

<b>Projekttitle</b>	<b>Integrating Intuitive and Scientific Reasoning: A Pluralistic Approach for Primary Science Education</b>
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<b>Abstract</b>	<b>Scientific Summary</b> <p>The proposed research explores the complex interplay between intuitive reasoning and learning about scientific concepts. Scientific concepts often conflict with intuitive thinking patterns, so-called intuitive construals (IC), creating significant learning barriers in science education (Coley &amp; Tanner, 2015). Traditional educational methods have aimed to replace IC with scientific facts (Bé langer et al., 2023). However, this strategy is overly simplistic because IC cannot be displaced in human cognition; rather, they tend to persist and coexist alongside scientific concepts, requiring active suppression to prioritize scientific reasoning (Shtulman, 2017). Besides, IC can be instrumental in everyday contexts and even facilitate students' learning by linking abstract concepts to familiar reasoning patterns, thereby enhancing memory retention and reducing cognitive load (Evans &amp; Rosengren, 2018). Therefore, scholars emphasize the need to equip students with the metacognitive skills to discern between IC and scientific explanations and to flexibly switch between these perspectives to apply them appropriately (González-Galli et al., 2020). This set of skills is seen as a key element of scientific literacy (Halls et al., 2021) and can be summarized under the term 'conceptual bilingualism'. Although recent literature suggests that the implementation of metacognitive training to cultivate conceptual bilingualism is the most viable way to handle IC in science education, research and educational materials on this topic are scarce, particularly regarding primary school students, a critical demographic for developing the foundations of science literacy (Halls et al., 2021). Our project has three objectives, each associated with targeted intervention studies. The first two objectives investigate the impact of metacognitive prompts and metacognitive training on primary school students' conceptual bilingualism. Further, educators have a critical role in implementing such a training, which presupposes that they themselves have mastered conceptual bilingualism. However, because research indicates that many teachers may lack this skill set (Tempelmann et al., 2024), Objective 3 focuses on metacognitive training for pre-service teachers: Objective 1: Assessing the Impact of Metacognitive Prompts on Children's Learning of Scientific Phenomena. In Study 1, we examine whether incorporating metacognitive prompts into instructional explanations influences the acquisition of scientific knowledge, the employment of IC, and the development of conceptual bilingualism. Objective 2: Evaluating the Effect of</p>

	Metacognitive Training on Children's Conceptual Bilingualism. Study 2 is inspired by the work of Halls et al. (2021) but ventures beyond their findings by not only investigating the impact of metacognitive training on elementary students' abilities to distinguish between IC and scientific concepts but also assessing how such training influences students' management of IC in their personal explanations, thus promoting their conceptual bilingualism in explaining scientific phenomena. Objective 3: Investigating the Effect of Metacognitive Training on Pre-Service Teachers' Conceptual Bilingualism. Study 3 explores how metacognitive training can enhance pre-service teachers' conceptual bilingualism, thereby equipping them with the necessary skills to reflect on and regulate the use of IC in their own teaching as well as to effectively foster this critical competency in students through targeted instructional methods. This research is innovative in evaluating the role of metacognitive strategies in education, fostering teachers' and students' ability to reflectively navigate between intuitive and scientific reasoning. It seeks to address a significant gap in current educational practices by developing and evaluating interventions designed to augment cognitive flexibility and comprehension in both students and teachers.
<b>Schlagworte</b>	Science Education, Intuitive Construals, Metaconceptual Awareness, Conceptual Bilingualism, Teleology, Anthropomorphism, Primary School Students, Teacher Education, Intuitive Thinking
<b>Laufzeit</b>	1. September 2025 bis 31. August 2029

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