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Early declarative memory and self-concept

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Abstract

Infantile amnesia is a major issue in memory development. For a growing body of researchers, self is probably a key-concept for this enigma. The role of the cognitive self in early declarative memory as a function of perceptual manipulation between study- and test-phase was investigated. Two recall conditions were compared: either the same color props as in the modeling phase or different color props. Twenty-four 20-month-old children were observed in a 10-min deferred imitation task with two enabling sequences. An additional control group ($N = 16$) ensured that imitation scores did not rely on spontaneous production of the target behaviors at this age. Children in the experimental groups were classified as early or late recognizer depending on their success or failure to the mirror test. A significant interaction was observed between color props conditions and recognizer types: only late recognizers' memory performance was affected by the perceptual manipulation. Results suggest that cognitive self could be one of the factors contributing to the differentiation between episodic and semantic subsystems in early declarative memory by the end of the second year.
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1. Introduction

A growing body of studies shows, mainly from differed imitation paradigms, that declarative memory emerges around 6 months of age. However, first autobiographic memories do not appear before the age of

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3 years. Several researchers consider self-awareness or cognitive self as probably one of the keys to the long delay in autobiographic memory appearance. The aim of this study is to explore the role of cognitive self in declarative memory development.

Autobiographical memory allows retrieving experienced events as personally experienced (Bauer, Wenner, Dropik, & Wewerka, 2000; Howe & Courage, 1997; Nelson, 1993; Perner & Ruffman, 1995; Wheeler, Stuss, & Tulving, 1997). Such memory depends on episodic memory (Tulving, 2002; Tulving & Markowisch, 1998; Wheeler et al., 1997) and, like semantic memory, is a subsystem of the declarative memory system (Tulving, 1983, 2002). Episodic memory is considered as emerging later than semantic memory and stems from "the conjunction of three concepts—self, autonoetic awareness, and subjectively sensed time" (Tulving, 2002, p. 5). The sense of subjective time, possible only with autonoetic awareness, opens the ability to mentally travel in time from present to experienced past (and/or to the imagined future). Autonoetic awareness differs from noetic awareness because it allows encoding facts as personally experienced, and recollecting them, as they were experienced. The self is the traveler, existing in subjective time. In this perspective, it is a key concept for the emergence of autobiographic memory.

For Howe and Courage (1997), the cognitive self or self-concept emerging by the end of the second year of life sets the lower limit for early autobiographical memories. The cognitive self is defined as a new knowledge structure that serves to organize memories of experiences that happened to *me*. These authors propose a memory model in which traces, integrated during the learning phase,[1] consist of collections of primitive elements. Once the self is "viable", its features can be sampled and encoded in traces following a probabilistic process: "as more features are added to the 'urn', the greater the likelihood that at least some self features are sampled and encoded in the functional trace for an event" (Howe & Courage, p. 513). A memory trace that includes some features of the self potentially could change into an autobiographical memory and, in turn, contribute to the development of cognitive self. In this model, the probabilistic process of sampling self-features is not specific to the cognitive self but also serves for sampling primitive elements from all knowledge structures integrated into a new memory trace. Thus, autobiographic memories differ from other memories because of the contribution of cognitive self and, consequently, depend upon the developmental level of the self.

The development of the self has been of particular interest for many researches during the past 10 years. Two aspects of the self are generally distinguished: the '*I*' as subjective or implicit sense of one's own physical and social entity; and the '*me*' as objective or cognitive sense of self. Recent research focuses on the subjective self considered as either innate or developing from birth through infants' interactions with their physical and social world. For Rochat (2001) and Lewis (1999), it is not specifically human and it can be described as "an existential sense of self" (Rochat, 2001, p. 204). The cognitive self, assumed to emerge from the subjective self by the end of the second year, corresponds to the self as object of experience, knowledge, and imagination, i.e., *me*. This sense of self is probably specific to human beings (Lewis, 1999) and the mirror task can serve to evaluate its development in toddlers. Although limited to a particular experience and sensory modality (visual image), the mirror test is considered as "a valid instrument to assess self-knowledge at a conceptual and re-cognitory level" (Rochat, 2001, p. 206). It consists of applying surreptitiously an odorless red mark on the infant's nose to see if he demonstrates a self-directed behavior in front of a mirror by touching his nose instead of the mirror. For Wheeler

[1] And possibly disintegrated/reintegrated across retention intervals and testing phases.

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