



# Cue generation and memory construction in direct and generative autobiographical memory retrieval



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## ABSTRACT

Theories of autobiographical memory emphasise effortful, generative search processes in memory retrieval. However recent research suggests that memories are often retrieved directly, without effortful search. We investigated whether direct and generative retrieval differed in the characteristics of memories recalled, or only in terms of retrieval latency. Participants recalled autobiographical memories in response to cue words. For each memory, they reported whether it was retrieved directly or generatively, rated its visuo-spatial perspective, and judged its accompanying recollective experience. Our results indicated that direct retrieval was commonly reported and was faster than generative retrieval, replicating recent findings. The characteristics of directly retrieved memories differed from generatively retrieved memories: directly retrieved memories had higher field perspective ratings and lower observer perspective ratings. However, retrieval mode did not influence recollective experience. We discuss our findings in terms of cue generation and content construction, and the implication for reconstructive models of autobiographical memory.

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## 1. Introduction

The assertion that autobiographical memory is ‘reconstructed’ is virtually a truism in cognitive psychology. In a move away from the computer or video tape metaphors which had previously emphasised memory’s role in reproducing the past, current theories of autobiographical memory emphasise its malleability, its selectivity, its broader, meaning-making functions, and its openness to social influences (e.g. Anderson, 1997; Bluck & Levine, 1998; Conway, Singer, & Tagini, 2004; Drivdahl & Hyman Jr., 2013; Harris, Rasmussen, & Berntsen, 2014; Hasher & Griffin, 1978; Pasupathi, 2001). These ideas are not new, however, and can be dated back to Bartlett’s (1932) observation that “the first notion to get rid of is that memory is primarily or literally reduplicative, or reproductive. In a world of constantly changing environment, literal recall is extraordinarily unimportant. . . memory appears to be far more decisively an affair of construction rather than one of mere reproduction” (pp. 204–205). However, the concept of memory reconstruction is used in a variety of contexts and may encompass a variety of different processes in autobiographical memory retrieval (see also Michaelian, 2011).<sup>1</sup> In the current

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<sup>1</sup> There is some inconsistency in the use of related terms *reconstructive* and *constructive*, and it is not entirely clear whether these terms refer to different kinds of processes or imply different conclusions about the nature of autobiographical memory. One solution, suggested by Michaelian (2011), is to use ‘constructive’ for processes acting at encoding, and ‘reconstructive’ for processes acting at retrieval. ‘Reconstructive’ is generally the most commonly used term in the literature, and we retain it here while noting that ‘constructive’ may be more appropriate, and that more conceptual and empirical work is required to precisely define and differentiate these terms.

paper, we investigate the relationship between two processes – cue generation and content construction – and whether there is a distinction between them, by comparing the characteristics of memories retrieved directly and memories retrieved generatively.

### 1.1. Direct and generative retrieval processes

Theories of autobiographical memory suggest that two qualitatively distinct retrieval processes underlie everyday memory: direct retrieval – remembering without an experience of effortful search; and generative retrieval – remembering with an experience of deliberate or effortful search (Addis, Knapp, Roberts, & Schacter, 2012; Conway & Pleydell-Pearce, 2000; Haque & Conway, 2001; Rubin & Berntsen, 2009; Uzer, Lee, & Brown, 2012). According to Conway's Self-Memory System model of autobiographical memory (Conway, 2005; Conway & Pleydell-Pearce, 2000), these two retrieval processes access the same store of 'event-specific' autobiographical knowledge. Direct retrieval is a 'bottom-up' process (Williams et al., 2006), that occurs when a cue shares enough features with a memory to trigger direct access to the autobiographical knowledge base (Conway, 2005; Conway & Loveday, 2010). Generative retrieval, on the other hand, is a 'top-down' process (Williams et al., 2006), that involves goal-directed, hierarchical searching and spreading activation across the memory network in an attempt to retrieve a memory that meets current goals. In generative retrieval, associative memory networks mean that potential memory cues activate each other, until a cue is activated that successfully accesses the searched-for memory in the autobiographical knowledge base (Conway, 2005; Conway & Loveday, 2010). That is, in generative retrieval, when encountering a memory cue, one has to bring to mind additional, related information and knowledge from one's life before a specific memory is recalled (Uzer et al., 2012).

Some empirical research has supported this distinction between retrieval processes. Direct retrieval is associated with shorter retrieval latencies than generative retrieval (e.g. median response time of 2–4 s vs. 10–14 s in Uzer et al., 2012, Experiments 1–3; see also Addis et al., 2012). Direct retrieval is more common in response to concrete noun cues, and generative retrieval is more common in response to abstract emotion cues (Uzer et al., 2012). Neuroimaging research has identified strong overlap as well as some interesting differences in brain activity during direct vs. generative retrieval. Specifically, Addis et al. (2012) found that direct retrieval was associated with stronger activation generally across the neural 'autobiographical memory network', and particularly, increased activity in the visuospatial areas. On the other hand, generative retrieval was associated with increased activity in regions involved in executive control, memory search, retrieval of semantic information, memory elaboration, and post-retrieval monitoring (Addis et al., 2012). Conway and Loveday (2010) described the case of an amnesic patient who was unable to engage in generative retrieval, but whose memory function was intact for direct retrieval when she encountered an appropriate cue.

A related but not identical distinction has been made between voluntary and involuntary remembering (see Berntsen, 2010). Although direct retrieval and involuntary remembering are sometimes conflated in the literature, the defining feature of direct retrieval is its lack of effort, while the defining feature of involuntary retrieval is its lack of intentionality (see also Uzer et al., 2012). While involuntary memories must involve direct and not generative retrieval (since conscious effort to search for a memory must involve the intention to recall), voluntary remembering can involve either direct retrieval or generative retrieval. In fact, the paradigms that have indexed direct and generative retrieval as described above have involved intentional (i.e. voluntary) retrieval, in which participants are given the intention (via task demands) of recalling a memory in response to each cue (Addis et al., 2012; Uzer et al., 2012). Models of autobiographical memory have traditionally emphasized generative retrieval as more common than direct retrieval. For instance, Haque and Conway (2001, p. 532) stated that "More common than direct retrieval is the effortful repeated cycle of access, evaluate, and elaborate as a memory is constructed during the process of generative retrieval". However, new research indicates that direct retrieval occurs as frequently as generative retrieval, even in a laboratory-based intentional autobiographical memory task (Uzer et al., 2012). This finding parallels recent research suggesting that involuntary retrieval is a mundane, everyday experience (Berntsen, 2010).

### 1.2. Cue generation and content construction

Uzer et al. (2012) suggested that the generation involved in generative retrieval is the generation of cues, rather than the generation of memory content per se. That is, generative retrieval is a backup strategy that is initiated when the presented cue is unsuccessful at directly triggering a memory; in generative retrieval then, people continue to self-generate additional (internal) memory cues until they activate a cue that directly triggers a memory (Uzer et al., 2012). This proposition makes a strong conceptual distinction between cue generation and content construction. An alternative hypothesis – based on Conway's (2005; Conway & Pleydell-Pearce, 2000; Haque & Conway, 2001) hierarchical model of autobiographical memory – is that the generation of memory cues in practice is not separable from the construction of memory content, because the cues in question are linked to the memory in a hierarchy of increasing specificity. As an example, given the cue word 'dog', an individual might first think of their childhood dog, before recalling finding a puppy under the tree on Christmas morning. While moving from the generic cue 'dog' to thinking of one particular dog is certainly cue generation, it is also constructing part of the content that will make up the specific event (see also Addis et al., 2012). A third possibility lies somewhere between these viewpoints: it is possible that cue generation and content construction are distinct processes but that they both operate during retrieval.

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