PROCEEDINGS

OF THE
15TH MEETING

OF THE
EUROPEAN SOCIETY FOR COGNITIVE PSYCHOLOGY

29th AUGUST – 1st SEPTEMBER, 2007
MARSEILLE, FRANCE

Conference committee:

Jonathan Grainger (chair)
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Stéphane Dufau
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Conference proceedings edited by the scientific committee, consisting of

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Results showed that updating cost increased with operation difficulty. In other experiments, numerical comparisons determined if the number should be updated. Results showed that updating costs were greater for easy comparisons (distant numbers) than for difficult ones (close numbers). Taken together, results in these experiments suggest that, rather than operation difficulty itself, it is numerical distance between the numbers which has an impact on updating costs.

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9:40-10:00 **(27)**

Numbers and Space? Yes, But Having Room in Working Memory - *Amparo HERRERA, Pedro MACIZO, Carlo SEMENZA*

This work examined the role of working memory in basic numerical processing. In two experiments, participants performed a comparison task in single and dual-task conditions. In the dual conditions, the comparison task was accomplished while phonological or visuospatial information had to be maintained for a later recall test. The results showed that the requirement of maintaining visuospatial information produced the lack of spatial-numerical association of response codes (SNARC) effect. The absence of the effect was found even when participants correctly retrieved magnitude information, as indicated by a similar distance effect in all conditions. These results show the participation of the visuospatial component of working memory in the occurrence of the SNARC effect.

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10:00-10:20 **(28)**

Encoding Processes in Mental Arithmetic - *Catherine THEVENOT, Pierre BARROUILLET*

In line with Dehaene's triple-code model, we showed that each numerical processing requires a specific representational format for input. Adult were given two numbers presented successively on screen through a self-presentation procedure after being asked either to add, subtract or compare them. We considered the self-presentation time of the first number as reflecting the complexity of the encoding for a given planned processing. Self-presentation times were longer for additions and subtractions than for comparisons with two-digit numbers. In a second experiment, we showed that this effect was even more pronounced in participants with low arithmetic skills. These results suggest that variability in the very early stages of processing underpins individual differences in mental arithmetic.

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10:20-10:40 **(29)**

Abstract and Non-Abstract Representations of Numbers - *Roi COHEN KADOSH, Kathrin COHEN KADOSH, Amanda KAAS, Avishai HENIK, Rainer GOEBEL*

It is a commonly held view that numbers are represented in an abstract way. Here we show that by using a repetition suppression paradigm, which taps automatic numerical processing while reducing intentional strategies, it is possible to detect non-abstract numerical representations. The functional magnetic resonance imaging results revealed a left/right asymmetry in parietal lobe function. In contrast to an abstract representation in the left parietal lobe, the numerical representation in the right parietal lobe included non-abstract representations and showed a preference for magnitude in the notation of Arabic numbers. Our results challenge the commonly held belief that numbers are represented solely in an abstract way in the human brain. Moreover, they support the idea that the usage of automatic processing is needed in order to probe the core mental representation uncontaminated by intentional strategies.

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Spatial cognition
Amphi Péres
Thursday morning 9h – 10h20

Chaired by Marta Olivetti, University of Rome "La Sapienza"

9:00-9:20 **(31)**

Spatial Prepositions and Informativeness - *Michele BURIGO, Simona SACCHI, Kenny R. COVENTRY*

Describing the location of an object with respect to a second (reference) object is affected by a range of "extra-geometric" variables including "what" objects are and "how" they interact (e.g., Coventry & Garrod, 2004). The present study examined whether talking about the location of an object is also affected by how informative a spatial description can be, and specifically by whether "converseness" holds or not for a given spatial expression (i.e., whether "A on the left of B" correctly implies "B on the right of A" ; Levelt, 1996). An acceptability rating task investigated the use of spatial terms such as "on the left/right" as possible descriptions of scenes where the converseness principle was show to hold or not by manipulating the relative orientation of located and reference objects. The results show that converseness does matter for spatial language comprehension, suggesting that informativeness (Grice, 1975) is important for spatial description.

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9:20-9:40 **(32)**

Interactive Sonification of Geographical Maps: a Behavioural Study with Blind Subjects - *Marta OLIVETTI, Franco DELOGU, Massimiliano PALMIERO, Emanuele PASQUALOTTO, Stefano FEDERICI, Catherine PLAISANT*

Sonification is a promising solution for facilitating the access to geographical maps by blind people. This study aims at evaluating the representations of geographical maps acquired by means of a sonificated exploration. Three groups of subjects (10 early-blind, 10 congenitally-blind and 10 blindfolded sighted subjects) explored four sonificated maps of progressive difficulty by means of two interfaces (Keyboard-TouchTablet). For each one of the heard maps, subjects chose the correspondent tactile map among four alternatives (one target and three distractors). Then, subjects answered a questionnaire about the features of the acoustic geographical information. Main results indicate that all the groups of subjects achieved a good representation of the maps. Both keyboard and touch tablet are useful devices for navigating acoustical maps. Interestingly, we did not find any performance difference between the three groups. These results may imply that an early exposition to visual information is not a necessary condition for spatial mental mapping.

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9:40-10:00 **(33)**

Are Synaesthestic Spatial Forms Useful? - *Mark PRICE*

A minority of people experience certain types of sequential information, such as months, week days, or numbers, as involuntarily arranged in spatially extended patterns. These so-called spatial forms are often quite complex and idiosyncratic. A small but growing body of research is showing that the reported experience of these spatial forms is associated with behaviourally measurable differences in the cognitive representation of these sequences. It has been suggested that the forms can be considered as a variety of synaesthesia, and as an explicit exaggeration of the more common implicit overlap between spatial and sequential representation. However less attention has been paid to whether spatial forms are associated with any particular cognitive benefits or disadvantages, and to why only some people experience them. We address these issues by comparing people with and without spatial forms in a variety of experiments which test their ability to learn or manipulate sequence information, including conditions where we attempt to disrupt spatial forms using dual task interference paradigms that target visuo-spatial components of working memory.

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10:00-10:20 **(34)**

Are You Expecting a Change? Advantages in Focusing on the Details - *Michele BURIGO, Constantin A. ROTHKOPF*

Inductive and deductive mechanisms allow people to extract regularities from the world in order to improve the processing of everyday stimuli (Rips, 2001). These mechanisms are mediated by attention that contributes to improve dealing with unpredicted