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Short Communication

Survival of the selfish: Contrasting self-referential and survival-based encoding

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ABSTRACT

Processing information in the context of personal survival scenarios elicits a memory advantage, relative to other rich encoding conditions such as self-referencing. However, previous research is unable to distinguish between the influence of survival and self-reference because *personal* survival is a self-referent encoding context. To resolve this issue, participants in the current study processed items in the context of their own survival and a familiar other person's survival, as well as in a semantic context. Recognition memory for the items revealed that personal survival elicited a memory advantage relative to semantic encoding, whereas other-survival did not. These findings reinforce suggestions that the survival effect is closely tied with self-referential encoding, ensuring that fitness information of potential importance to self is successfully retained in memory.

1. Introduction

1.1. Survival-related processing

Memory researchers have identified adaptive qualities of encoding and retrieval that allow fitness information (i.e., that concerning survival and reproduction) to be preferentially processed (Kang, McDermott, & Cohen, 2008; Klein, Cosmides, Tooby, & Chance, 2002; Nairne, 2005; Nairne & Pandeirada, 2008a, 2008b, 2010; Nairne, Thompson, & Pandeirada, 2007; New, Cosmides, & Tooby, 2007; Öhman & Mineka, 2001). It is posited that ecological pressures have led to the evolution of specific processing biases in relevant domains such as physical survival (i.e., food, shelter, and danger), navigation, reproduction, social exchange, and kinship (Nairne & Pandeirada, 2008b). Of these domains, memory research has focused on physical survival-related processing, demonstrating a robust memory advantage for items encoded in a survival context over non-survival related items (e.g., Burns, Burns, & Hwang, 2011; Kang et al., 2008; Nairne & Pandeirada, 2008a, 2008b; Nairne et al., 2007; Weinstein, Bugg, & Roediger, 2008; Öhman & Mineka, 2001).

The body of research on survival-related memory has grown from a paradigm developed by Nairne et al. (2007). In this study, participants were asked to rate items for importance in the context of a surviving in a foreign grassland, before their item memory was assessed. Memory for this 'survival-related' information was contrasted with memory for information encoded in a non-survival related context (rating the importance of items if moving to a new home abroad), and other contexts known to elicit superior memory performance (rating words for pleasantness and self-relevance). Nairne et al. found that

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compared to all the non-survival related tasks tested, the survival-based encoding led to higher recall and recognition, suggesting that memory systems are indeed 'tuned' for fitness value.

Consolidating this conclusion, some subsequent studies have shown that the memory advantage associated with survival-based encoding is maximized in contexts that mimic the hunter-gatherer environment (i.e., the 'environment of evolutionary adaptedness' (EEA) – see Foley, 1995). For example, survival-related processing elicits a greater advantage when ancient grasslands rather than modern city contexts are evoked at encoding (Nairne & Pandeirada, 2010; Weinstein et al., 2008), and when specific hunter-gatherer goals are involved (e.g., searching in the grasslands for food to eat v. searching for the same items in a team scavenging game – Nairne, Pandeirada, Gregory, & Van Arsdall, 2009). However, recent research has questioned whether evoking the EEA is a necessary prerequisite for the survival effect on memory, with non-grasslands scenarios (e.g., going a picnic) evoking a similar memory advantage (Klein, 2012). Notwithstanding the relative importance of EEA scenarios, these studies together build a compelling argument for the existence of an adaptive, context-dependent encoding bias that ensures information relating to personal survival is successfully retained.

1.2. The self in survival

An interesting aspect of the memory bias for survival-related information, and the focus of the current inquiry, is the extent to which it is associated with self-referential processing biases (see Burns et al., 2011; Klein, 2012). As Nairne et al. (2007) acknowledge, processing personal survival is clearly a self-referential encoding context. Indeed, as Klein comments, "few things are *more* self-relevant than one's own survival" (2012, p. 2, emphasis added).

This self-processing and survival-processing conflation is of theoretical interest because encoding information in a context of self-relevance also elicits a strong memory bias (the self-reference effect (SRE) in memory – Rogers, Kuiper, & Kirker, 1977). The SRE has received an enormous amount of empirical attention for more than three decades, so that we now have a rich understanding of the mechanisms through which it is elicited (for review, see Symons & Johnson, 1997). There is evidence that self-referencing promotes better organization in memory, and leads to relatively rich representations due to elaboration by the detailed and accessible self-concept (Klein & Kihlstrom, 1986; Klein & Loftus, 1988; Symons & Johnson, 1997). Recent research also suggests that automatic responses to self-reference such as increased attention and physiological arousal may also contribute to the rich, elaborative encoding that characterizes self-referential memories (Turk, Cunningham, & Macrae, 2008; Turk, Van Bussel, Waiter, & Macrae, 2011; Turk et al., 2011). If the survival effect is related to self-referential processing, then such explanations could provide a useful account of the proximate mechanisms underlying the impact of survival-related encoding on memory.

Nairne et al. (2007) make the valid point that survival-related retention in their experiments exceeded control conditions that evoked self-reference (i.e., deciding what items would be necessary for a *personal* move abroad). However, Klein (2012) has pointed out concerns with these tasks. In particular, the self-referencing task used by Nairne et al. may have failed to elicit self-referential memories because participants were asked to rate the likelihood of items evoking autobiographical memories, rather than instructed to recall the memories themselves. Klein replicated Nairne et al.'s experiments using a more standard self-referential instructions and found that the memory advantage for survival-based over self-referential processing was rendered non-significant.

Interestingly, the effect of 'removing' the self from survival tasks has been explored previously. Weinstein et al. (2008) employed a between groups design to contrast memory from both first and third-person survival encoding tasks (i.e., rating words in relation to survival of self, friend or a stranger), and found a similar effect in each referent condition. Further, Kang et al. (2008) found that processing information in terms of its fitness for survival enhanced memory performance even when the referent was a cartoon character. However, an issue with both of these studies is that they use a between groups design – when participants are imaging what another person would do in a survival context that is unfamiliar to them, it is likely that they would project self to complete the task (i.e., *"If it were me trying to survive, I would need..."*). It may be that the utilization of a between groups design does not elicit the necessary self-other distinction at encoding (see Greene, 1996; Greenwald, 1976). The current inquiry seeks to overcome this issue and provide a direct test of the influence of self-referential versus survival-based encoding on subsequent memory.

1.3. The current inquiry

This inquiry sought to directly compare self- and other-survival using a variation of Nairne et al.'s (2007) grassland survival task. In a repeated-measures experiment, participants were asked to rate the usefulness of items in the context of their *own* survival in a grasslands context, or the survival of a familiar *other* person. A semantic encoding context was also included for contrast. By specifically generating the need for a self versus other contrast at encoding we predicted that an advantage for survival-related processing over semantic processing would be found when the referent is self, which would be attenuated or eliminated in the other-referent condition. An addition feature was the use of a recognition memory measure rather than free recall, to assess memory performance without relying on only recollective experience (see Symons & Johnson, 1997).