



## Emotional specificities of autobiographical memory after breast cancer diagnosis



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### ABSTRACT

Cancer involves stressful events. One aspect of cognition that is impacted by stress is episodic autobiographical memory (EAM). EAM is intimately linked to self-representation. Some studies have revealed impairment of EAM in patients with breast cancer in remission. Yet, these studies failed to differentiate between the influence of adjuvant treatments and that of psychosocial factors. We therefore assessed the psychological impact of breast cancer diagnosis on EAM and self-representation profiles prior to any adjuvant treatment. Patients newly diagnosed with breast cancer ( $n = 31$ ) and women without any history of cancer ( $n = 49$ ) were compared on state anxiety, EAM and its emotional characteristics, and self-representations. The most anxious patients retrieved fewer emotional details for memories than the controls, and had lower self-representation scores than the least anxious patients, who had no deficits in emotional detail retrieval. Our results revealed distinct EAM profiles for patients, reflecting two contrasting modes of coping with breast cancer.

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## 1. Introduction

A growing body of research focuses on cognitive functioning in non-central nervous system (non-CNS) cancers, mainly in breast cancer. Complaints concern memory, attention or concentration problems which are mostly quite subtle, although they strongly affect patients' quality of life. Studies report cognitive deficits during and after completing adjuvant chemotherapy, often referred to as *chemobrain* (Wefel & Schagen, 2012), but many of the recent prospective studies report performances below normal scores even before adjuvant treatment has begun (Ahles et al., 2008; Cimprich et al., 2010;

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Quesnel, Savard, & Ivers, 2009; Wefel, Saleeba, Buzdar, & Meyers, 2010). These results suggest that, in addition to the aggressive effects of chemotherapy, combinations of biological and medical factors, such as side-effects of surgery and anesthesia, could also play a role in patients' cognitive impairment (Joly, Rigal, Noal, & Giffard, 2011). Furthermore, due to the diagnosis of a life-threatening illness, cancer involves many stressful events that may lead to psychosocial changes (state anxiety and self-representations), and in some cases, to psychiatric symptoms, such as those reported in post-traumatic stress disorder (PTSD) or in major depression.

Such psychological distress may have adverse effects on cognition, and one aspect of cognition that is particularly vulnerable to stress-related symptoms is autobiographical memory (e.g. St Jacques, Kragel, & Rubin, 2013). Autobiographical memory refers to personally relevant events extended over time and is important for grounding and modifying personal identity as it enables one to construct a sense of identity and continuity over time (Conway & Pleydell-Pearce, 2000). A bidirectional relationship exists between autobiographical memory and self-representations: while autobiographical memory plays a fundamental role in the formation of self-representations, inversely, retrieval of the past is influenced by the current self, known as the working self (i.e., one's current beliefs, goals and self-images; Conway, 2005; Klein & Lax, 2010). The Self-Memory System (SMS, Conway & Pleydell-Pearce, 2000) emphasizes this interrelationship between self and memory. Autobiographical representations are organized hierarchically along three levels: from lifetime periods (extended over long periods of time), to generic events (repeated or extended in time), and lastly event-specific knowledge (contains specific episodic memories). This last level refers to episodic autobiographical memory (EAM) which supports our capacity to re-experience personal past events (i.e., to mentally travel in time) with their specific details, such as the spatiotemporal context, factual and emotional descriptions (Piolino, Desgranges, & Eustache, 2009; Tulving, 2002) (e.g., "I remember the moment when Mr O. asked me to sit at his desk to look at my tests. I felt anxious when he said he had the results. It was in December."). The SMS proposes an explanation concerning the voluntary retrieval of EAM when assessed using a semi-structured interview such as the Autobiographical Memory Task (AMT, Williams & Broadbent, 1986) or the TEMPaU task (for *Test Episodique de la Mémoire du Passé autobiographique*; Piolino et al., 2003). Generative retrieval provides controlled access to event-specific knowledge via the personal semantic knowledge base (lifetime periods and generic events). This generative retrieval process relies on both executive functions and the working self, which acts as a moderator between the demands of correspondence (memory should correspond to experience and reality) and coherence (memory should be consistent with one's current goals, self-images and beliefs) in the formation of memories (Conway, Singer, & Tagini, 2004).

Numerous studies have focused on autobiographical memory functioning in stress-related disorders. When asked to retrieve a specific episodic life event, depressed or traumatized patients with PTSD or acute stress disorder (ASD) instead tend to recall broader, repeated and generic events with no specific details, i.e. overgeneral memories (see Moore & Zoellner, 2007; Sumner, Griffith, & Mineka, 2010; Williams & Moulds, 2007 for reviews). Based on the SMS, overgenerality occurs when the generative retrieval search process is aborted prematurely, before reaching the level of event specific knowledge (e.g., Haque, Juliana, Khan, & Hasking, 2014). This phenomenon may rely on the interaction between executive dysfunction (deficits in executive resources limit the ability to conduct a successful retrieval search) and the current self. According to the CaR-FA-X model (capture and rumination, functional avoidance, and impaired executive control) proposed by Williams et al. (2007), overgeneral memories and avoidance of intrusive memories contribute to protect the self against specific stressful memories by decreasing the likelihood of any episodic recollection, as a means of affect regulation. The model also postulates that overgeneral memories occur when the generative retrieval search process is aborted as a result of two other mechanisms: capture and rumination (capture at a general autobiographical level which occurs particularly in individuals prone to rumination) and impaired executive control (e.g. inhibition and working memory capacity) which play a role in the strategic retrieval of a specific memory (see Sumner, 2012).

Debeer et al. (2012) suggest that the functional avoidance hypothesis might not only be proposed to explain overgeneral memories in depressed and traumatized patients, but also for healthy individuals, i.e. without psychiatric disorders. The authors observed that confronting healthy subjects with an acute stressor increases memory overgenerality, although this observation depends on the individual's general tendency to engage in (cognitive) avoidant coping. Thus, overgenerality could be a form of cognitive avoidance strategy used in a flexible way by nonclinical individuals only under certain conditions (Hermans et al., 2008). These studies suggest that reduced memory specificity for certain unpleasant events may be a natural and healthy coping strategy in individuals without psychiatric diagnoses. Indeed, autobiographical memory dysfunction—specifically overgenerality—has also been reported in specific medical populations (e.g., tinnitus patients, Andersson, Hesser, Cima, & Weise, 2013), patients with chronic pain (Liu et al., 2014), or in life-threatening illnesses such as patients with HIV (e.g., Abdollahi, Moradi, Hasani, & Jobson, 2012), but some of these patient groups were associated with psychiatric disorders like depression or PTSD.

In non-CNS cancer, a life-threatening illness in which psychological turmoil may occur, autobiographical memory impairment has also been observed (see Giffard et al., 2013, for a detailed review). In early studies, autobiographical memory overgenerality observed in groups of patients with different types of cancer (breast, gastro-intestinal, lung, etc.) was also found to be related to major depression or PTSD (Brewin, Watson, McCarthy, Hyman, & Dayson, 1998; Kangas, Henry, & Bryant, 2005). However, in comparison studies with healthy controls without any history of cancer, autobiographical memory overgenerality has also been observed in breast cancer patients who are in remission and have no stress-related psychiatric disorders (Bergouignan et al., 2011; Nilsson-Ihrfelt et al., 2004). In these two studies, patients were assessed several months after the end of adjuvant treatment (i.e., these patients had undergone surgery, chemotherapy and radiotherapy, and sometimes hormonal therapy, too). Thus, no clear distinction can be drawn between the influence of aggressive adjuvant treatments and

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