



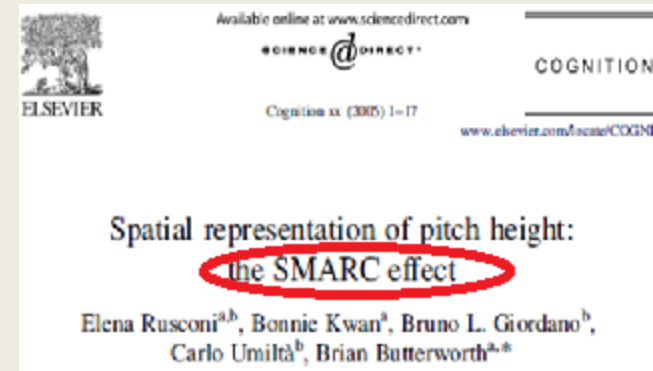
Cultural and Conceptual Aspects of SNARC

Samuel Shaki
Ariel University Center, Israel

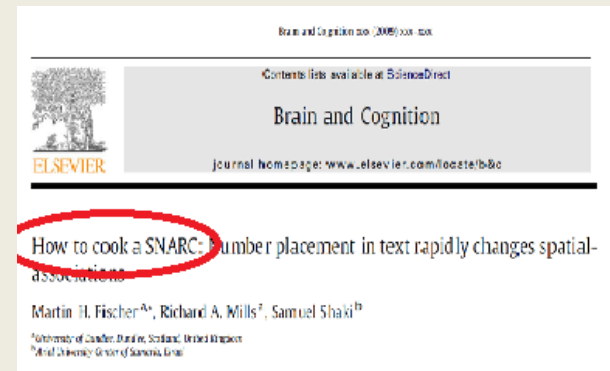
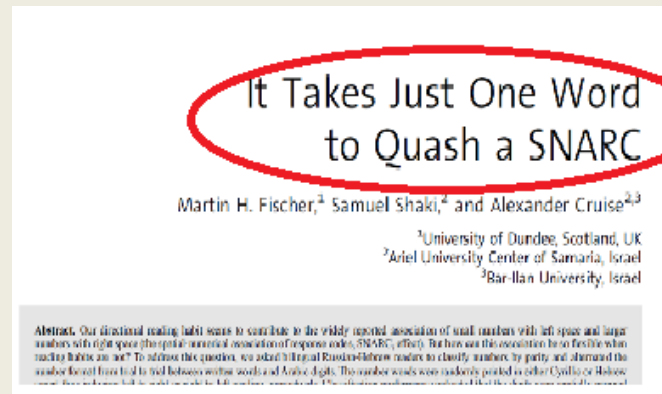
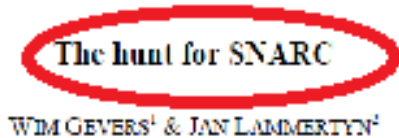
Martin Fischer
University of Potsdam, Germany

Things you can do with SNARC

- Hunt
- Quash
- Cook
- Modify it to SMARC, SPARC, etc.



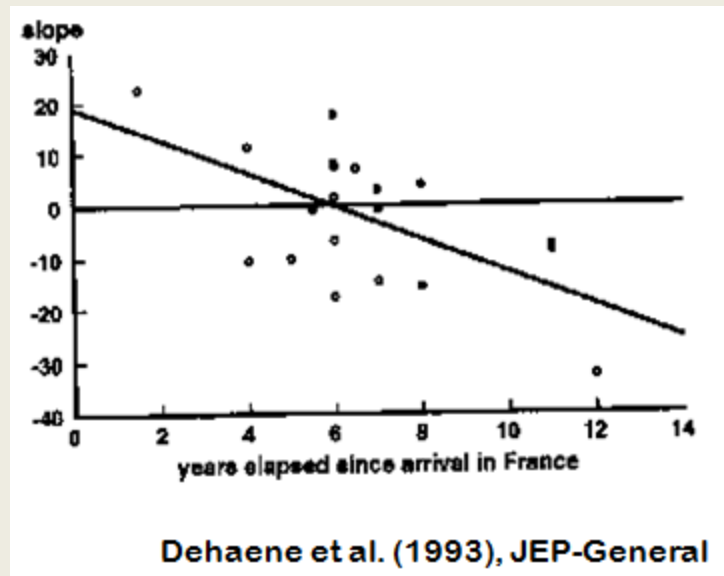
Psychology Science, Volume 17, 2006 (1), p. 10–21



SNARC – Where does it come from?

The role of reading direction habits:

- Dehaene et al., 1993 (Iranian-French participants).



- Zebian, 2005. (Lebanese and Western participants).
- Shaki, Fischer & Petrusic, 2009 (Canadians, Palestinians and Israelis).

Reading direction

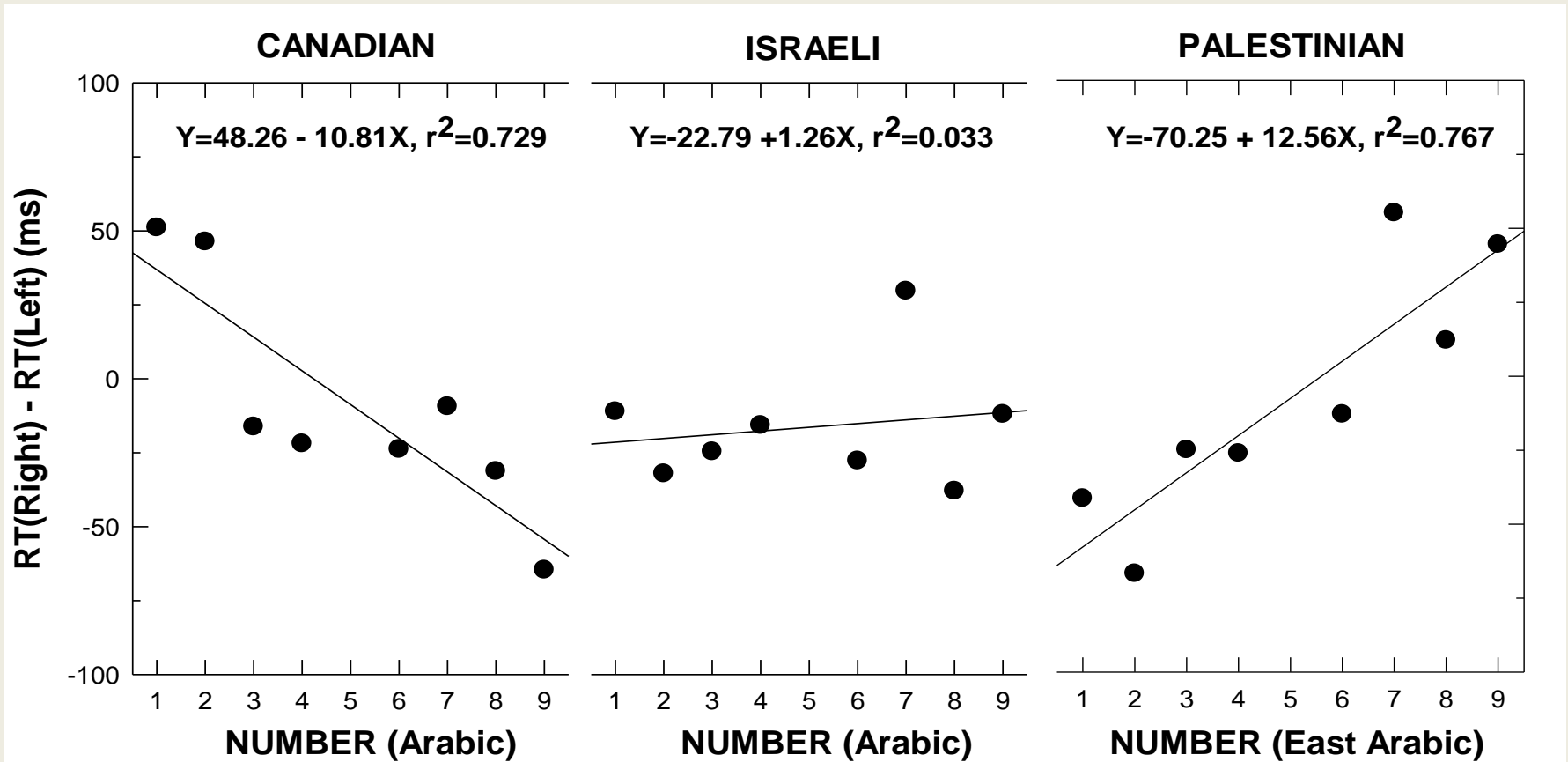
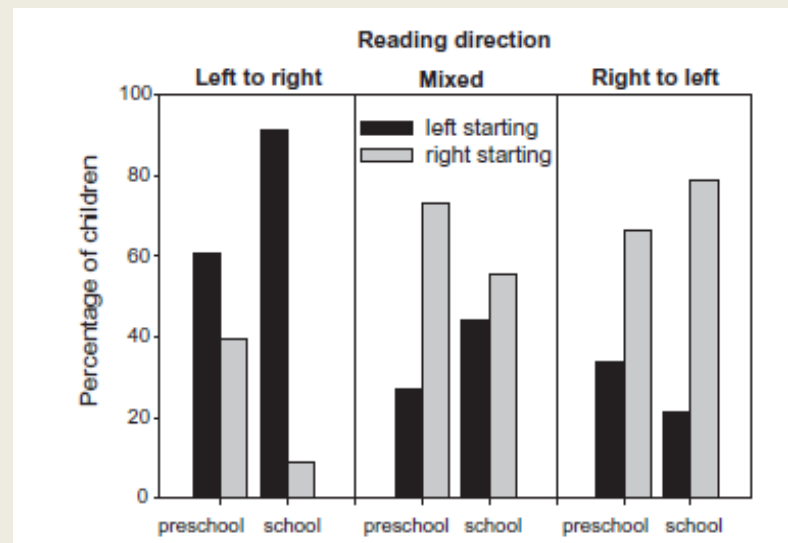
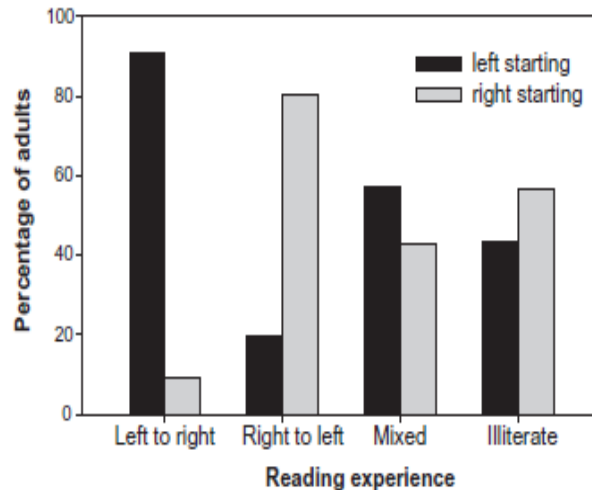


Figure 1. Mean SNARC effect (RT(Right) – RT(Left) in ms) as a function of digit presented in the parity task with Canadian, Israeli, and Palestinian participants.

SNARC – The developmental trajectory

The role of counting direction habits:

Task: Adult, school (7-10 yo) and pre-school children (4-6 yo) from cultures with different reading habits were asked to count four “coins” aloud, and to touch each coin while counting.



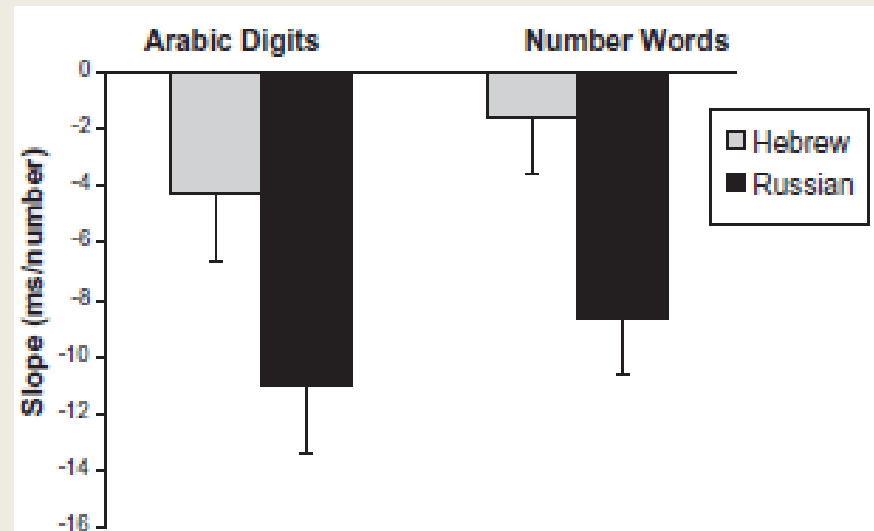
SNARC – Short-term changes

Effect of the current reading direction:

- **Paragraph level –**
Shaki & Fischer, 2008 (bilingual Russian–Hebrew participants).
- **Word level –**
Fischer, Shaki & Cruise, 2009 (bilingual Russian–Hebrew participants).

How to quash a SNARC:

Task: Bilingual Russian-Hebrew participant performed a parity task of Arabic digits and number words (randomly shown in Russian or in Hebrew).



SNARC – Short-term changes

Effect of the current reading direction:

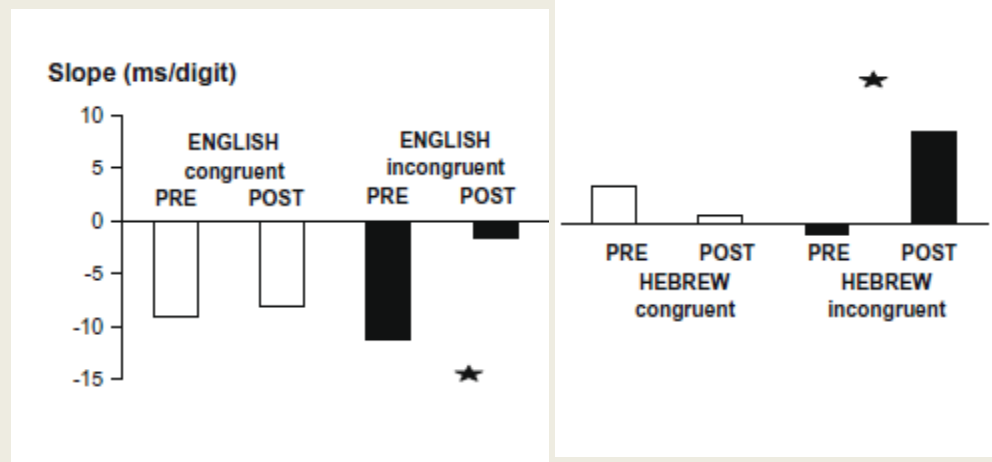
- **Paragraph level –**
Shaki & Fischer, 2008 (bilingual Russian–Hebrew participants).
- **Word level –**
Fischer, Shaki & Cruise, 2009 (bilingual Russian–Hebrew participants).

Effect of number position during reading:

- Fischer, Mills & Shaki, 2010 (English and Israeli participants).

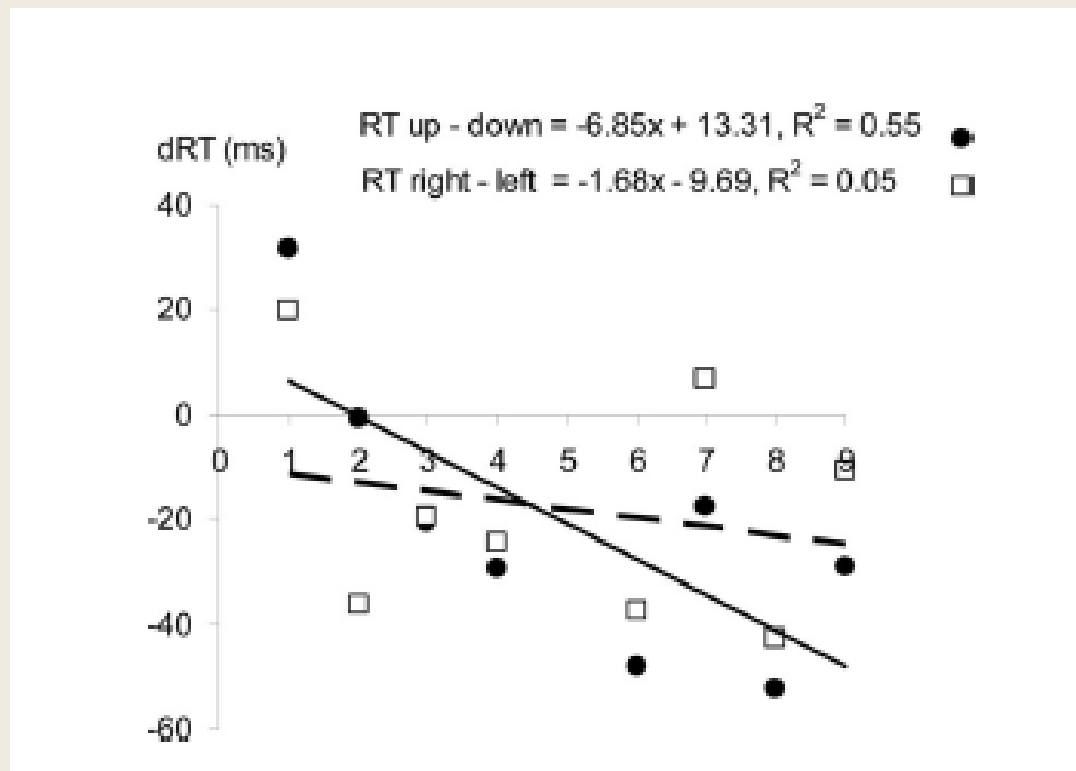
How to cook a SNARC:

Peel 8 salad potatoes, chop these up and boil for 4 min.
Beat 6 eggs in a large mixing bowl, adding 1 tbsp salt.
Add 9 tbsp oil to a frying pan and pre-heat.
Chop 7 onions and fry these in the frying pan for 3 min.
When the onions begin to brown add these and boiled
Potatoes to the eggs mixture and stir. Fry this mixture for 2 min,
stirring thoroughly.



SNARC – Multiple spatial mappings

Task: Israeli participants performed horizontal and vertical (radially near and far keys) parity tasks in separate blocks



SNARC – Where does it come from?

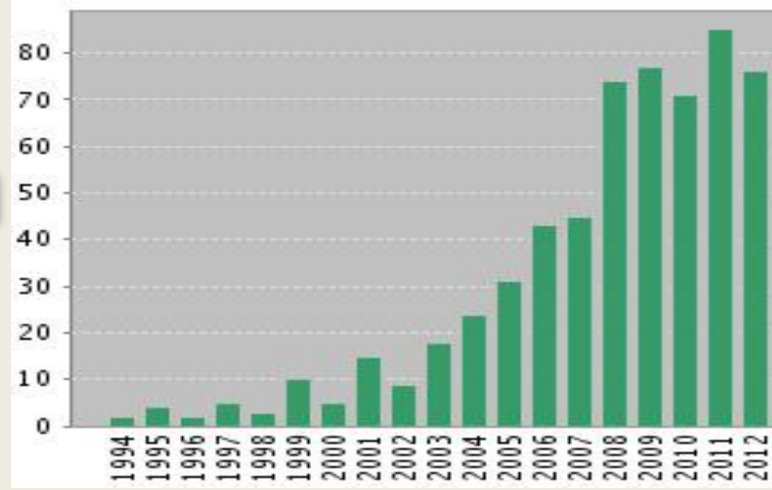
1. Multiple spatial dimensions are involved whenever we observe SNARC:

- Long standing spatial habits (e.g. Reading direction of text and numbers; observation of spatial habits, counting).
- Short-term experiences (current reading; numbers position).

2. EVERYBODY SNARCS.

Conceptual Aspects

20 Years of Research



1. Empirical Generalization

- SNA(rc)

2. Modelling

- of SNARC effect, not of numerical cognition

3. Theoretical Integration

- Embodied Cognition

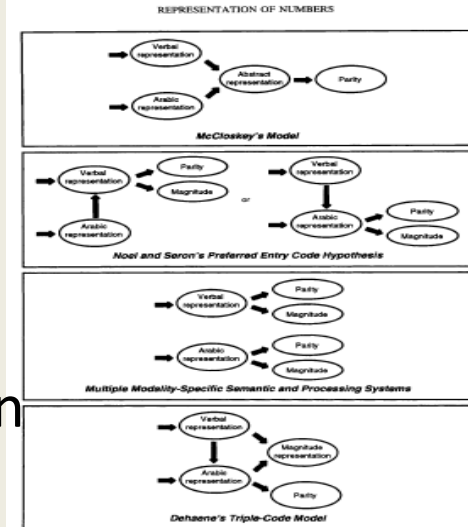
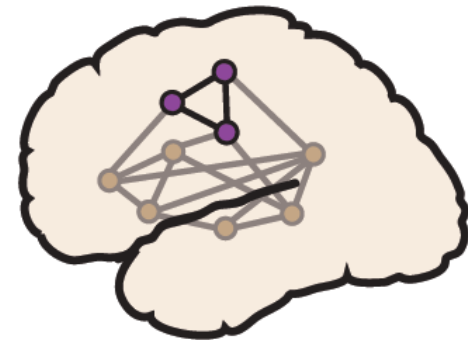


Figure 1. Four alternative models of mental number processing applied to parity judgments of Arabic and verbal numerals.



A hierarchy of spatial-numerical knowledge



**SITUATED
COGNITION**

= task-specific constraints
(e.g. Wmem; low rel/corr)

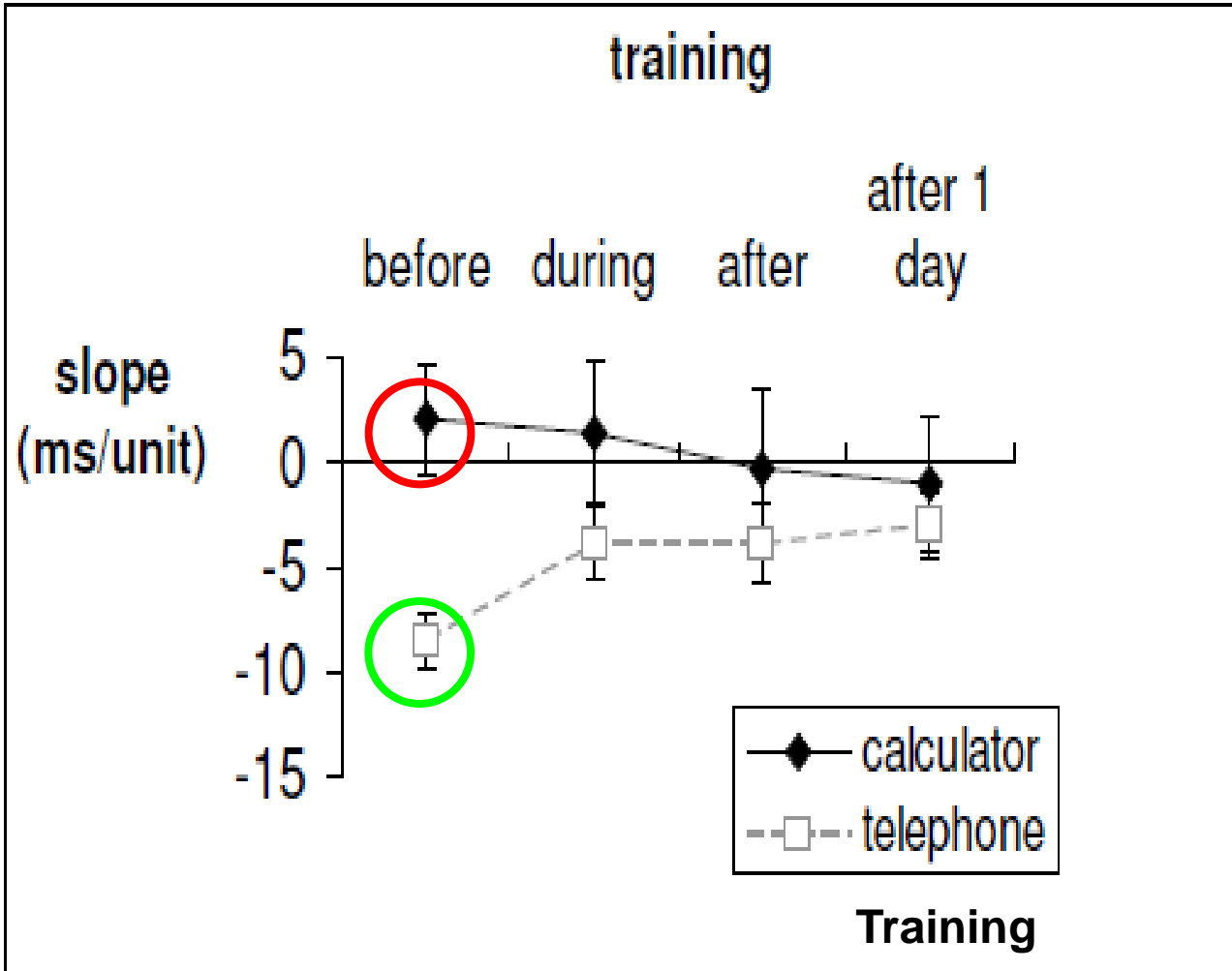
EMBODIMENT

= sensory-motor learning
(e.g. culture)

GROUNDING

= universal
(e.g. vertical SNA, time/space/mag)

Vertical SNARC is robust



Questions for 2018

- Is mental arithmetic embodied? (OM, fingers, gestures, ... → Special Issue)
- Does (un-) learning differ for grounded vs. embodied vs. situated SNAs?



The image shows a screenshot of the website for the Embodied & Situated Language Processing (ESLP) Conference 2013. The website has an orange header with the title "Embodied & Situated Language Processing" and a navigation menu with links for HOME, ABOUT, VENUE, REGISTRATION, SUBMISSION, and ACCOMMODATION. The main content area features the text "ESLP Conference 2013", "University of Potsdam, Germany", and "July 29, 2013 – July 31, 2013". To the right of this text is a photograph of a large, classical building with a central dome, likely the University of Potsdam. Below the main text is an "Overview" section with a welcome message and a focus statement. At the bottom, there is an "Invited Speaker" section listing several names and their affiliations.

Embodied & Situated Language Processing

HOME ABOUT VENUE REGISTRATION SUBMISSION ACCOMMODATION

ESLP Conference 2013

University of Potsdam, Germany

July 29, 2013 – July 31, 2013



Overview

Welcome to the sixth annual conference on Embodied and Situated Language Processing (ESLP). The meetings aim to bring together researchers working on the interaction of language and visual/motor processing in embodied, situated, and language-for-action research traditions. A further goal is to unite converging and complementary evidence from behavioral, neuroscientific, computational, and neuropsychological methods.

The focus of the ESPL 2013 is on the motor processes that occur before, during and after language comprehension, their function and time course. The conference will take place at the University of Potsdam (see [conference venue](#)) before the co-located conferences [CogSci 2013](#) and [MathPsy 2013](#).

Invited Speaker

Anna Borghi, University of Bologna/Italy
Barbara Kaup, University of Tübingen/Germany
Tatiana Nazir, CNRS Lyon/France
Friedemann Pulvermüller, FU Berlin/Germany
Gabriella Vigliocco, UCL London/UK

