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DERLEME **REVIEW**

Semantic Autobiographical Memory: A Literature Review

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Abstract

Autobiographical memory is subcomponent of declarative memory and defined as memories of personal experiences that are closely linked to who we are. Research suggests that autobiographical memory consists of both semantic and episodic components. Semantic autobiographical memory is defined as the knowledge of the facts about one's personal past whereas episodic autobiographical memory refers to the memories of events. Most research on autobiographical memory has focused on its episodic component, while the semantic aspect has only recently begun to receive attention. The present review aims to offer a comprehensive summary of the literature on the semantic component of the autobiographical memory. For this purpose, the initial parts of the review will focus on the methods used to examine semantic autobiographical memory and the dissociation between episodic and semantic autobiographical memories. In addition, findings regarding the life span development of semantic autobiographical memory and semantic autobiographical memory in two neurodegenerative diseases will be summarized. Finally, methodological issues and directions for the future studies will be discussed.

Keywords: Episodic Autobiographical Memory, Semantic Autobiographical Memory, Mild Cognitive Impairment, Alzheimer's Disease

Semantik Otobiyografik Bellek: Bir Alanyazın Taraması

Öz

Otobiyografik bellek, açık belleğin bir alt bileşeni olup, kim olduğumuzla yakından bağlantılı kişisel deneyimlerin hatıraları olarak tanımlanır. Araştırmalar, otobiyografik belleğin hem semantik hem de epizodik bileşenlerden oluştuğunu öne sürmektedir. Semantik otobiyografik bellek, kişinin kendi geçmişine dair olgusal bilgileri içerirken, epizodik otobiyografik bellek ise olaylara dair anıları ifade eder. Otobiyografik bellek üzerine yapılan araştırmaların büyük bir kısmı epizodik bileşene odaklanmış olup, semantik bileşen ise ancak son yıllarda ilgi görmeye başlamıştır. Bu derleme, otobiyografik belleğin semantik bileşeni üzerine olan literatürü kapsamlı bir şekilde özetlemeyi amaçlamaktadır. Bu doğrultuda, derlemenin ilk bölümlerinde semantik otobiyografik belleği incelemek için kullanılan yöntemler ve epizodik ile semantik otobiyografik bellek arasındaki ayrım ele alınacaktır. Ayrıca, semantik otobiyografik belleğin yaşam boyu gelişimi ve iki nörodejeneratif hastalıktaki değişimi ile ilgili bulgular özetlenecektir. Son olarak, metodolojik sorunlar ve gelecekteki çalışmalar için öneriler tartışılacaktır.

Anahtar Kelimeler: Epizodik Otobiyografik Bellek, Semantik Otobiyografik Bellek, Hafif Bilişsel Bozukluk, Alzheimer Hastalığı

Introduction

Autobiographical memory (ABM) encompasses recollections of personal experiences that evoke a sense of reliving and self-awareness (Greenberg & Rubin, 2003; Williams et al., 2008). It is classified under declarative memory, which refers to the system responsible for consciously accessible knowledge, including facts and events (Squire, 2004). ABM consists of both semantic and episodic elements (Conway & Pleydell-Pearce, 2000; Urbanowitsch et al., 2013). The semantic aspect includes general self-relevant knowledge, such as personal facts, while the episodic

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component involves specific past events that are vividly re-experienced. McAdams (2001) stated that life stories are built around semantic ABMs. Prebble et al. (2013) suggested that semantic ABM is important for our understanding of the self. The main aim of the present literature review is to provide an extensive examination of the findings on the semantic component of the ABM. For this purpose, first the definition of semantic ABM and how it is distinguished from the episodic component of ABM will be discussed. Next, I will summarize the methods to assess semantic ABM and their critics to provide a better foundation to the reader to evaluate the studies reviewed here. After discussing the lifespan development of semantic ABM, I will focus on how semantic ABM is affected by two common neurogenerative diseases to highlight the importance of semantic ABM.

Method

The screening method and inclusion criteria for the studies reviewed in this article were determined as follows:

1. The keywords "semantic autobiographical memory", personal semantic memory were searched in combination with keywords including "lifespan development," "assessment," "mild cognitive impairment," and "Alzheimer's Disease" in different combinations within the PsycINFO, ScienceDirect, and PubMed databases without specifying the type of publication.
2. Studies published between 1980 and 2025 that fit the scope of this review were identified by examining the abstracts to determine the most appropriate articles for inclusion.
3. Reference lists of the articles included in the review were examined to identify additional relevant articles not found in the initial search.
4. Only articles published in English were included.

Unpublished studies, theses, and case studies were excluded.

Semantic Autobiographical Memory

In his paper on remembering and knowing, Tulving (1989) summarizes the famous case of an amnesic patient. K.C., who had a closed head injury due to a motorcycle accident, suffered from both anterograde (inability to form new memories; Baddeley, et al., 2020) and retrograde amnesias (inability to recall the past; Baddeley, et al., 2020). His amnesia was so dense that he cannot remember any events from his past. Interestingly, however, he knew where he had worked before the accident, that his brother had passed away, and the location of his family's summer house, despite having no recollection associated with these personal facts. Tulving (1989) stated that this kind of autobiographical knowledge should be differentiated from the ABM since it involves more knowing than remembering. In line with this idea, Tulving, et al., (1988) suggested that episodic and semantic components of ABM should be examined separately, and that episodic ABM consists of memories of specific events with a sense of recollection whereas semantic ABM consists of factual information about a person's past.

Although this distinction was accepted in the literature, different authors preferred to use different names to refer to the semantic component of ABM. More specifically, Kopelman et al. (1989) preferred the term "personal semantic memory" and defined it as the "factual knowledge about a person's own past" (p. 726) whereas Crane and Goddard (2008) named it as "self-related information" (p. 498). Picard et al. (2009) defined semantic ABM as "the retrieval of general facts and events pertaining to oneself through 'just knowing' instead of remembering" (p. 864). Willoughby et al. (2012) preferred to use the term "semantic ABM" like Tulving (1989) and defined it as "recollection of personal facts, traits, or general self-knowledge which are independent of time, place and any sense of re-experiencing a past event" (p. 1). In sum, although different names are used, it can be suggested that these different names refer to the same phenomenon by reading the definitions. In the present review the term semantic ABM will be used to cover all in order to avoid confusion.

Methods to Assess Semantic ABM

There are three methods that are frequently employed to assess semantic ABMs (Renoult et al., 2012). The first one, Autobiographical Memory Interview (AMI), was developed by Kopelman et al. (1989) to examine the retrieval of autobiographical and personal semantic memories in amnesic patients, though it is later used with many different samples. AMI consists of two parts as Autobiographical Incidents Schedule (AIS) and Personal Semantic Memory Schedule (PSMS). During AIS participants are asked to remember three specific events from three different time periods (childhood, early adult life, and recent events) and provide a detailed narrative of the remembered events. If the participant cannot retrieve a memory, s/he is provided with at most 6 cue questions (e.g., Can you recall a birthday celebration you had as a child?) as probes. Two experimenters later score the narratives between 0 and 3 by two for how rich the descriptions are, and the level of specificity for the event's time and location. The maximum score a participant can get from the AIS is 27. For the second part, PSMS, participants are asked to reply to questions about their autobiographical facts regarding their background (e.g., the name of their elementary school), childhood (e.g., the city they grew up), early adult (e.g., their major in university) and recent lives (the neighborhood they live in). A background information score over 23 is calculated using their answers for the background questions and a total personal semantic score over 63 is calculated using the remaining three.

Although it is a widely used tool, AMI is criticized for several reasons (Dritschel et al., 1992; Levine et al., 2002; Murphy et al., 2008). First of all, by making the participants remember semantic and episodic ABMs separately which normally co-exist, AMI is claimed to force an artificial division between them (Levine et al., 2002; Murphy et al., 2008). Second, it is suggested that scoring of the AIS part overlooks whether memories are detailed, single-event recollections or broad, repeated events or categorical memories, making AMI an insensitive measure (Murphy et al., 2008). Third, the task demands of AIS and PSMS are proposed to be different (Dritschel et al., 1992). Finally, Levine et al. (2002) claimed that the lifetime periods covered by AMI falls short in assessing older individuals' memories.

Based on these criticisms, Levine et al. (2002) developed another method to assess the episodic and semantic aspects of ABMs in aging: The Autobiographical Interview (AI). AI requires participants to retrieve events from five different lifetime periods: early childhood, adolescence, early adulthood, middle age and last year. Older adults are asked to remember events from all periods while younger adults are asked to retrieve events only from appropriate periods. Unlike AMI, in AI participants are only provided one detailed narrative for each time period. If the participant cannot retrieve a specific event, an unlimited number of general cues are given to aid retrieval. After the recall phase is completed, participants are further provided with specific probes to enable them retrieve as much information as possible. Then these narratives are coded for episodic and semantic ABM information.

Although AI is commonly used by the researchers in the field, it is not without limitations. Notably, Melega et al. (2024) pointed out that AI does not measure semantic ABM as directly as it measures episodic ABM since semantic details are prompted in the standard instructions as episodic details. For example, the participants are asked to retrieve a specific event (in other words an episodic one) and later on, the narrative is coded for the presence of both episodic and semantic details. Therefore, they developed the Semantic Autobiographical Interview (SAI; Melega et al., 2024) as a measure that is prompting episodic and semantic details equally and helping participants produce different types of details naturally. The structure of SAI is similar to AI, with both consisting of free recall, general prompt and specific prompt and includes personal and general semantic sections. For the personal and general semantic sections, during the free recall phase participants are prompted to summarize their experiences during a particular life period (in the personal semantic section) or to describe events that happened within their local community, nation, or globally (in the general semantic section). Subsequent specific cueing involves targeted questions that focus on precise periods and specific categories of personal and general knowledge, as defined in our taxonomy (Renoult et al., 2012; Renoult et al., 2020).

Dissociation of Semantic and Episodic Autobiographical Memory

It is suggested that ABM has characteristics of both episodic and semantic memory. Although interconnected, episodic and semantic ABMs are claimed to be distinct (Kazui et al., 2003). Dritschel, et al (1992) examined the dissociation between the episodic and semantic ABM using an autobiographical fluency task, which requires participants to recall as many episodic or semantic ABMs as possible in 90 seconds. They are also asked to generate items from different semantic categories. A cluster analysis showed that participants' performance for semantic and episodic ABM and semantic memory differentiated from each other implying a dissociation among three types of memories.

Recent neuroimaging studies have begun to delineate the neural correlates underlying the dissociation between semantic and episodic subcomponents of ABM. Episodic ABM, characterized by the recollection of specific events with spatiotemporal context and associated emotions, primarily activates a network involving the medial temporal lobes (MTL), including the hippocampus, and regions of the prefrontal cortex (PFC). Conversely, semantic ABM, which pertains to general personal knowledge and facts about one's life devoid of specific contextual details, shows increased engagement of areas such as the anterior temporal lobes (ATL) and additional regions within the PFC (Renoult et al., 2019). These results provide neurological support for the distinction between semantic and episodic ABMs.

There are several studies that investigated semantic/episodic ABM distinction in patient samples. Kopelman et al. (1989) examined episodic and semantic ABM in amnesia comparing healthy and amnesic participants. The results revealed that controls performed much better than amnesic patients in AIS and PSMS but the group difference was robust for AIS and total personal semantic score than for background information score. Kopelman et al. (1989) further divided the amnesic group into two as normal (amnesic patients with intact autobiographical recollective experience at least for remote memories) and clouded (patients who cannot recall specific details of ABMs). It has been found that although both groups performed worse than controls in all tests, the total personal semantic memory scores of the two groups were significantly different while the difference in AIS scores did not reach significance. Based on these findings, Kopelman et al. (1989) suggested that there is a dissociation between semantic and episodic components of ABM.

A case study conducted by Hirano et al., (2002) supported this suggestion. They reported the case of Y.K., who has anterograde and retrograde amnesia. Y.K. was tested by using a remote memory interview comprised of 20 questions for personal semantic information, 20 for autobiographical incidents and 15 for public events. In addition, Y.K. was asked whether they have a feeling remembering the incident they reported in their answer or whether they just knew it happened for each question. The results showed that Y.K. had intact semantic ABM and semantic memory but impaired episodic ABM. Furthermore, Y.K. had a tendency to give know ratings even for the episodic ABMs he retrieved. Y.K. stated that he had no feeling of recollection for such events and it is "as if his mouth talking on his own" (p.552). Hirano et al. (2002) concluded that his semantic ABM enabled Y.K. to retrieve episodic ABMs as facts without the feeling of recollection.

More studies are conducted to examine the dissociation between the semantic and episodic ABMs, especially on how they are dissociated at the neural level. Levine et al. (2004) explored the brain activity patterns associated with episodic and semantic autobiographical memories and found both similarities and differences. Both memory types activated the left anteromedial prefrontal cortex, a region involved in self-referential thinking, though this activation was stronger during episodic memory retrieval. Specifically, episodic memory tasks engaged the right temporo-parietal cortex, which plays a key role in reconstructing spatial contexts and focusing attention. In contrast, semantic memory tasks activated the left temporo-parietal and parieto-frontal cortices, areas linked to egocentric spatial navigation and attentional control. Interestingly, retrieving episodic memories also showed reduced activity in emotional paralimbic regions. St. Jaques and Cabeza (2008) demonstrated that the retrieval of episodic (detail-rich) memories preferentially engaged the hippocampus and other MTL structures, whereas the retrieval of more generalized personal (semantic) information involved lateral temporal and prefrontal regions. Similarly, McDermott et al. (2008) reported that the retrieval of episodic details was related to increased activation in the hippocampus and posterior midline regions, whereas more semanticized autobiographical retrieval engaged lateral temporal and prefrontal areas. These findings emphasize the unique neuroanatomical features of episodic and semantic ABM, consistent with clinical observations where amnesic syndromes selectively impair one type of memory.

Building on this, Renoult et al. (2019) argued that the distinction between episodic and semantic autobiographical memories is more of a continuum rather than a clear-cut divide. They pointed to neuroimaging evidence showing partial overlap in the neural networks supporting both types of memory, particularly in the hippocampus and prefrontal cortex. This overlap suggests an interdependence, where episodic memories enrich semantic knowledge and semantic structures support episodic recall. Supporting this perspective, Tanguay et al. (2023) found that personal semantic, general semantic, and episodic memories share some neural correlates while also having distinct ones. These include regions like the inferior/middle frontal gyrus, caudate, lingual gyrus, parahippocampal gyrus, hippocampus (on both sides of the brain), and the left middle/superior temporal gyrus. Based on these findings, Tanguay et al. (2023) proposed that all memory types rely on similar brain networks, but the weighting of specific parts in the network differs depending on the memory type. Together, these behavioral, neuropsychological and physical finding suggest that semantic and episodic ABM can be dissociated.

Life Span Development of Semantic ABM

The development of semantic ABM is a lifelong process, shaped by the continuous accumulation and restructuring of personal knowledge. Data regarding the life span development of semantic ABM, investigating the development of different components of ABM during childhood and adolescence (e.g. Picard et al., 2009; Piolino et al., 2007; Willoughby et al. 2012), and the effects of aging (e.g. Levine et al., 2002; Piolino et al., 2002) is very limited.

Piolino et al. (2007) examined the developmental trajectory of episodic and semantic ABMs in children between the ages 7 and 13. Participants' memory performances were examined using a modified version of AMI. Instead of using the original life time periods, participants remembered the present school year, the year before and previous school years. It has been revealed that children from all ages performed equally well on the semantic part of the AMI for all time periods, however, for the episodic part, performances got better as the children's age increased. These results suggest distinct developmental trajectories of semantic and episodic parts of the ABM showing that development of semantic part precedes the development of the episodic part.

There are several factors contributing to the development of semantic ABM. Picard et al. (2009) examined the development of episodic ABM and its relation with semantic ABM in school children between the ages 6-11 with the same task used in Piolino et al. (2007). Picard et al. (2009) demonstrated that episodic and semantic ABM capacities show significant age-related changes. There is also an indirect effect of semantic ABM on the episodic ABM development for all time periods but it was more pronounced for the first 5 years of life. In line with Conway (2005), Picard et al. (2009) suggested that semantic ABM is a leading actor in the improvement of episodic ABM.

Extending the findings of Piolino et al. (2007) and Picard et al. (2009), Willoughby et al. (2012), examined the developmental course of episodic and semantic ABM and whether these two subtypes of ABM are affected by gender using a modified version of AI. In the Children's Autobiographical Interview (CAI), instead of retrieving one ABM from five different lifetime periods, participants are asked two remember 2 specific memories that are older than one month. Children and adolescents between the ages 8 and 16 participated the study. The results demonstrated that age related improvements in episodic ABM extend to adolescence. Furthermore, semantic ABM was also found to improve with age, although its development was not as pronounced as the improvements in episodic ABM. Willoughby et al. (2012) suggested that these findings supported the idea that the two forms of ABM have distinct developmental trajectories, and semantic ABM precedes episodic ABM supporting previous findings (Piolino et al. 2007). In terms of gender differences, it has been revealed that females were better than males for the episodic ABM but for the semantic part both females and males performed equally well. Based on these findings Willoughby et al. (2012) claimed that the gender differences in ABM are caused by the differences in episodic ABM only.

Much of the existing literature on the development of semantic ABM focuses on aging, examining how cognitive changes, life transitions, and reminiscence shape the retention and organization of personal knowledge in later life. Levine et al. (2002) examined the effects of aging on episodic and semantic ABMs using AI by comparing two age groups. The younger adult group was between the ages 19 to 34 and the older adult group was between the ages 66 to 89. The results showed that younger adults tended to retrieve more episodic details whereas older adults retrieved more semantic information. Furthermore, older adults experienced age related impairments in their episodic ABMs but their semantic ABM was found to be intact for all time periods. These results suggested a dissociation in the effects of aging on episodic and semantic ABMs.

Piolino et al. (2002) provided both supporting and contradicting results. More specifically, Piolino et al, (2002) examined the effects of aging in episodic and semantic ABM utilizing a modified version of AMI (targeting five to eight life periods) in a group of participants between ages 40 and 79. Unlike Levine et al. (2002), the results revealed that not only episodic ABM but also semantic ABM deteriorated with age and time. As the participants' age increase, the effect of retention interval on the memory performance also increased. However, these effects are more pronounced for the episodic ABMs, still suggesting a dissociation of episodic and semantic ABMs in aging. It should be noted that these two studies used different methods to assess different components of ABM and the differences in their results may be due to the differences in their choice of methods.

Abram et al. (2014) examined the lifespan development of semantic and episodic ABM and episodic future thinking in a cross-sectional study. They examined 5 age groups: young children (6-8 years), older children (9-12 years), adolescents (13-15 years), young adults (16-21 years) and older adults (62-81 years). Their results supported the dissociation between episodic and semantic ABMs and showed that both components continue their development throughout childhood and adolescence. However, age affects semantic ABM slightly differently than episodic ABM (Piolino et al., 2007, Willoughby et al., 2012) and aging does not usually impair semantic ABM, in line with the literature (Levine et al., 2002, Martinelli et al., 2013, Piolino et al., 2002, Piolino et al., 2007). Melendez et al. (2018) found similar results using AMI for younger and older adults. Younger adults could outperform older adults only for episodic ABM scores. Older adults have their semantic ABM preserved while their episodic ABM deteriorated. Together these results suggest that there is a negative effect of aging on episodic ABM, whereas semantic ABM is preserved or even enhanced in older adults. However, it should be noted that these findings are based on healthy aging. To have better understanding of how episodic and semantic ABMs dissociate, next I will focus on dementia and how it affects these two types of ABM differently.

Semantic ABM in Alzheimer's Disease and Mild Cognitive Impairment

Dementia is defined as a range of neurodegenerative conditions that are characterized by progressive decline in cognitive abilities such as memory, reasoning, and communication (American Psychiatric Association, 2013). It is a major health concern since over 55 million people lives with dementia and about 10 million new people are diagnosed with it each year (World Health Organization, 2021). Alzheimer's disease and mild cognitive impairment (MCI) are two such neurocognitive conditions. With Alzheimer's being the most common form of dementia and MCI often acting as an early warning sign, they are almost at different ends of the spectrum of cognitive decline. Alzheimer's is responsible for 60%-80% of dementia cases and gradually erodes memory and thinking abilities, making everyday life increasingly difficult (Alzheimer's Association, 2023). MCI, on the other hand, involves noticeable changes in memory and cognitive function, but these changes don't yet interfere significantly with daily activities. However, people with MCI have a greater risk of developing Alzheimer's over time (Petersen et al., 2018). Research suggests that around 10%-20% of adults over 65 experience MCI, emphasizing its role as a potential stepping stone to more severe cognitive decline (Roberts & Knopman, 2013).

Alzheimer' Disease

ABM declines significantly in AD since it relies on the hippocampus and other medial temporal lobe structures that are among the first regions affected in AD (Knopman et al., 2021).

Greene et al. (1995) examined episodic and semantic ABM and showed that both types of ABM were impaired in AD patients. In line with literature (e.g. Kopelman et al., 1989), Greene et al. (1995) showed that the impairments in episodic ABM were more pronounced for the recent events than for remote events. However, contradicting earlier findings, they documented semantic ABM for all time periods to show equal levels of impairment. The authors suggested that as the age of memory gets older it becomes more like a semantic memory than an episodic memory and therefore become more resilient to memory impairments caused by AD. Similarly, Graham and Hodges (1997) found that AD group performed worse than controls in both episodic and semantic part of the AMI. Furthermore, recent memories of both types of ABM were more impaired than the remote memories in an AD group.

Research shows that when compared semantic ABM, episodic ABM is unequally affected by Alzheimer's especially during the early stages (El Haj et al., 2015). This is attributed to the reliance of semantic memory on neocortical areas rather than the medial temporal lobe structures, which are more vulnerable in AD (Budson & Price, 2005; Nadel & Moscovitch, 1997). In a longitudinal study, Melendez et al. (2021), showed that although both episodic and semantic ABMs decline as AD progresses, the deterioration is less severe for semantic ABM. Similarly, Piolino et al. (2002) found that semantic memories from earlier life periods are better preserved than episodic memories in AD. This preservation is related to the progressive nature of hippocampal dysfunction in AD. However, as AD progresses, semantic ABM also declines, especially when the lateral temporal association cortices are affected. Semantic ABM loss becomes pronounced in advanced stages due to the involvement of neocortical regions critical for its retrieval (Melendez et al., 2021).

Other studies also supported these findings showing that episodic ABM tend to be impaired early in the disease (Irish et al., 2016), whereas semantic ABM seem to hold up better at first, although it too may begin to fade as Alzheimer's progresses (King et al., 2017). Irish et al. (2016) noted that individuals with early-stage Alzheimer's struggled significantly with recalling detailed events compared to people without the disease, while their ability to remember general life facts remained relatively intact. Further research by Melendez et al. (2021) has shown that over time, these general memories also start to decline.

Overall, it can be concluded that semantic ABM remains relatively undamaged in the early stages of AD and as the disease progresses, it also starts to deteriorate. These suggest that the loss of detailed, episodic memories can serve as an early warning sign, with broader memory issues emerging as the disease advances, highlighting the importance of understanding the different ways our memories are affected, which can be crucial for early diagnosis and better planning for care and intervention.

Mild Cognitive Impairment

Mild cognitive impairment (MCI) is defined as a condition where a person's thinking and memory abilities decline more than expected for their age and education. However, this decline isn't severe enough to significantly affect their daily activities or independence (Petersen et al., 1999). MCI is often considered as a bridge between healthy aging and dementia, and it is commonly considered as an early sign of Alzheimer's disease (Albert et al., 2011). There are two main types of MCI: amnestic MCI (aMCI) mainly affecting memory, and non-amnestic MCI (naMCI) impacting other areas like language, attention, or spatial awareness (Petersen, 2004). These two main types are also divided into two subtypes as single vs multiple domains depending on how many cognitive domains they are affecting (Petersen, 2016).

Marselli et al. (2023) conducted a systematic review exploring semantic and episodic ABM in MCI. Of the 21 studies they reviewed, all reported a decline in the episodic ABM in patients with MCI compared to healthy controls. However, when it comes to the semantic ABM, the picture is less clear. Of the 21 studies only 14 included semantic ABM to their design. Among those 14 studies, 4 did not find a significant difference in decline in semantic ABM whereas seven found that patients with MCI showed worse semantic ABM performance when compared to the healthy controls.

Murphy et al. (2008) examined episodic and semantic ABM in an aMCI sample using the AI (Levine et al., 2002). They found that narratives of aMCI participants included more semantic and less episodic information compared to controls implying impairment in the latter. This result suggests that the changes in the brain caused by aMCI affect episodic and semantic ABM differently.

However, Leyhe et al. (2009) contradicted these results. Using the AMI (Kopelman et al., 2002), they examined deficits of episodic and semantic ABM in healthy individuals, aMCI and AD patients. Healthy control participants performed better in AIS than both aMCI and AD participants but for the semantic ABMs, AD patients performed worse than aMCIs and healthy controls who performed equally well. However, when further analyses were conducted it is shown that aMCI participants' scores for recent semantic ABMs were worse than controls contradicting the results of Murphy et al. (2008). It should be noted that these two studies used different tools to asses semantic ABM.

To reach a conclusion, Barnabe et al. (2012) compared AI and AMI in samples with MCI and AD. In line with the literature, when AMI is used AD patients showed impaired retrieval for episodic ABM at all time periods and their semantic ABM was defective compared to healthy participants. Furthermore, results for the aMCI patients were also in line with previous literature. Their episodic ABM was impaired but semantic ABM was rather intact. On the other hand, although both groups showed deficits in episodic ABM according to AI results, there was no impairment in the semantic ABM processes. Barnabe et al. (2012) attributed these results to the number of probes used in both methods. Although both methods use probes, AI method offers an infinite number of probes, causing an overestimation for the semantic ABM performance. Furthermore, for AMI, participants are asked to produce three memories for each time period whereas for AI they asked to retrieve only one. Barnabe et al. (2012) showed that the memory impairments became more noticeable after the second one, which suggests AMI as a more sensitive tool to measure memory deficits.

In short, Barnabe et al. (2012) showed that both AI and AMI can detect episodic memory problems in people with AD and aMCI. However, AMI seems to be a more sensitive tool for semantic ABM because it asks for multiple memories from different time periods, making it easier to spot the full extent of memory loss—especially in episodic ABM. Barnabe et al. (2012) stated that future studies should consider these differences when interpreting the contradictory results.

Conclusion and Future Directions

Research on semantic and episodic ABM shows that while these two types of memory are closely connected, they are affected differently in various clinical conditions (Greenberg & Verfaellie, 2010; Tulving, 1989). Episodic ABM, which allows us to recall specific personal experiences with rich details, tends to be more vulnerable—especially in conditions like Alzheimer's disease and MCI. Then again, semantic ABM, which includes general personal facts and knowledge, is often more resilient, at least in the earlier stages of cognitive decline (Leyhe et al., 2009). However, research findings don't always align, partly because different studies use different methods to assess memory. For example, structured approaches that ask participants to recall multiple memories may be better at detecting subtle deficits than those that allow unlimited retrieval attempts (Barnabe et al., 2012).

One of the main problems in the semantic ABM literature is the lack of terminology. Studies on semantic ABM usually prefer different names for it like personal semantic memory (Wood et al., 2006) semantic ABM (Kopelman, et al., 1989), autobiographical semantic remembrance (Leyhe et al., 2009) and sometimes, autobiographical facts (Renoult et al., 2012) and these terms were used interchangeably (Parker, et al., 2013). As summarized in the introduction, the definitions of these terms are only slightly different from each other. The use of different terminology to refer the same phenomenon causes confusion and a consensus should be reached to cultivate more research on semantic ABM.

Furthermore, Renoult et al., (2012) introduced the term personal semantics as an umbrella term to cover memories related to personal information: autobiographical facts, self-knowledge, repeated events and autobiographically significant concepts. Autobiographical facts are defined as closer to semantic ABM since there is no feeling of recollection, but they contain information that is highly personal. Although studies mentioned above seemed to focus on the semantic ABM, it is not clear whether different types of personal semantic information were excluded from the semantic ABM scores of the participants. Especially in the AI (Levine et al., 2002), narratives of participants were coded for semantic details, but the definition of semantic detail is not clear cut. Different kinds of personal semantics can be coded as semantic ABM. On the other hand, in AMI, only autobiographical facts are accepted as semantic ABMs. This difference between the two main methods used to assess semantic ABMs causes contradictory results (e.g. Levine et al., 2002; Piolino et al. 2002). Future studies should take the different types of personal semantics into consideration of to reach better conclusions.

As stated above, AMI received several criticisms (Dritschel et al., 1992; Levine, et al., 2002; Murphy et al., 2008). Levine et al. (2002) developed the AI which does not cause artificial division between semantic and episodic ABMs like AMI does. Furthermore, AI examined more lifetime periods to be able to assess older individuals' memories. However, AI is also criticized for several reasons. Barnabe et al. (2012) stated that use of only one memory for each time period make AI less sensitive to assess semantic and episodic ABM. Moreover, use of unlimited probes cause the overestimation of the semantic ABM performance, causing the contradictory results in the literature. Finally, as mentioned above, the definition of coded semantic details are more clear-cut. Moving forward, researchers should work toward standardizing memory assessment methods, combining findings from neuroimaging studies, and conducting long-term studies to better understand how episodic and semantic ABM evolve with age and disease (Willoughby et al., 2012).

Finally, as can be seen above, studies on semantic ABM focused mostly on the dissociation between semantic and episodic ABMs. Although there is a great amount of information about the condition of semantic ABM in different disease and disorders (e.g. Crane & Goddard; 2008; Kenealy et al., 2002; Kopelman et al., 1989) our knowledge about the nature of semantic ABM, its developmental course, its relation to self and other types of personal semantics is limited. Future research should examine the different aspects of semantic ABM for a more comprehensive understanding of the subject.

The importance of the distinction between episodic and semantic ABM is not only theoretical but also clinical. To advance the field, future research must prioritize methodological consistency, clarifying terminological ambiguity and standardizing assessment tools. Furthermore, examining semantic ABM in broader contexts, as its interaction with executive functions, emotional regulation, and personal identity, could enrich our comprehension of its role within cognition. Finally, longitudinal studies integrating behavioral data with neuroimaging methods will be instrumental in elucidating the nuanced trajectory of semantic ABM across the lifespan, ultimately contributing to more effective interventions and support mechanisms for individuals experiencing cognitive decline.

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