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Individual differences in cognitive control on self-referenced and other-referenced memory

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ABSTRACT

Self-referenced information is better recalled than other-referenced information – a mnemonic advantage known as the “self-reference effect” (SRE). By using a modified version of the “think/no-think” (TNT) paradigm (Anderson & Green, 2001), this study examined the effects of cognitive control on the SRE after the encoding stage. The results indicate that individual differences in personality traits and affective states strongly modulated the SRE after the TNT phase. For individuals high in negative cognitive style, an ironic enhancement of negative self-referenced memory produced a “maladaptive” SRE: better memory for negative self-referenced information than for negative other-referenced information, when trying to suppress that information. Before the TNT phase, instead, the SRE was characterized by the opposite bias. These results indicate that (1) the SRE is strongly affected by cognitive control after encoding, and (2) also in the non-clinical population, dysfunctional cognitive control can transform the SRE into a “maladaptive” memory bias.

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1. Introduction

Self-relevant information is better remembered compared to information related to another person, a phenomenon known as the “self-reference effect” (SRE). The SRE is a pervasive memory phenomenon that occurs when individuals are instructed to evaluate trait words in relation to self or to others (e.g., Klein & Kihlstrom, 1986; Rogers, Kuiper, & Kirker, 1977; Symons & Johnson, 1997), for objects that had been associated with the self or with other people (Cunningham, Turk, Macdonald, & Macrae, 2008), in mild depressive and healthy individuals (Kuiper & Derry, 1982), and across age groups (Gutchess, Kensinger, Yoon, & Schacter, 2007).

Typically, the processing of self-related information involves the processing of emotional valence (Glisky and Marquine, 2009). If individuals remember better positive self-referenced information than positive other-referenced information, then the SRE has an “adaptive” role, because it can maintain or increase the positivity of one’s self-concept (Leary, 2007). On the other hand, a tendency for negative self-referenced information to be remembered better than negative other-referenced information is “maladaptive,” because it may result in a distorted mental representation of the social environment and it may contribute to negative self-appraisal and low self-concept (e.g., Caudek & Monni, 2013).

The purpose of the present study is to examine individual differences in the memory of valenced self-referenced information and to determine the extent to which they are mediated by memory control. It is here hypothesized that individuals

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with a dysfunctional cognitive processing style, due to maladaptive control over self-related information, reverse the bias towards positive information which characterizes the SRE in healthy individuals (e.g., D'Argembeau, Comblain, & Van der Linden, 2005; Watson, Dritschel, Obonsawin, & Jentsch, 2007). Cognitive control after encoding might thus contribute to maintain a positivity bias for self-related memories in some individuals, while creating a bias which favors negative self-related information, in others.

1.1. Self-reference effect and memory biases for valent information

In the non-clinical population, positive information tends to be remembered better than negative information, but only when it is related to the self. For example, D'Argembeau et al. (2005) asked participants to recall trait adjectives that had been previously processed either in reference to the self or in reference to a stranger. They found better recall performance for positive than for negative trait adjectives, but only when the adjectives were encoded with reference to the self (see also Kuiper & Derry, 1982; Sedikides & Green, 2000, 2004). It has also been shown that the affective intensity associated with autobiographical memories decreases more rapidly with time for negative memories than for positive memories (Walker & Skowronski, 2009), and that self-related memories are distorted by the tendencies to form positive (Wilson & Ross, 2003) and consistent (Conway, 2005; Conway, Singer, & Tagini, 2004) memories about ourselves.

Also in healthy subjects, however, the positivity bias that characterizes the SRE can sometimes be replaced by an opposite bias. For example, Caudek and Monni (2013) found that the self-face advantage (i.e., better memory recognition for the self-face than for stranger's faces) can be modulated by individual differences in negative cognitive style, defined as the tendency to attribute negative life events to stable, global, and internal causes (Alloy et al., 2000; Alloy, Abramson, Keyser, Gerstein, & Sylvia, 2008). In the study of Caudek and Monni, participants high in negative cognitive style who, during the experiment, experienced higher levels of sadness, displayed a stronger self-face advantage for sad expressions than for happy expressions. The remaining participants displayed an opposite bias (a stronger self-face advantage for happy expressions than sad expressions), or no bias. These results thus suggest that, also in a healthy sample, the SRE might be biased towards positive or towards negative information, depending on individual differences in cognitive style.

1.2. Individual differences in cognitive control over self-referenced memory

The SRE is usually attributed to the specific attentional processing for information related to the self, relative to processing of information about other people. According to the standard account of the SRE, information related to the self compared to other people is *encoded* more fully and it gives rise to the formation of richer, more organized, and more elaborated memory representations (Klein, 2012; Klein & Kihlstrom, 1986; Klein & Loftus, 1988; Symons & Johnson, 1997). Even though there is strong evidence of the importance of the encoding stage for the SRE, little is known about how the SRE is modulated by the memory processes that take place *after* encoding. The main purpose of the present study is to investigate the individual differences in the effects on the SRE of cognitive control over memory after the encoding stage.

Diathesis-stress models postulate that cognitively vulnerable individuals (e.g., depressed and dysphoric individuals, but also individuals at risk for, but without a history of, depression) harbor dysfunctional information-processing schemas that influence how stimuli are selected, encoded, interpreted, and retrieved (Clark & Beck, 2010; Disner, Beevers, Haigh, & Beck, 2011). Beck's cognitive theory (Beck, 1967) suggests that dysfunctional information-processing schemas remains dormant until activated by internal or external stressors. Indeed, empirical research has provided strong evidence that cognitively vulnerable individuals have reduced ability to regulate and control negative information in memory, especially self-related information, which gives rise to explicit memory biases (Alloy et al., 2000).

It is here hypothesized that individuals with a negative cognitive style (Alloy et al., 2000; Safford, Alloy, Abramson, & Crossfield, 2007), and/or individuals who show a tendency toward rumination (Dieler, Herrmann, & Fallgatter, 2013), will be more likely to manifest a maladaptive SRE compared to individuals not having these personality traits, as a consequence of their dysfunctional attempts to control the process of memory retrieval. In order to activate latent cognitive vulnerability, in the present study participants were primed with a negative mood induction (Segal & Ingram, 1994).

2. Experiment

A modified version of the think/no-think procedure was used to study the individual differences in the effects of cognitive control over memory of information that is relevant to the self, as opposed to memory of information that pertains to other people. In the first phase of the experiment, participants were asked to learn the associations between a set of pictures portraying each participant and a set of strongly (positively or negatively) emotionally valenced images. For comparison purposes, pictures portraying a stranger were also used as cues for the learned associations. A cued-recognition test was administered before and after the think/no-think phase.

The main questions were as follows (1) Is the SRE characterized by a positivity bias before the think/no-think phase? (2) Is the SRE affected by cognitive control after encoding? (3) Do individual differences in personality traits and affective states modulate the effects of cognitive control on the SRE? Control observations were also gathered in order to determine whether maladaptive self-focus is mainly influenced by personality traits or whether it arises from a generic impairment involving executive functions (e.g., Levy & Anderson, 2008).

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