



Engaging in an experiential processing mode increases positive emotional response during recall of pleasant autobiographical memories



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ARTICLE INFO

Article history:

Received 16 August 2016

Received in revised form

30 January 2017

Accepted 17 February 2017

Available online 21 February 2017

Keywords:

Processing mode

Positive affect

Autobiographical memory

Emotion regulation

Anhedonia

Happiness

ABSTRACT

It is important to identify effective emotion regulation strategies to increase positive emotion experience in the general population and in clinical conditions characterized by anhedonia. There are indications that engaging in experiential processing (direct awareness of sensory and bodily experience) bolsters positive emotion experience but this has not been extensively tested during memory recall. To further test this notion, 99 community participants recalled two positive autobiographical memories. Prior to the second recall, participants either underwent an experiential, analytical, or distraction induction ($n = 33$ per condition). Subjective happiness and sadness ratings and heart rate variability (HRV) response were measured during each recall. Greater spontaneous use of experiential processing during the first memory was associated with greater happiness experience, but was unrelated to HRV and sadness experience. Inducing experiential processing increased happiness experience relative to both the analytical and distraction conditions (but had no impact on sadness experience). There was a significant difference in HRV between conditions. The experiential condition led to a trend-significant increase, and the other conditions a non-significant decrease, in HRV from the first to the second memory. These results suggest that engaging in experiential processing is an effective way to up-regulate positive emotion experience during positive memory recall.

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1. Introduction

There is increasing interest in understanding positive emotion regulation, defined as the range of processes used to change the nature, frequency and intensity of positive emotion experience (Bryant, Chadwick, & Kluwe, 2011; Carl, Soskin, Kerns, & Barlow, 2013; Quoidbach & Gross, 2015). Helping individuals enhance positive emotions in appropriate situations may increase wellbeing in the general population and in clinical groups who experience anhedonia (e.g., depression, social phobia and schizophrenia; Dunn, 2012; Dunn & Roberts, 2016; Kashdan, Weeks, & Savostyanova, 2011; Watson & Naragon-Gainey, 2010).

The way in which individuals direct their attention during potentially positive activities arguably impacts their experience of positive emotions. In particular, several therapeutic approaches emphasize the value of attending to sensory and bodily experience to amplify positive affect. Behavioral activation approaches utilise ‘attention to experience’ exercises to encourage individuals to repeatedly direct attention to external sensory experience (Dimidjian, Barrera, Martell, Munoz, & Lewinsohn, 2011; Martell, Dimidjian, & Herman-Dunn, 2010). Imagery techniques encourage individual to generate vivid, rich representations of experience incorporating sensory information in the mind’s eye (Holmes, Blackwell, Burnett Heyes, Renner & Raes, 2016), likening this to “weak perception” (Pearson, Naselaris, Holmes, & Kosslyn, 2015). Mindfulness interventions attempt to cultivate a ‘being’ mode, where individuals attend to sensory and bodily experience without judgement as it unfolds in the moment (Segal, Williams, & Teasdale, 2002, Teasdale, 1999; Williams, 2008). Positive

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psychology savouring techniques include promoting experiential absorption, where an individual engrosses themselves in perceptual experience and focuses their attention on the most positive aspects of this experience (sensory-perceptual sharpening; Bryant et al., 2011; Bryant & Veroff, 2007). Collectively, these techniques can be described as fostering an experiential processing mode (characterized by direct, non-judgemental and concrete awareness of sensory and bodily experience as it unfolds moment-to-moment).

A growing body of evidence is now starting to converge on the finding that engaging in an experiential processing mode bolsters positive affective experience. For example, in the imagery domain a range of studies have shown that imagining things in the mind's eye as opposed to thinking about things verbally tends to enhance positive affective experience (Holmes, Lang, & Shah, 2009; Holmes, Mathews, Dalgleish, & Mackintosh, 2006). Moreover, two recent clinical trials demonstrate that imagery training can help repair anhedonia in the context of depression (Blackwell et al., 2015; Pictet, Jermann & Ceschi, 2016). While the beneficial effects of experiential processing on positive mood have not always been replicated using alternative induction techniques (e.g. see Hetherington & Moulds, 2013), the consensus view is that experiential processing during engagement with a potentially positive activity is likely to bolster positive mood.

However, as far as we are aware, there is less consensus on the consequences of engaging in an experiential processing mode on positive emotions when *recalling* a positive experience. There is an increasing interest in the field of 'memory therapeutics' (Dalgleish & Werner-Seidler, 2014) and it is likely to be of clinical benefit to help individuals be able to recall, and re-experience, pleasant memories in a variety of psychological conditions.

A handful of studies have made use of well validated procedures to induce an experiential processing mode and assess its cognitive-affective consequences (for example, see Watkins & Teasdale, 2001, 2004; Watkins, Moberly, & Moulds, 2008). In the typical procedure, participants are asked to read a series of self-referential sentences and focus on the sensory experience these bring to mind (referred to in the literature either as an experiential or concrete processing mode induction). This is contrasted to another condition where participants are asked to read the same series of sentences but to focus on the causes, meanings and consequences of them, so as to induce an evaluative, conceptual and abstract analysis of experience (referred to in the literature either as an analytical or abstract processing mode induction). Using this approach, three studies have examined if inducing particular processing modes changes how well individuals can use positive memory recall to repair negative mood after undergoing a negative mood manipulation (Hetherington & Moulds, 2015; Werner-Seidler & Moulds, 2012, 2014). However, the focus within two of these studies was changes in negative mood during the memory recall phase and changes in positive mood were not measured (Werner-Seidler & Moulds, 2012, 2014). Hetherington and Moulds (2015) did report positive affect ratings, unexpectedly finding that there was a greater increase in happiness experience following the induction of both an experiential and an analytical processing mode (relative to a distraction condition). All of these studies focus on positive emotion experience during memory recall following a negative mood manipulation and it is unclear if a similar pattern of findings would emerge during positive memory recall in a more neutral mood state.

To the best of our knowledge, only one study has examined the impact of processing mode on positive emotion experience during memory recall (unconfounded by a prior negative mood manipulation). Individuals were asked to recall a positive autobiographical memory whilst following concrete/imagery instructions (akin to an experiential processing mode) or abstract/verbal instructions (akin

to an analytic processing mode) (Nelis et al., 2015; Study One). Findings revealed a greater increase in positive affect in those allocated to the concrete/imagery versus abstract/verbal induction. However, in a follow-up study within the same manuscript this effect was not replicated, with no significant difference emerging between the concrete/imagery and abstract/verbal conditions in this second study (Nelis et al., 2015; Study Two).¹ Moreover, in the absence of a neutral control condition it is difficult to interpret whether the significant condition effect in Study One of Nelis et al. (2015) reflected the concrete/imagery condition increasing, or the abstract/verbal condition decreasing, positive emotion experience.

There are two other design issues with all of the extant studies examining links between experiential processing mode and positive emotional response during memory recall, which further complicate interpretation of the findings. First, positive emotion experience was assessed solely using self-report measures, which are vulnerable to demand characteristics (Nichols & Maner, 2008). Recording objective physiological measures of positive affect, which are less influenced by experimental demands, would strengthen conviction in the findings. For example, greater heart rate variability (HRV) has been linked to increased activation of the positive affect system (Kok & Fredrickson, 2010; Kok et al., 2013). HRV in part reflects functioning of the vagus nerve, a core part of the parasympathetic nervous system that regulates how fast the heart beats when an organism experiences signals of interest or safety and is believed to promote social-affiliative behavior (Porges, 2007; Appelhans & Luecken, 2006; Thayer & Lane, 2000). Second, all studies relied on a purely between-subjects design (participants underwent a single positive mood recall, having first been randomized to one of the experiential processing mode inductions). Individual differences in emotional response to the positive mood manipulation itself may have over-ridden any processing mode induction effects, reducing the sensitivity of these designs. A mixed within-between participants design (where individuals undergo a positive mood manipulation before and after processing mode is induced) can better control for individual differences in positive emotional experience between participants and may therefore have greater sensitivity. In particular, an analysis of covariance approach can be used, whereby response to the mood manipulation *before* the processing mode induction can be entered as a covariate in the model predicting response to the mood manipulation *after* the processing mode induction. Moreover, being able to examine changes in emotional experience from pre- to post-induction within participants makes it possible to establish more clearly if each condition increases or decreases positive emotion experience. A final advantage of a mixed within- and between-subjects design is the ability to assess if spontaneous use of each processing mode is related to positive emotional experience during the positive memory recall prior to inducing processing mode.

Therefore, the aim of the current study was to clarify whether inducing an experiential processing mode does bolster positive emotion experience during positive memory recall when using a mixed within-between-subjects design. Participants recalled two positive autobiographical memories before and after being randomized to either an experiential processing mode induction, an analytical processing mode induction, or a distraction induction (intended as a neutral control condition). We measured subjective

¹ Study Two in Nelis et al. (2015) included a third condition. This was intended to lower positive emotional response by encouraging participants to make an unfavourable verbal comparison between their current state and this past happy state. As expected, participants in the verbal comparison condition showed less of an increase in positive mood when recalling the memory, relative to the both the analytical and concrete conditions (who did not differ from one another).

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