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Cognitive Development



Remembering the past to envision the future in middle childhood: Developmental linkages between prospection and episodic memory



Christine Coughlin*, Kristen E. Lyons¹, Simona Ghetti

Department of Psychology and Center for Mind and Brain, University of California, Davis, 1 Shields Avenue, Davis, CA 95616, United States

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ABSTRACT

Prospection is the mental simulation of future events and may promote positive, future-oriented action in the present. Despite evidence of a relation between prospection and episodic memory, there is a paucity of research comparing the developmental trajectories of each during middle childhood, a time of substantial episodic memory development. This study examined prospection and episodic memory in 5-, 7-, and 9-year-old children and adults ($N=80$). Participants provided narratives and introspective judgments about their experience of mentalizing past and future events. The development of prospection was more protracted than that of episodic memory, although individual differences in past event episodicity predicted prospection. Although both prospection and episodic memory were characterized by a rich subjective experience, future events were rated as more difficult to envision and were more frequently viewed in the third-person perspective. Although both prospection and episodic memory appear to improve during middle childhood, results suggest that prospection may require additional skills.

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* Corresponding author. Tel.: +1 209 652 8226.

E-mail address: cacoughlin@ucdavis.edu (C. Coughlin).

¹ Present address: Department of Psychology, Metropolitan State University of Denver, Campus Box 54, PO Box 173362, Denver, CO 80217, United States.

1. Introduction

Prospection is the ability to mentally project forward in time in order to pre-experience future events (Tulving, 1985, 2005). This capacity is critical for adaptive behavior. While it is possible to plan for the future based on a factual understanding of contextual consequences (e.g., I will practice piano because I want to be part of the year-end recital), mentally pre-experiencing possible outcomes (e.g., pre-experiencing the feeling of joy at being selected or disappointment at being excluded) connects an individual with a future self and may provide stronger motivation for action (Suddendorf & Corballis, 2007).

Although the capacity to anticipate future events is associated with a number of abilities including planning (Hudson, Shapiro, & Sosa, 1995; Thompson, Barresi, & Moore, 1997) and reasoning about mental states (Lagattuta, 2007), a special role for episodic memory has been proposed (Schacter & Addis, 2007a, 2007b). Episodic memory is the capacity to mentally reinstate a personally experienced event in specific, sensory–perceptual detail (Conway, 2001; Tulving, 1972, 1985, 2005). Despite their opposite temporal directions, episodic memory and prospection are similar in that they involve mentalizing about personal events that are isolated in space and time and contain rich contextual features (Tulving, 1985). Both are also characterized by autoegetic consciousness, which enables one to be aware of (and reflect on) one's subjective experience during an event's mental simulation (Tulving, 2001). Therefore, reports on phenomenological experience (such as the clarity and visual perspective of an event) may provide important insight into the similarities and differences between mentalizing past and future events.

The Constructive Episodic Simulation hypothesis provides a theoretical basis for an emphasis on similarities between these abilities (Schacter & Addis, 2007a, 2007b) by proposing that the mental simulation of future events involves accessing and then recombining details from one's autobiographical memory (Conway, 2001) in order to mentally simulate a realistic, yet novel, future event. From this perspective, remembering the past and mentally pre-experiencing the future are integrally related.

Empirical comparisons of the functioning of episodic memory and prospection suggest a strong relation between the two abilities in adults. Although representations of past events tend to be more detailed than future events, variables like valence and temporal distance affect past and future event representations similarly (D'Argembeau & Van der Linden, 2004). We also know there are commonalities in the neural substrates supporting these abilities (Addis, Wong, & Schacter, 2007; Buckner & Carroll, 2007), and that impairments in episodic memory often co-occur with impairments in prospection (Tulving, 1985; Williams, Ellis, Tyers, & Healy, 1996). Although these similarities support a functional relation between episodic memory and prospection, an important additional question is whether these two abilities exhibit similar developmental trajectories. The present study addresses this question by investigating the relation between episodic memory and prospection during middle childhood and comparing children's abilities to those of young adults.

1.1. *The development of episodic memory during middle childhood*

Developmental studies show robust improvements in episodic memory during middle and late childhood (Billingsley, Smith, & McAndrews, 2002; Ghetti & Angelini, 2008; Ghetti, Mirandola, Angelini, Cornoldi, & Ciaramelli, 2011; Piolino et al., 2007; Schneider, Knopf, & Stefanek, 2002; Shing, Werkle-Bergner, Li, & Lindenberger, 2008). In a study of personal event narratives, Piolino and colleagues (2007) asked 7–13-year-olds to report specific personal events from three different time periods in the past and to describe these events with as many details as possible. Analyses of event narratives revealed age-related increases in the episodicity of events within each time period (see also Picard, Reffuveille, Eustache, & Piolino, 2009; Willoughby, Desrocher, Levine, & Rovet, 2012). Similar developmental improvements have been observed in studies (Ghetti & Angelini, 2008; Ghetti et al., 2011; Shing et al., 2008) in which children were shown a series of items and asked to remember each item and its associated contextual features or subjective experience (defining features of episodic memory; Tulving, 1972). Results from these behavioral studies are complemented by developmental research on the neural substrates of episodic memory showing similar age-related differences (DeMaster, Pathman, & Ghetti, 2013; Ghetti, DeMaster, Yonelinas, & Bunge, 2010; Ofen et al., 2007).

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