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Remembering, imagining, false memories & personal meanings ☆

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ABSTRACT

The Self-Memory System encompasses the working self, autobiographical memory and episodic memory. Specific autobiographical memories are patterns of activation over knowledge structures in autobiographical and episodic memory brought about by the activating effect of cues. The working self can elaborate cues based on the knowledge they initially activate and so control the construction of memories of the past and the future. It is proposed that such construction takes place in the *remembering–imagining system* – a window of highly accessible recent memories and simulations of near future events. How this malfunctions in various disorders is considered as are the implication of what we term *the modern view of human memory* for notions of memory accuracy. We show how all memories are to some degree false and that the main role of memories lies in generating personal meanings.

1. Introduction

The main contention of this paper is that when people remember they imagine and when they imagine they use memory. Imagining involves 'working with memory' (Moscovitch, 1992). Because of the intrinsic relatedness of memory and imagination we refer to what we term the *remembering imagining system*, RIS, (Conway & Loveday, 2015). The RIS is described further below. The constructive nature of autobiographical memory and autobiographical remembering are considered first.

2. Autobiographical memory

Autobiographical memory (AM) is a complex cognitive system mediated by neural networks distributed through large areas of the neo-cortex and limbic system (see Cabeza & St. Jacques, 2007). Indeed, recent neuroimaging studies have found few differences between remembering, imagining the future, and what is sometimes termed 'the default network', all of which appear to share the same extensive distribution of interlocking neural networks (see Schacter, Chamberlain, Gaesser, & Gerlach, 2012 for a recent review). Autobiographical memory contains autobiographical knowledge, e.g. personal factual knowledge and cultural knowledge, such as the history of our times. It also contains *episodic memories*,

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e.g. fragmentary knowledge derived from experience (Conway, 2009). As such it forms a major part of the self (Conway, 2005; Conway & Pleydell-Pearce, 2000; Conway, Singer, & Tagini, 2004). Fig. 1 depicts partonomic knowledge structures in AM in which episodic memories are part of general events which in turn are part of lifetime periods which may themselves be part of broader themes such as work or relationship themes and the life story (Bluck & Habermas, 2001).

Different levels of the knowledge structures are accessed by *cues* and the lines in Fig. 1 connecting different levels depict the action of cues and should *not* be taken as some sort of direct connection. So for example, knowledge represented in a lifetime period such as 'Working at university X' could be used as a cue to access a the general event, 'Departmental talks', which in turn contains knowledge that can access specific episodic memories. Thus, the entire complex knowledge base has patterns of activations arising and dissipating continuously in it as experience is represented in the mind and has the effect of activating associated long-term knowledge. The idea is that the AM system is labile and intrinsically responsive to cues. Occasionally, on a daily basis according to Berntsen and colleagues (Berntsen, Staugaard, & Sørensen, 2013), an AM may spontaneously come to mind. Such involuntary memories often appear to be the result of a specific cue, illustrating this cue-sensitivity. On other occasions control process elaborate a cue as a specific memory is sought for (Conway, 2005). This process of generating a memory takes time as a cue iterates through repeated cycles of elaboration and activation, until the sought-for memory has been constructed. In all cases the effect of a cue or set of cues is to form a stable pattern of activation within AM knowledge structures and it is that pattern of activation that is, temporarily, a memory. A specific AM will also always include the activation of episodic memories.

One interesting hypothesis here is that it is *only* when an episodic memory or set of episodic memories are activated that a constructed memory enters consciousness, i.e. the rememberer becomes consciously aware of the memory. A possibility that then arises is that activation in the autobiographical memory knowledge base can, and indeed does, occur non-consciously. Experiences of 'involuntarily' remembering may then simply reflect unawareness of memory processing that occurred prior to the 'involuntary' recall. Indeed, Schank (1982) catalogued many instances of what he term 'remindings' – memories unexpectedly coming to mind often because of an abstract relation to a current situation or to another memory. So, for example, the structure of an event might cue a memory, as in the case of a person who recalled that he could not get his hair cur as short as he wanted when in England cueing a memory of not being able to get a steak cooked as rare as he liked, cf. Schank (1982).

Remindings suggest that there maybe some non-conscious process that monitors memory for autobiographical knowledge that could help current problem solving. The non-conscious activation of memories may also underlie feelings such as déjà states, e.g. déjà vu, having *seen* before, and déjà vecu – having *lived* this moment before. We have proposed that in patients who often experience déjà states, particularly déjà vecu, their memory feelings may arise from memories that do not enter into consciousness but nevertheless are strongly enough activated to trigger recollective experience (Moulin, Conway, Thompson, James, & Jones, 2004). One of the problems with a memory system that has highly labile patterns of activation continually arising in response to continuously changing cues is that memories could, potentially, swamp consciousness. Thus, control process must modulate what memories become instantiated in consciousness at the same time as monitoring the cue-driven changing patterns of activation in long-term memory for information relevant to current goals. Finally, it seems to us highly possible that such non-conscious activation of autobiographical memory knowledge structures might, potentially, play a significant role in mediating a wide variety of social interactions, e.g. in influencing who we like, who we do not like, and who we are uninterested in, although this aspect of autobiographical memory has yet to be investigated.

Autobiographical memory is then a complex multilayered distributed knowledge base in which cues constantly cause patterns of activation, some of which may stabilize into memories. It seems that this AM network is never totally inactive although, of course, activation will vary in strength at different times and may be modulated by control processes as suggested above. For instance, neuroimaging studies have found a 'default' network that is active when attention is unfocused but which is powered down when attention is focused (Schacter et al., 2012). The default network takes in many of the networks that feature in autobiographical remembering and, importantly, many of the same networks are active when future experiences are imagined. Thus, during 'day dreaming' the autobiographical memory knowledge base is active. In addition during sleep it is now clear that a major component of the AM system, the medial temporal lobe memory system is also highly active (see Solms, 1997). The AM knowledge base is, then, never totally quiescent and regions of it are always active, even during sleep.

In general, however, it may be the case that control or executive processes exercise considerable control over which patterns of activation enter consciousness and also how patterns of activation are 'shaped' by cues. The latter by elaborating cues on the basis of initial cue activation and so directing a search. The former by denying patterns of activation access to consciousness, where they would disrupt current goal processing by turning attention to the pattern of activation in the AM knowledge base and away from other attention focused activities. Despite this inhibitory control the effect of cues is always to cause activation in the AM knowledge base. As proposed earlier it seems possible that such activation, that does not gain conscious representation, may nonetheless influence goal processing non-consciously. Whether this actually occurs is not known, but the *Self–Memory System* (SMS) model of AM put forward by Conway and Pleydell-Pearce (2000) allows for the possibility.