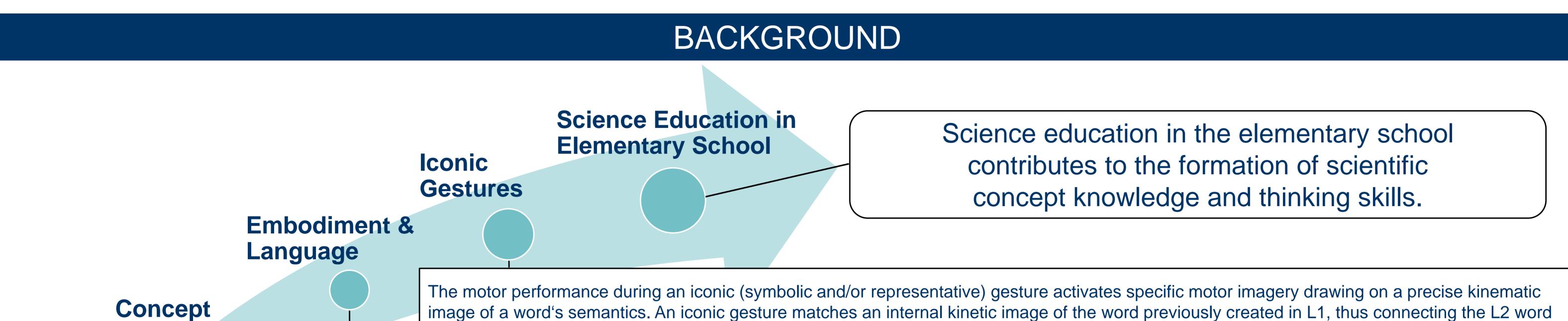




Scientific Concept Learning in SLA and Embodiment A mixed methods study in CLIL elementary school science classes PhD project: Anna Bitmann – Supervisor: Univ.-Prof. Dr. Michaela Sambanis



Formation

and the embodied representation on a more abstract level (Macedonia/Müller/Friederici 2011).

Language (linguistic symbolic system) is embodied, since it is part of activities in systems which are used for perception, action, and emotion. Reasoning about meaning -

including combinatorial processes of sentence formation and understanding – requires use of those systems (Glenberg/de Vega/Graeser 2008). Semantic knowledge

Scientific Literacy

information.

Students' scientific concepts gradually change over the course of their scientific instruction (conceptual change), but are grounded in perception and action. Language (external symbolic representation) shapes the formation of conceptual categories (Amin/Smith/Wiser 2014).

emerges from the interactive activation of modality-specific perceptual representations of objects and statements about respective objects (Rogers et al. 2004).

Students are scientifically literate, when they apply acquired scientific knowledge (terminology, concepts, discourse) to personal and societal problems to get a better grasp of the issue (Roberts/Bybee 2014).

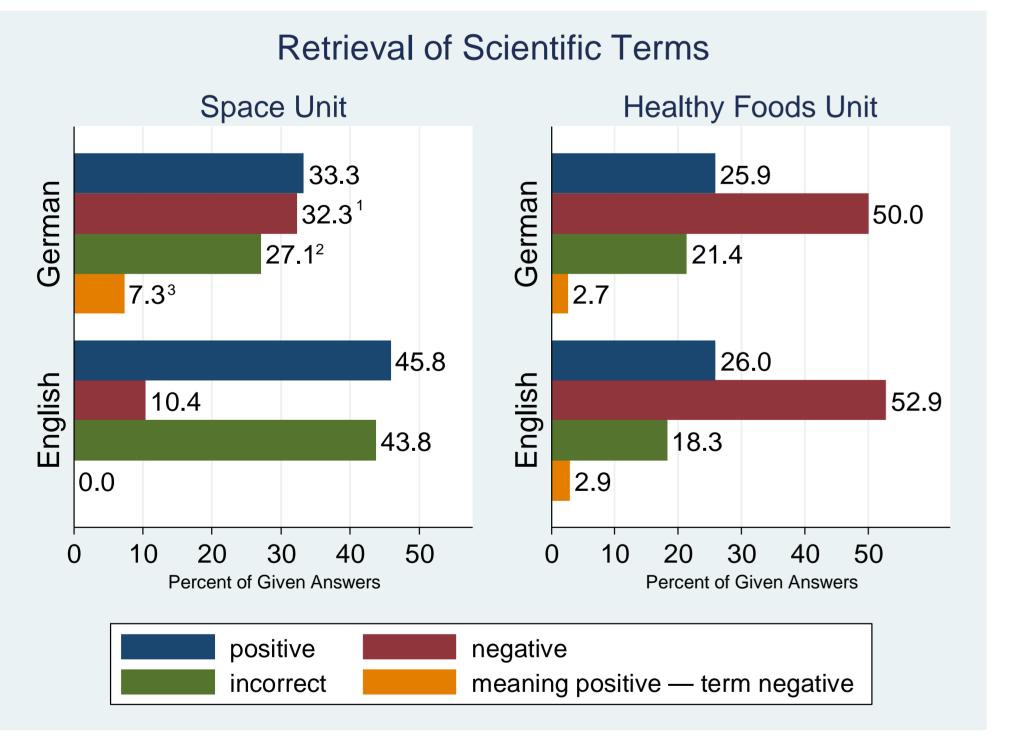
OBJECTIVES	DESIGN & METHODS
 Hypotheses Students who learn scientific terminology through iconic gestures have a higher chance of remembering scientific terminology in the L2; a superior retrieval rate of scientific concept 	 Matched between-group quasi-experimental design iconic gesture group & reading group N = 48 (n = 24): matched on the basis of gender and L1 (German or English) 2 teaching units: Space and Healthy Foods pre-tests: standardized language tests for L1 & L2; spatial cognitive ability test post-interview: structured interview (individual; videotaped)

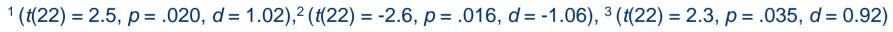
retrieval of scientific terms after watching corresponding iconic gesture or

reading clip

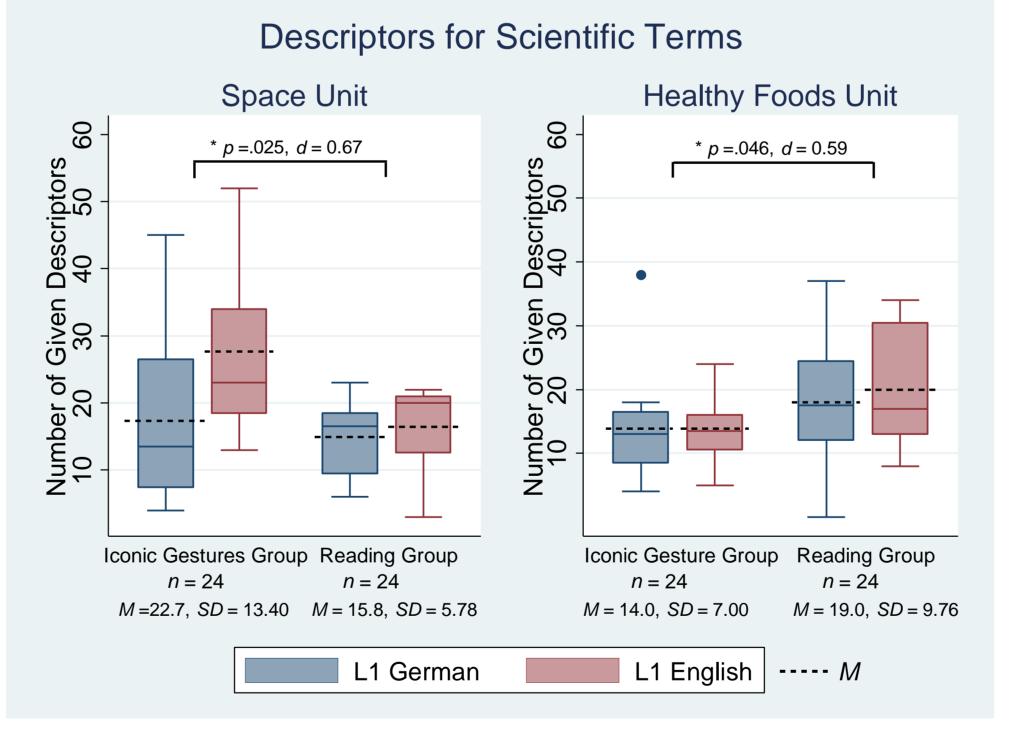
description and explanation of scientific terms

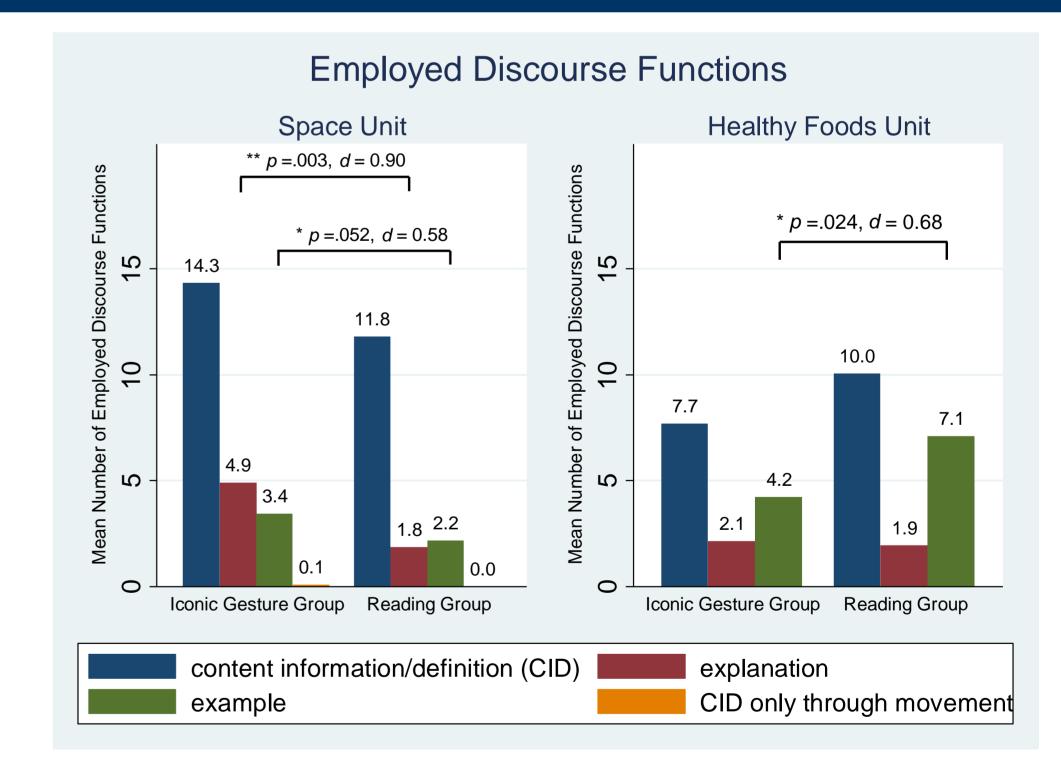
PRELIMINARY RESULTS





Performance score (%) for the **retrieval of the** scientific terms after observing the corresponding iconic gesture/movement shows a significant difference between the two L1 groups in three categories:





Results for reproducing **descriptors for the** scientific terms differ in the two teaching units:

A qualitative content analysis showed that students employed four discourse functions. The findings demonstrate that

- L1 English students had fewer negative retrieval attempts than L1 German students, but erred more frequently when guessing the scientific term;
- L1 German students seem to remember the meaning but not the term itself.
- The difference between the language groups was not statistically significant in the Healthy Foods unit.
- for the Space unit, the **iconic gesture** group significantly outperformed the reading group; both language groups seem to profit from utilizing the iconic gestures;
- for the Healthy Foods unit the **results are** reversed.
- in the Space unit the **iconic gesture group** uses significantly more explanations and examples in their discourse;
- whereas in the Healthy Foods unit the **reading** group shows a significantly higher utilization of examples.

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