Mental Files in Development

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Speakers

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The concept of mental file reflects the realization that different concepts used in different areas of cognitive science share central features. *Mental files* play an important role in philosophy, addressing longstanding issues about Russell's problem of acquaintance and Frege's (foundational problems of logics about identity and the sense-reference distinction. As *discourse referents* they play a role for solving problems of reference in linguistics. In psychology they have only been used as *object files* in research on attention and search and on tracking visually moving objects. They have been used in infancy research to explain infants' individuation of objects and their understanding of numerosity. They have not played any significant role in later child development. It has not yet entered research on children's theory of mind, which is surprising since mental files theory in philosophy has been used extensively to deal with the pernicious logical problems created by statements about beliefs and other mental terms. This symposium will close this gap.

The first paper by Patricia Ganea covers 2-year olds' problems with object search when they have seen an object hidden in one place and are later told that the object has been moved to a new place. They tend to search in the original place. Management of files for the object as well as its various locations can shed new light on these problems.

The second paper by Josef Perner uses coreferential object files to represent children's understanding of belief: a regular file for an object of thought to represent the child's own view and a vicarious file for that same object to represent another person's belief about the object. The assumption that children around 4 years become able to understand the coreferentiality of files helps explain why children at this age understand false beliefs as well as identity statements. The third paper by Ágnes Kovács uses mental files for a similar purpose but in a quite different way. Her belief files represent the content of a person's belief with the goal to explain the speed with which we and even young babies adapt to changes in another person's belief.

Object files in children's search for objects

Patricia Ganea

Much of the information that we have about the world is based entirely on testimony provided by other people. This is certainly the case for information that we have about events that happened too far away or too long ago for us to witness them. Recent findings show limitations in children's ability to verbally update what they know about an absent

object (Ganea & Harris, 2010; 2013). More specifically, when 24-month-olds were told that an object that they had put in one container had been moved to a different container during their temporary absence, they often searched for the object on the basis of their earlier, first-hand observation of its whereabouts. This error did not occur in a control condition in which they saw the object moved to a new location rather than learning about its movement through language.

As repositories of information about objects mental files can be extremely sophisticated and the management of such files can be logically complex. I will discuss two types of update of a mental file. A *conservative* update of a file simply extends the list of properties and relations in it. A *revision* update involves the elimination of some of these properties and relations and their replacement with incompatible properties and relations. I will show that children have difficulty updating an object's mental file when the update requires management of multiple mental files that are about the object.

Vicarious object files in children's representation of belief

Josef Perner

A mental file represents an object. The information on the file represents what one knows about the object. The function of the file is to track the object, its referent, and accumulate knowledge over time. An interesting case occurs when one conceives of an object in different ways, e.g., the famous Roman orator as Tully or as Cicero. This can be represented by two different files that have the same referent. To represent that the two files have the same referent the files have to be informationally linked. Whatever is true of the person but has been recorded on only one of the files needs to be made available to the other, coreferential file. To understand identity statements, e.g., "Tully is Cicero," one has to be able to link coreferential files.

Coreferential files can also be used to distinguish one's own beliefs about an object, recorded on a *regular file*, from what another believes about it, recorded on a *vicarious file* for the same object. To understand that the other person's belief is about the same object as one's own the vicarious file has to be linked to the regular file, representing the identity of the object.

The simple developmental assumption that children become able to link coreferential files around 4 years can explain why children at this age become able to process identity statements as they become able to answer questions about another person's mistaken beliefs.

Belief files in infants' social interaction

Ágnes Kovács

Humans seem to readily track their conspecifics' mental states, such as their goals and beliefs from early infancy. However, the underlying cognitive architecture that enables such powerful abilities remains unclear. A basic representational structure, *the belief file*, could provide the foundation for efficiently encoding, and updating information about, others' beliefs in online social interactions. I will discuss the representational possibilities offered by the belief file and the ways in which the repertoire of mental state reasoning is shaped by the characteristics of its constituents. A series of questions will be outlined concerning the representational skeleton of the belief file, sketching a possible structure that supports the rapid encoding and re-identification of belief related information (e.g., variables for the agent, as the belief holder and for the belief-content). After presenting data pointing to the possible limitations of the belief attribution system, I will examine some of its characteristics that might enable a flexibility that is often neglected. Results from a further study involving 15-month-olds infants suggest that operations involving belief files are not impeded by the absence of precise first-person information regarding their contents. In fact, the system permits manipulations with "empty" belief files, allowing humans to ascribe beliefs to conspecifics based on little or no direct information regarding the content of the mental state. Such an analysis aims to advance our understanding of how spontaneous belief attribution may be performed, and to provide an insight into the possible mechanisms that allow humans to successfully navigate the social world.