal Klein
Indiana University - Bloomington

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