



Review

Autobiographical memory decline in Alzheimer's disease, a theoretical and clinical overview



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ABSTRACT

Autobiographical memory, or memory for personal experiences, allows individuals to define themselves and construct a meaningful life story. Decline of this ability, as observed in Alzheimer's disease (AD), results in an impaired sense of self and identity. In our model (AMAD: Autobiographical Memory in Alzheimer's Disease), we present a critical review of theories and findings regarding cognitive and neuroanatomical underpinnings of autobiographical memory and its decline in AD and highlight studies on its clinical rehabilitation. We propose that autobiographical recall in AD is mainly characterized by loss of associated episodic information, which leads to de-contextualization of autobiographical memories and a shift from reliving past events to a general sense of familiarity. This decline refers to retrograde, but also anterograde amnesia that affects newly acquired memories besides remote ones. One consequence of autobiographical memory decline in AD is decreased access to memories that shape self-consciousness, self-knowledge, and self-images, leading to a diminished sense of self and identity. The link between autobiographical decline and compromised sense of self in AD can also manifest itself as low correspondence and coherence between past memories and current goals and beliefs. By linking cognitive, neuroanatomical, and clinical aspects of autobiographical decline in AD, our review provides a theoretical foundation, which may lead to better rehabilitation strategies.

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1. Introduction

Autobiographical memory refers to memory for personal experiences and facts about the self. This ability allows individuals to define themselves, construct a life story, and attribute meaning to it. On the cognitive level, memory decline is a hallmark of Alzheimer's Disease (AD) and this decline involves multiple memory systems, including those involved in autobiographical memory. Decline of autobiographical memory in AD leads to loss of knowledge about events and facts that defined the patients' life, and consequently, degradation of their self-knowledge and sense of identity. Bearing in mind these clinical implications, our review aims at describing the current theoretical understanding about autobiographical memory decline in AD, with particular focus on clinical applicability and venues for future research. First, we provide an overview of sense of self and theoretical perspectives on the organization and construction of autobiographical memories. We then describe consequences of autobiographical decline in AD, such as over-generalization of autobiographical recall, and discuss the impact of anterograde and retrograde amnesia, and impairment in the sense of identity. Next, we highlight recent findings on the cognitive and neuroanatomical underpinnings of the disorder, as well as studies on its clinical rehabilitation. Finally, we provide a theoretical framework for conceptualizing the empirical findings about autobiographical memory in AD.

This review was based on a literature survey that was performed by combining the keywords "Alzheimer's disease"; "autobiographical memory"; "identity"; and "self". The search was performed on the PubMed and PsycInfo databases from the first available year until 2015; and was limited to studies published in peer-reviewed journals. Additional exploration of the reference lists of these papers was carried out to identify additional papers."

2. Sense of identity, sense of self

Since the present review emphasizes identity compromise in AD, it would be of interest to highlight some theoretical assumptions about identity and sense of self. Although several attempts have been made to categorize the different aspects of sense of self (e.g., Klein and Gangi, 2010; Neisser, 1988; Singer, 1995), we mainly follow the framework of framework by Prebble et al. (2013), according to which, sense of self is the mental processes that provide us with feelings of singularity, individuality, coherence, and unity that define our uniqueness (for a similar view, see Damasio, 2003). More precisely, the framework of Prebble et al. (2013) delineates sense of self along two dimensions: the subjective versus objective sense of self and the present versus temporally extended aspects of that sense. The first distinction refers to the difference between our phenomenological experience of identity (i.e., subjective sense of self) and our mental representation of identity, comprising all the things that we perceive and know about ourselves (i.e., objective sense of self). This division was posited by James (1892), who distinguished between the experience of knowing (the I-self) and the object of this awareness (the me-self); an assumption that still influences contemporary literature (Klein and Gangi, 2010). As for the second dimension of the framework of Prebble et al. (2013), these authors distinguish between sense of self that is related to the present moment (i.e., present self) and that that is extended over time

(i.e., temporally extended self). This assumption fits with the idea that identity involves a temporally extended aspect, involving past, present, and future (Addis et al., 2009; Klein et al., 2002; Neisser, 1988; Schacter and Addis, 2007a,b; Schacter et al., 2007). The extension of identity over time is directly related to autobiographical memory, since the latter is fundamental to the formation and maintenance of identity in the present moment and to the continuity of the mental representation of identity over time (Conway, 2005). Hence, one consequence of autobiographical decline, as observed in AD, would be compromise in both the subjective experience of identity and its continuity over time.

3. Autobiographical memory: memory of the self

According to the autobiographical model of Conway (Conway, 2005; Conway and Pleydell-Pearce, 2000), autobiographical memories contain knowledge with different levels of specificity ranging from general knowledge about one's past to highly contextual-specific knowledge [for the same view, see Kopelman, 1994]. More specifically, autobiographical memory is composed of two main components, a semantic component and an episodic one. The semantic component refers to generic representations rather than to particular events linked to particular times and places. These generic representations cover long lifetime periods (e.g., "when I was young") and general events referring to thematic events that occur repeatedly (e.g., "I used to hike every weekend"). The episodic autobiographical component refers to memories for specific personal experiences that occurred at a particular time and place (e.g., "that day on that mountain when I lost my compass"). This distinction is essential in describing the re-experiencing aspect of autobiographical memory. Semantic autobiographical knowledge triggers a state of noetic consciousness by which awareness of the past is limited to feelings of knowing or familiarity, whereas episodic events trigger a state of autonoetic consciousness by which the subjective experience of past is relived thanks to mental time travel.

Besides the phenomenon of re-experiencing that characterizes autobiographical recall, another characteristic of autobiographical memory is its uneven temporal distribution. This distribution refers to three distinct features: childhood amnesia, reminiscence bump, and recency effect (Conway and Pleydell-Pearce, 2000; Janssen et al., 2012; Rubin and Wenzel, 1996). Childhood amnesia refers to a near complete extinction of memories from the earliest years of life, the reminiscence bump refers to a substantial rise of memories for events that occurred between the ages of 10 and 30 years, and the recency effect refers to preferential recall for recent (Conway and Pleydell-Pearce, 2000; Janssen et al., 2012; Rubin and Wenzel, 1996). Among these three features, the reminiscence bump is the most studied, as it covers the most important events of people's lives (e.g., first day at high school, first meeting with a partner, or first driving lesson). Indeed, it has been argued that the reminiscence bump is the result of many first-time experiences and that these novel events are used later in life as milestones when people experience similar events (Pillemer, 2001). The reminiscence bump is the most self-defining memory component, as it covers self-defining memories and events that are vivid and emotion-laden with a large impact on the sense of identity (Conway et al., 2004).

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