



## The role of episodic and semantic memory in episodic foresight<sup>☆</sup>

Gema Martin-Ordas<sup>a,b,\*</sup>, Cristina M. Atance<sup>a</sup>, Alyssa Louw<sup>a</sup>

<sup>a</sup> School of Psychology, University of Ottawa, Canada

<sup>b</sup> Center on Autobiographical Memory Research, Aarhus University, Denmark

### ARTICLE INFO

Available online 16 August 2012

#### Keywords:

Episodic memory  
Episodic foresight  
Non-human animals  
Human animals

### ABSTRACT

In this paper we describe a special form of future thinking, termed “episodic foresight” and its relation with episodic and semantic memory. We outline the methodologies that have largely been developed in the last five years to assess this capacity in young children and non-human animals. Drawing on Tulving’s definition of episodic and semantic memory, we provide a critical analysis of the role that both types of memory might have on the episodic foresight tasks described in the literature. We conclude by highlighting some unanswered questions and suggesting future directions for research that could further our understanding of how memory is intimately connected to episodic foresight.

© 2012 Elsevier Inc. All rights reserved.

The most profound consequence of the conceptual revolution set in train by the introduction of the term episodic memory (Tulving, 1972, 1985) was that it established the idea of mental time travel through subjective time. Mental time travel allows one, as an “owner” of episodic memory (“self”), through the medium of auto-noetic awareness, to remember one’s own previous “thought about” experiences, as well as to “think about” one’s own possible future experiences (Tulving, 2005, p. 9). The adaptive function of the episodic memory system has been suggested to lay not so much in the keeping of accurate records of the past, but in what it can offer to present and future fitness (Buckner & Carroll, 2007; Dudai & Carruthers, 2005; Schacter, Addis, & Buckner, 2007; Suddendorf & Corballis, 1997, 2007; Tulving, 2005).

While episodic memory has been the topic of intense research efforts (e.g., Tulving, 1984, 2005), mental construction of potential future episodes has only very recently begun to draw attention. Thinking about and imagining the future are highly adaptive capacities that allow us to act now to secure future benefits and avoid future difficulties. In fact, the ability to imagine future events seems to be an essential part of human cognition since much of our behaviors are guided by foresight (e.g., distant goals or plans) (Suddendorf, 2006). As a consequence, over the last few years, there has been an increasing multi-disciplinary effort to study future thinking and how it relates to episodic memory. Most of these studies come from the adult literature, where this link has typically been assessed by asking adults to think about a personal past event and to pre-experience a plausible future one (Addis, Wong, & Schacter, 2007; Okuda et al., 2003; Szpunar, Watson, & McDermott, 2007). Results have led to the idea of a “core brain network” that is activated when people remember their past, imagine their future, take the perspective of others (i.e., theory of mind), and also use some forms of spatial navigation (e.g., Buckner & Carroll, 2007; Spreng & Grady, 2010). Similarly, patients with impaired episodic memory have been found to have comparable problems with imagining future events (Hassabis, Kumaran, Vann, & Maguire, 2007; Klein, Loftus, & Kihlstrom, 2002; Tulving, 2005; Williams et al., 1996). In clinically normal participants, phenomenological characteristics of thinking about past and future events have also been reported to be similar (D’Argembeau et al., 2007; D’Argembeau &

<sup>☆</sup> The writing of this paper was supported in part by a grant from the Government of Ontario to the second author.

\* Corresponding author at: Department of Psychology, Center on Autobiographical Memory Research, Aarhus University, Aarhus, Denmark.  
E-mail address: [ordas@psy.au.dk](mailto:ordas@psy.au.dk) (G. Martin-Ordas).

Van der Linden, 2004). Findings from social psychology (e.g., Gilbert & Wilson, 2007, 2011), developmental psychology (e.g., Busby & Suddendorf, 2005; Suddendorf, 2010a) and comparative psychology (e.g., Eacott & Easton, 2012; Raby & Clayton, 2009; Roberts, 2012; Roberts & Feeney, 2009; Suddendorf & Corballis, 2010) have also provided evidence for such a link.

The terminology that has been used to capture the notion of a “mental projection” of the self into the future tends to differ between researchers. While some refer to it as “episodic future thinking/thought” (Atance & O’Neill, 2001; Szpunar, 2010) or “episodic foresight” [the term that we will adopt here (Suddendorf, 2010a; Suddendorf & Moore, 2011)], others have used the terms “prospection” (e.g., Buckner & Carroll, 2007; Gilbert & Wilson, 2007; Suddendorf & Corballis, 2007) and “simulation” (e.g., Schacter & Addis, 2007). Nonetheless, most researchers would agree that the goal of all of these terms is to capture the ability to vividly pre-experience events in one’s personal future.

Accordingly, this type of thought about one’s personal future should be distinguished from thought about a more “general” future – or, what some have referred to as “semantic future thinking” (Atance & O’Neill, 2001) or “known future” (Klein et al., 2002). This “episodic/semantic” distinction echoes the one that Tulving drew with respect to memory and also appears to be useful with respect to the future. For example, Klein et al. (2002) describe an amnesic patient who could not provide a description of a personal future event but could respond to a question about a public (as opposed to personal) event (e.g., “Can you tell me what you think will be the most important medical breakthroughs likely to take place in the next ten years?”).

The main goal of this paper is to analyze the relation between memory – both semantic and episodic – and episodic foresight, focusing on research that has been conducted in the areas of developmental and comparative psychology. To do so, we begin by providing a brief overview of the research on episodic foresight in young children and non-human animals. We then draw on Tulving’s definition of episodic and semantic memory to analyze how these two types of memory contribute to episodic foresight behaviors. We conclude by highlighting some unanswered questions and suggesting future lines of research.

## Episodic Foresight in Young Children

Young children’s episodic foresight has been assessed using both “verbal” and “non-verbal” approaches. We briefly outline studies in both of these areas next while noting those instances in which children’s task performance was related to their episodic memory.

### Verbal Measures

Children begin to talk about the future by 2 years of age (Eisenberg, 1985; Nelson, 1989; Sachs, 1983). At first, such utterances may refer only to events occurring later in the day (e.g., “We gotta drive pretty soon” or “Gotta put a bandaid on a little later”) (Sachs, 1983, p. 15), but later in the third year of life, references to events happening in the more remote future also begin to emerge (Sachs, 1983).

Children’s talk about the future has been explored more systematically in the past 5–10 years and has largely focused on the 3–5 year age range (e.g., Atance & O’Neill, 2005; Busby & Suddendorf, 2005; Hayne, Gross, McNamee, Fitzgibbon, & Tustin, 2011; Quon & Atance, 2010). For example, Busby and Suddendorf (2005) asked 3-, 4-, and 5-year-olds to report an activity that they would do tomorrow. They found that a majority of the 4- and 5-year olds were able to answer this question correctly (as measured by parental reports), with significantly fewer 3-year-olds able to do so. Moreover, in one of their two experiments, children’s capacity to predict a future event was significantly correlated with their capacity to accurately report a past event (i.e., “Can you tell me something that you did yesterday?”) (a finding that has also been replicated by Suddendorf, 2010a) suggesting that episodic foresight and episodic memory are related.

Several more recent studies have expanded on Busby and Suddendorf’s (2005) paradigm by asking children more specific questions about the future. In Quon and Atance (2010), children were asked about the next time they would partake in a specific event (e.g., breakfast or going to the park). Five-year-olds’ responses were rated as significantly more likely by parents than those of 3- and 4-year-olds and were thus consistent with those of Busby and Suddendorf’s findings but differed in that children’s performance levels were, overall, higher. Whereas 3-year-olds’ accuracy in reporting a future event in Busby and Suddendorf’s study was approximately 30%, the corresponding percentage in Quon and Atance was approximately 60.

Higher accuracy rates were also found by Hayne et al. (2011). In their study, parents, rather than children themselves, were asked to provide the experimenter with future events corresponding to two time points: “later today” and “tomorrow.” The experimenter then asked children, for example, “Your mum told me that tomorrow, you will go visit your grandpa. What can you tell me about this?” Ninety-two percent of 3-year-olds provided accurate additional information about the future event in question. Children were also asked about events occurring “earlier today” and “yesterday” with the results revealing a significant correlation (after controlling for age and language scores) between the number of clauses that children provided for the past and future events, providing further evidence for a link between episodic foresight and episodic memory. What remains unclear from these studies, however, is the extent to which episodic foresight draws on episodic (or semantic) memory.

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات