

Brain and Mind – from Concrete to Abstract

»SCIENCE AND THE BRAIN« MAY 13TH 2025

AN INTERDISCIPLINARY WORKSHOP BETWEEN MSH AND ST HILDA'S COLLEGE OXFORD UNIVERSITY

Prof. Dr. Maïke Glitsch

»Science and the Brain: What can Science tell Us about how the Brain works«

This talk will give an insight into how researchers study the brain, covering questions such as what techniques can be used, what they can and cannot show, how useful animal models are and limitations thereof. The aim is to give an overview over what is possible and what limitations are in modern research.

Maïke Glitsch is Professor in Physiology at MSH Medical School Hamburg and teaches preclinical medical students. Between 2009 and 2021, she was Associate Professor in the Department of Physiology, Anatomy and Genetics (Oxford University) and Muriel Tomlinson Fellow at St Hilda's before and is one of the co-founders of Brain and Mind. Her research focusses around understanding how metabolic and mechanical changes affect neuronal function.

Prof. Andrew Tolmie

»Imagination in Primary Science Learning«

Effective science education is important not just for the scientific field generally, but also to facilitate people's ability to engage meaningfully in science-related decision making (e.g. on climate change, vaccination programmes etc). The complex nature of science as an enterprise can make it challenging to promote good understanding in children. However, science's core emphasis on causation provides a natural focus for primary science teaching, one that provides a basis for wider comprehension. An accurate grasp of causal connections, such as when a switch turns on a light, is evident from infancy; however, this understanding needs to be expanded during primary school into ideas about the mechanisms that lead from cause to effect. This is especially true with respect to causal processes that extend over time, where the mechanisms involved are typically not directly observable (e.g. when water evaporates or salt dissolves in water). There is a strong ten-

TIMETABLE

18:00 Uhr

Introduction

18:10 Uhr

»*Science and the Brain: What can Science tell Us about how the Brain works*«

Prof. Dr. Maïke Glitsch,
MSH Medical School Hamburg

18:30 Uhr

»*Imagination in Primary Science Learning*«

Prof. Andrew Tolmie,
UCL Institute of Education

18:50 Uhr

Discussion and break

19:30 Uhr

»*Science as Perception: Experimental Data, Sense Data, their Sameness and Difference*«

Prof. Simon Saunders,
University of Oxford

19:45 Uhr

Discussion

20:00 Uhr

End of Workshop

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endency in education to think that the best way to foster understanding of such mechanisms is through verbal instruction. This is contradicted by research which indicates that while this can be a powerful way forming concepts, these are often detached from experience and consequently a source of misunderstanding. There is growing evidence that an accurate grasp of mechanism stems instead from nonverbal cognition. That is, careful observation (especially accurate attention to changes over time) and the construction of dynamic 'imaginal' representations of the unseen sources of these changes. The importance of language, in the form of scientific vocabulary, only comes to the fore subsequently, once these representations are established, with the appropriate vocabulary allowing their content to be captured explicitly. We need to build a new dimension into primary science teaching which is based on encouragement of imagination about hidden processes, following on from close observation of change over time, with the resulting ideas being actively linked to scientific vocabulary.

Andy Tolmie is Chair of Psychology and Human Development at the UCL Institute of Education, and a Deputy Director of the University of London Centre for Educational Neuroscience. Andy is a developmental psychologist with longstanding interest in the neuro-cognitive and social factors underpinning the growth of children's conceptual representations and behavioural skills in real world settings, particularly in the primary school age range. Most of his work has focused on educationally-relevant topics and settings, with a substantial emphasis on primary school science, but also on the acquisition of road-crossing skills among children, and most recently the role of motor control in the development of executive function.

Prof. Simon Saunders

»Science as Perception: Experimental Data, Sense Data, their Sameness and Difference«

Bas van Fraassen, in his *The Scientific Image* (OUP 1980), set the agenda for debates over realism in philosophy of science, and indeed the goals of science. Fundamental to his formulation is that the kinds of inference from sensory stimulus to the nature of ordinary things is direct, and nothing like the kinds of inference that goes on in science, from experimental data to the nature of unobservable things. Prof. Saunders questions that assumption.

*Simon Saunders is Professor Emeritus of Philosophy of Physics at the University of Oxford, and Fellow of Merton College, Oxford. He has written extensively on the foundations of quantum mechanics, the history of physics, and philosophy of physics and philosophy of science more generally. He is lead editor of *Many Worlds? Everett, quantum theory, and reality* (OUP 2010).*

