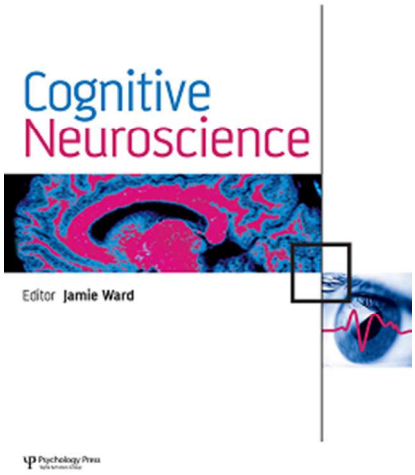

The Self-relevance System?

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RUNNING HEAD: Self-relevance

The Self-Relevance System?

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Abstract

We suggest that the Self Attention Network (SAN) maybe part of a larger self-regulatory system, which we term the *Self-Relevance System* (SRS) of which the 'core' or default network is a major part. It is within the core network that memories are generated and the future imagined. Such memories and imaginings are the basis of preoccupations. Within the SRS then preoccupations drive the emergence of attentional biases (ABs). ABs in turn are modulated by the SAN activating and inhibiting circuits that shape behaviour. We consider briefly how this might function in dysfunctional appetitive behaviours, e.g. substance abuse.

It has long been known that the self plays a central role in many forms of cognition, from attention and perception to memory and emotion. Indeed, it may be critical in giving rise to memories that can later trigger recollective experience, (Dewhurst & Conway, 1995). The link between self-relevance and attention has also been demonstrated in previous studies. For example, the relationship between automatic and controlled attentional processing in self-referential encoding tasks can be seen in the studies reported by Turk, van Bussel, Brebner, Toma, Krigolson and Handy (2011). They used a temporary ownership task in which items were assigned to self or other on the basis of a colour cue. Responses to self-relevant cues were associated with a narrowing of spatial attention (occipital P1 component) to the location of the owned object. This early, automatic response to the detection of self-relevance was followed by a later increase in the P300 component associated with higher-order, top-down modulation of attention and executive processing. Indeed, Turk, van Bussel, Waiter, and Macrae (2011) proposed a temporal model in which activity in attentional and reward circuits in frontal cortex associated with object ownership was followed by activity in lateral posterior regions associated with attention for action. Interestingly, activity in this network was suppressed during the processing of items belonging to others.

The main contribution of Humphreys and Sui (2015) is in identifying a potential self-attention network (SAN) in the temporal lobes and ventromedial prefrontal cortex that is modulated by an inhibitory network in intra-parietal sulcus and dorsolateral prefrontal cortex. It seems to us that the inhibitory control is essential as not all events are high in self-relevance and those that are may attenuate other processes, for example the encoding of memory details. It is interesting that experiences of intense self-relevance, such as trauma, often lead to memories low in detail with amnesic

gaps (Conway, Meares, & Standart, 2004). Thus, controlling attentional biases (ABs) created by high self-relevance is perhaps critical to optimum cognitive functioning.

The SAN, however, may be part of a larger and more complicated *self-relevance system* (SRS) encompassing a wide range of cortical networks collectively known as the *core* or *default* network (Buckner, Andrews-Hanna, & Schacter, 2008). When attention is unfocussed the core system is characterized by activation in anterior and posterior networks, the same networks that become active during remembering and imagining (Conway & Loveday, 2015). But when attention is unfocussed remembering and imagining are probably the main activities of the cognitive system and their outputs are the representations that the SAN attends to. Inhibiting or facilitating such outputs shapes ABs and behavior.

In this regard an interesting and important role for the SAN may lie in generating ABs in, for instance, appetitive behaviours both functional and dysfunction, e.g. substance abuse. Alcohol abuse can lead to an AB for alcohol-related information (Cox, et al., 2006), just as hunger is associated with ABs for food-related information (Tapper, et al., 2010). Preoccupation may explain how SAN ABs arise, i.e., an alcohol abuser is preoccupied with consuming alcohol and so alcohol-related information becomes salient (Klinger & Cox, 2011). Could self-biases arise analogously? Plausibly, we are preoccupied with ourselves, what we own, or perhaps by how others perceive us. Additionally, some key characteristics of decision-making, such as loss aversion, make sense only in relation to the self. Perhaps self-preoccupation in the SRS could result in an AB for the self, overall.

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Authors' Note

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