Program Awards

2014 Mid-Year Meeting
July 9-11, 2014
Jerusalem, Israel

The Marit Korkman Award

Presented for the Best Student Submission in Pediatric Neuropsychology at the Mid-Year Meeting

Sarit Rotem, MS
Bar-Ilan University

Where to see this award-winning presentation
Paper Session 2: Attention
Wednesday, July 9, 2014 at 10:00 AM
Zion Hall B

Asymmetric Attention Networks: The Case Of Children

S. Yaakoby-Rotem, R. Geva

Objective: Visuospatial attention networks are represented in both hemispheres, with right-hemisphere dominance. Little is known about the lateralization of the attention networks in children.The objective of the current study was to generate an adaptation of the Attention Network Test for Children (ANT-C) (Rueda et al., 2004) and the Lateralized Attention Network Test (LANT) (Greene et al., 2008) to create a children's version of the latter (LANT-C).

The first aim was to compare performance on the ANT-C with results of the LANT-C. The second aim was to study the added value of the LANT-C by studying expressions of each of the three attention-networks as functions of a lateralized stimulus presentation, and lateralized execution. The goal was to understand how the different combinations of stimulus presentation field and executing hand influence the functioning of the three networks in children.

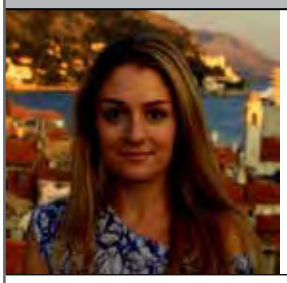
Participants and Methods: Participants were 82 children, aged 5-6y. They were examined with the ANT-C, LANT-C, and intelligence and attention questionnaires. To assess the lateralization of attentional-networks performance on the LANT-C was compared with performance on the ANT-C.

Results: MANOVA showed a main effect for network, with high efficiency for orienting and lower executive efficiency (accuracy; $p<0.001$, $\eta2=.282$). An effect for procedure elucidated higher efficiency in the ANT-C relative to LANT-C (accuracy; $p<0.01$, $\eta2=.097$). A procedure x network interaction was also found; procedure difference was present in alerting and executive networks ($p<0.05$, $\eta2=.096$). A LANT-C analysis showed left visual-field alerting advantage, while right hand benefitted executive performance.

Conclusions: Results extend previous findings manifesting a right-hemisphere advantage in children's alerting-attention, pointing to the importance of lateralization of brain function in understanding the integrity of attention networks in children.

The Nelson Butters Award

Presented for the Best Submission by a Postdoctoral Fellow



Sarah Rajtmajer, PhD
Pennsylvania State University

Where to see this award-winning presentation
Paper Session 12: Cognitive Neuroscience (B)
Friday, July 11, 2014 at 10:30 AM
Zion Hall B

Modeling Plasticity in Brain Networks After Neurological Disruption: A Critique of Connectivity Modeling Approaches

S. Rajtmajer, F. G. Hillary

Objective: The goal of this presentation is to provide a critical overview of the current approaches used to examine functional brain connectivity in neurologically impaired samples. There is now a growing literature using functional imaging methods to examine brain network changes and it is a goal in this presentation to offer a critique of the current methods used to examine brain pathology and aging including possible pitfalls and advantages of each approach.

Participants and Methods: We conducted a literature review of over 1400 studies examining neural networks in multiple sclerosis, traumatic brain injury, mild cognitive impairment, and Alzheimer's disease. We outline the current approaches used to examine connectivity modeling in the brain, focusing the review on several critical decision points in connectivity modeling including: 1) data pre-processing, 2) region-of-interest selection, 3) network creation and modeling, 4) network variability and issues surrounding stationarity, and 5) integration of behavior. We discuss the robustness of connectivity findings to various approaches including issues surrounding non-stationarity and network thresholding.

Results: This critical review reveals a number of possible approaches for determining region of interest selection and defining connectivity in a network. The primary methods for selecting network "nodes", or brain regions, remains: 1) anatomical atlases, 2) independent components analysis and 3) seed-based approaches. Less commonly graph theoretical approaches are being used. Importantly, consistent findings emerge even given the diversity of approaches.

Conclusions: Connectivity modeling of brain networks holds incredible promise for the understanding of neurological disorders. While a number of approaches currently exist, there remain important methodological challenges for mapping brain functioning and these critical issues require continued attention.

Program Awards

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The Laird S. Cermak Award

Presented for the Best Submission in the Field of Memory or Memory Disorders

Yoni Pertzov, PhD
The Hebrew University of Jerusalem

Where to see this award-winning presentation

Paper Session 13: Memory
Friday, July 11, 2014 at 12:00 PM
Zion Hall A

Remembering What Was Where, From Cognitive Mechanisms to the Clinic

Y. Pertzov

Objective: It has been suggested that objects are maintained as integrated units in working memory and when forgotten they are lost as a whole, without leaving any trace. To study the relevance of this claim to real-life situations, we investigated how object-location information is remembered – and forgotten.

Participants and Methods: We used a localization task with a continuous, analogue scale of reporting rather than binary (correct / incorrect recall) responses, with difficult-to-verbalize stimuli and variable delays.

Results: Analysis of the distribution of localization errors made by healthy participants showed that items were sometimes mislocalized precisely near the original position of other items in memory ('swap errors'). Moreover, when objects were forgotten they did not disappear completely from memory, but rather the links (bindings) between identity and location became vulnerable with time, so swap errors increased with longer retention intervals. Maintaining object-location links was found to be especially fragile in patients with focal, bilateral damage of the medial temporal lobes (MTL), specifically the hippocampus. Increased binding errors also occurred in pre-symptomatic carriers of an autosomal dominant gene (PSEN1 or APP) which gives 100% risk of developing Alzheimer's disease. Hippocampal volume in these individuals, who scored within normal range in standard neuropsychological tests, correlated inversely with the number of binding errors.

Conclusions: These findings offer an insight into the early cognitive deficits associated with Alzheimer's disease and strengthen the claim that the hippocampus is necessary for maintaining associative information across short retention intervals,challenging traditional accounts of MTL function as exclusively involved in long term memory. The results are also a proof of concept for the ability of continuous report tasks to measure and quantify early (asymptomatic) impairments in memory disorders.

Acknowledgment: The research was done with the help of many others, especially Masud Husain from University of Oxford.

The Phillip M. Rennick Award

Presented for the Best Submission by a Graduate Student

Dror Dotan
Tel Aviv University
INSERM (France)

Where to see this award-winning presentation

Paper Session 5: Language
Wednesday, July 9, 2014 at 3:30 PM
Zion Hall A

Breaking Down Number Syntax: Dissociation Between Naming and Comprehension of Two-Digit Numbers

D. Dotan, S. Dehaene, N. Friedmann

Objective: What is the scope of the syntactic processes that handle multi-digit numbers? Can the meaning of two-digit Arabic numbers be accessed even if a syntactic deficit prevents accessing their verbal-phonological representations?

Participants and Methods: We explored the number processing of ZN, an aphasic patient with a syntactic deficit in digit-to-verbal transcoding.

Results: ZN could hardly read aloud two-digit numbers, but could read them as single digits ("four, two"). Neuropsychological examination showed that his deficit was neither in digit input nor in phonological output processes, as he could copy and repeat two-digit numbers. His deficit lied in a central process that converts digits to abstract number words and sends this information to phonological retrieval processes.

Crucially, in spite of this deficit in number transcoding, ZN's two-digit comprehension was spared in several ways: (1) he could calculate two-digit additions; (2) he showed good performance in a two-digit comparison task, and a continuous distance effect; and (3) his performance in a task of mapping numbers to positions on an unmarked number line showed a logarithmic (nonlinear) factor, indicating that he represented two-digit Arabic numbers as holistic two-digit quantities.

The number-to-position task further showed that whereas ZN's logarithmic representation was normal, his linear quantity encoding was delayed and more decomposed into digits than in the control group.

Conclusions: Two-digit number comprehension – arithmetic and quantity encoding – does not require converting the digits to verbal representation. Namely, saying and comprehending multi-digit Arabic numbers is handled by separate syntactic processes.

ZN's performance in number-to-position task suggests two separate quantity encoding mechanisms: a logarithmic-holistic mechanism, which is intact for ZN, and a linear-decomposed mechanism, which is impaired. The latter might be related to the verbal encoding of numbers.