

## Personality and Social Psychology

# Effects of analytical (abstract) versus experiential (concrete) induced rumination of negative self defining memories on schizotypic symptoms

JORGE JAVIER RICARTE,  LAURA ROS,  DOLORES FERNÁNDEZ, MARTA NIETO  and JOSÉ MIGUEL LATORRE

*Department of Psychology, University of Castilla La Mancha, Spain*

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Repetitive thought may have adaptive and functional consequences, depending on, among other things, the interpretation of the content: analytical or abstract (general and decontextualized) and experiential or concrete (specific, contextual and incidental). Studies experimentally manipulating repetitive thought have shown both the constructive consequences of the experiential mode and the dysfunctional consequences of the analytical mode. The aim of the current study is to observe the effect of analytical and experiential rumination of negative self-defining memories on schizotypic symptoms. A sample of 111 university students were randomly assigned to one of the two experimental conditions of induced rumination, “analytical” or “experiential.” The participants completed a series of questionnaires (anomalous perception of reality, preoccupation and depression) and a negative self-defining memory was obtained to be used as the content of the induced rumination. Following the rumination induction, participants in the experiential condition significantly decreased their scores on anomalous perception of reality compared with those in the analytical condition. We also observed that post-induction scores on self-reported sadness significantly increased in both experimental conditions while scores on self-reported happiness decreased. Our results show that the concrete/experiential rumination, focused here on negative self-defining memories, have positive consequences on schizotypic symptoms, such as decreased anomalous perception of reality.

**Key words:** Schizotypic symptoms, induced rumination, self-defining memories.

Laura Ros, Psychology Department, Faculty of Medicine, University of Castilla La Mancha, Avda. Almansa 14, 02006-Albacete (Spain). Tel: (34) 967 599 200 Ext. 8289; fax: (34) 967 599 204; e-mail: Laura.Ros@uclm.es

### INTRODUCTION

Rumination is a type of perseverative cognition referring to the experience of conscious thoughts that revolve repetitively and intrusively around a common theme (such as personal goals and concerns) (Brosschot, Gerin & Thayer, 2006; Nolen-Hoeksema, Wisco & Lyubomirsky, 2008; Watkins, 2008). These thoughts recur in the absence of immediate environmental demands requiring the thoughts, and are characterized by the predominance of negative affect (Alloy, Abramson, Hogan *et al.*, 2000; Lavender & Watkins, 2004; Nolen-Hoeksema, 1991), which may result in increased distress (Brosschot *et al.*, 2006), vulnerability to depression (McLaughlin, Borkovec & Sibrava, 2007; Nolen-Hoeksema, 2008; Raes *et al.*, 2006; Thomsen, 2006), increased negative autobiographical memories (Lyubomirsky, Caldwell & Nolen-Hoeksema, 1998), a decrease in specific autobiographical memories (Kao, Dritschel & Astell, 2006; Park, Goodyer & Teasdale, 2004), anxiety (Behar, Zullig & Borkovec, 2005; Harvey, Watkins, Mansell & Shafran, 2004; Siddique, LaSalle-Ricci, Glass, Arnkoff & Díaz, 2006) and even difficulties in physical health (Brosschot *et al.*, 2006; Watkins, 2008). Nonetheless, rumination may also be constructive, yielding adaptive, functional and beneficial consequences. In other words, not all types of rumination are necessarily disruptive. Indeed, this type of repetitive thought may impact on cognitive processing in successful post-traumatic recovery (Calhoun, Cann, Tedeschi & McMillan, 2000; Tedeschi & Calhoun, 2004; Tugade & Fredrickson, 2004), permitting adaptation and planning to deal with future potential threats (Tallis & Eysenck, 1994) and influencing depression recovery

(Treyner, Gonzalez & Nolen-Hoeksema, 2003; Watkins & Teasdale, 2004).

Whether repetitive thought has constructive or unconstructive consequences depends, on the one hand, on the emotional valence of its content (positive or negative), as more negative content has been associated with worse overall mental health (Segerstrom, Stanton, Alden & Shortridge, 2003; Treyner *et al.*, 2003), while positive content has been linked to a reduction of negative affect (Mor & Winquist, 2002). On the other hand, it depends also on the situational context (traumatic events, stressful situations, etc.) and the intrapersonal context (low self-esteem, negative expectations, etc.), as well as the level of construal of the repetitive thought (Watkins, 2008). With regard to this latter aspect, the literature identifies two levels of construal of repetitive thought (Dweck & Leggett, 1988; Freitas, Salovey & Liberman, 2001; Trope & Liberman, 2003): high-level construals, which are abstract or analytical (general, decontextualized representations based on the gist and meaning of events) and low-level construals, which are concrete or experiential (including specific, contextual and incidental details of events and actions) (Watkins, 2008).

Studies that have experimentally manipulated both concrete (Watkins & Teasdale, 2001, 2004) and abstract repetitive thought (Ehring, Szeimes & Schaffrick, 2007; Rimes & Watkins, 2005) have found that, broadly speaking, concrete repetitive thought generates more constructive consequences, such as improved problem-solving, higher autobiographical memory specificity or lower emotional vulnerability, compared with abstract repetitive thought. Even studies experimentally manipulating concrete rumination focused on depressive symptoms obtained constructive

consequences (Watkins & Moulds, 2005; Watkins & Teasdale, 2001, 2004). In contrast, abstract or analytical repetitive thought is assumed to be responsible for the dysfunctional effects of rumination, especially about a distressing or traumatic event (Ehring & Watkins, 2008; Santa María, Reichert, Hummel & Ehring, 2012). Thus, the same ruminative content may be detrimental, when the mode is abstract or analytical, or beneficial, when the mode is concrete or experiential (Watkins, 2008; Watkins, Moberly & Moulds, 2008).

Schizophrenia is characterized by a distortion of the self and reality (Gameda, Woodward, Moritz & Kokosza, 2013; Sass & Parnas, 2003). Within this anomalous perception of reality, schizophrenia patients may exhibit symptoms typically grouped in a positive or negative dimension. Schizophrenia patients have a greater tendency toward rumination (Ricarte, Hernández, Latorre, Danion & Berna, 2014), reinforced by factors such as emotional withdrawal and stereotyped thinking (Halari, Premkumar, Farquharson, Fannon, Kuipers & Kumari, 2009), the distress caused by hallucinations (Badcock, Paulik & Maybery, 2011) or the persistence of persecutory delusions about future potential threats (Watkins, 2008). However, anomalous perception of reality is not only exhibited in schizophrenia patients, but may also be found in non-clinical population (Freeman, Pugh, Vorontsova, Antley & Slater, 2010; Ohayon, 2000). A continuum of normal experience has been established, which permits the conceptualization of, for example, persecutory delusions (Freeman, 2007). Persecutory delusions represent one extreme of the continuum, while more transient and occasional thoughts of mistrust and suspicion represent the other extreme (Ellet, Lopes & Chadwick, 2003). This reflects the multidimensional nature of the disease and the fact that the diagnosis of psychosis is determined more by the intensity of the anomalous perceptual experience than by its appearance (Johns & Van Os, 2001). In this sense, schizotypic symptoms can be useful when studying and identifying possible deficits still unaffected by a patient's schizophrenia, representing the vulnerability underlying the clinical deterioration of the psychopathology (Kwapil & Barrantes-Vidal, 2015).

Narrative identity is a dual memory system that generates autobiographical memories that may evolve into self-defining memories (Singer, Blagov, Berry & Oost, 2013). Thus, drawing on the model of autobiographical memory created by Conway and Pleydell-Pearce (2000), a new model was proposed, which not only generates autobiographical memories, but also a key subtype, self-defining memories, which are vivid, affectively intense memories linked to self-discovery, self-understanding and self-images, which assist us in building and giving meaning to our life story (Blagov & Singer, 2004), helping to maintain our sense of identity and explain what we really are (Singer & Conway, 2011). McLean and Thorne (2003) argue that the central theme of self-defining memory (SDM) is a reflection of one's own concerns. An SDM is a memory about an important and recurrent theme, issue, conflict, or concern from our life (Singer & Salovey, 1993). In schizophrenia patients, self-defining memories are characterized as less coherent, less contextualized and less thematically developed (Blagov & Singer, 2004). Self-defining memories increase in the years leading up to diagnosis and decline in the years immediately following diagnosis as

schizophrenic individuals find it difficult to establish new or evolve existing definitions of self (Holm, Pillemer, Bilksted & Thomsen, 2017). Schizophrenia patients' difficulty in developing a coherent sense of self through their own narrative identity has been associated with the internalization of stigmatizing beliefs about mental illness and deficits in metacognitive processes (the ability to think about one's own thoughts or those of others) (Raffard, D'Argembeau, Boulenger & Van der Linden, 2009). Illness narratives facilitate better understanding of the relationship between identity and illness (Williams, 2000). Thus, focusing on self-defining autobiographical memories might permit a better understanding of patients' self-image (Berna, Bennouna-Greene, Potheegadoo, Verry, P., Conway & Danion, 2011). It seems, then, that the use schizophrenia patients make of their self-defining memories might mitigate their altered sense of personal identity. Consequently, utilizing rumination, one of the most characteristic cognitive processes in schizophrenia, and focusing it on negative aspects which might be obstructing the continuity of personal identity, could be beneficial to recovery. Schizophrenia is characterized by symptoms of distorted perception and ruminating of negative self-defining memories may augment an already disturbed identity which then again weakens sense of reality leading to symptoms of anomalous perception. In a feedback loop, the lack of accurate processing of information about our past experiences impedes a correct definition of the self, which is also impeded by a ruminative approach to past experiences more focused on the causes than on the specific way the event really occurred. Simultaneously, an analytical approach added to a distorted reality account, could have as a consequence an incoherent unintegrated self observed in schizophrenia.

Consequently, and in light of the above, the aim of the current study is to observe the effect of analytical and experiential rumination of negative self-defining memories. Our results may add to the knowledge on the possible consequences (constructive or unconstructive) of the use of repetitive thought on schizotypic symptoms. Our hypothesis is that experiential (concrete) rumination will reduce anomalous perception of reality (Ricarte, Del Rey, Ros, Latorre & Berna, 2018; Watkins, 2008) while analytical rumination (abstract) will increase this anomalous perception. We also propose there will be no difference between the effects of these two types of induction on self-focused attention during the task (Watkins, 2008). However, those participants in the analytical condition will report a higher engagement in abstract thinking during the task than participants from the experiential condition. Rumination on a negative memory may also increase feelings of sadness and decrease feelings of happiness, regardless of experimental condition (Watkins *et al.*, 2008). Indeed, previous studies have demonstrated a positive association between brooding (maladaptive rumination) and negative symptoms in schizophrenic patients (Ricarte *et al.*, 2014).

## METHOD

### *Participants*

The study sample comprised 111 university students (age range 18-51 years;  $M = 19.50$ ,  $SD = 3.39$ ), who were invited to take

part in the research in exchange for course credits. A total of 38% were males.

Participants were randomized to one of the two experimentally induced rumination conditions, “analytical” or “experiential.” There were no significant differences between the two groups (analytical vs. experiential) as regards distribution by gender, age, depressive symptomatology and trait worry (see Table 1).

### Materials

*Cardiff Anomalous Perception Scale (CAPS; Bell, Halligan & Ellis, 2006).* This self-report scale consists of 32 dichotomous response (yes/no) items scored between 1 (low) and 5 (high). It measures aspects of anomalous perception on the psychosis continuum: temporal lobe experience (e.g. “Do you ever feel that someone is touching you, but when you look nobody is there?”), chemosensation (“Do you ever notice that food or drink seems to have an unusual taste?”) and clinical psychosis (e.g. “Do you ever hear your own thoughts spoken aloud in your head, so that someone near might be able to hear them?”). A total score was calculated by summing the number of items endorsed (total CAPS). In addition, for each item endorsed, participants were required to rate the item on 1–5 scales for distress, intrusiveness, and frequency factors. Compared to other measures, the inclusion of dimensional scales to measure distress, intrusiveness, and frequency increases validity of results as metacognitive factors and affective reactions to anomalous experiences may be mediated by the appraisals and the unpleasant consequences in which they are interpreted (e.g., Gauntlett-Gilbert & Kuipers, 2005). To observe the evolution of anomalous perceptions from pre to post induced rumination, participants were prompted to answer the questionnaire as they felt “right now.” In this study, Cronbach’s alpha values for the 32 dichotomous items were respectively 0.82 and 0.84 for pre- and post-test. Test-retest reliability for distress ( $r = 0.88$ ), intrusiveness ( $r = 0.93$ ) and frequency ( $r = 0.95$ ) were acceptable.

*Action Control Scale (ACS-90; Kuhl, 1985; Kuhl & Beckman, 1994).* This scale assesses differences in action-state orientation. It comprises 36 items divided into three subscales measuring action orientation in relation to failure, decision and performance. In this study, we used only the 12-item Preoccupation subscale (PS) as a measure of trait tendencies towards rumination. Cronbach’s alpha for this study was 0.75.

Table 1. Characteristics of the sample by experimental condition

	Analytical (n = 57)	Experiential (n = 54)	$F/\chi^2$	$p$
Age ( $M, SD$ )	19.19 (1.35)	19.83 (4.65)	0.99	.322
Depression (BDI) ( $M, SD$ )	7.67 (4.33)	7.94 (5.13)	0.10	.758
Preoccupation (PS) ( $M, SD$ )	4.81 (1.62)	4.76 (1.79)	0.02	.883
Gender (n)				
Female	36	33	0.05	.824
Male	21	21		

Notes: BDI = Beck Depression Inventory; PS = ACS-90 Preoccupation Subscale, Action Control Scale.

*Beck Depression Inventory II (BDI; Beck, Steer & Brown, 1996, Spanish version by Sanz & Vázquez, 1998).* Using Likert-type items, this self-report inventory measures the presence and severity of depression in adults and adolescents across 21 indicators of symptoms such as sadness, failure, guilt, etc. Internal consistency is high in both clinical and non-clinical populations, with a Cronbach’s alpha of 0.92 (Beck *et al.*, 1996).

### Procedure

After informing participants about the study (aims and procedure) and obtaining their informed consent, we collected the data in one 75-minute session. Participants first completed the trait questionnaires (BDI and PS), followed by the CAPS, focusing on their sensations at that moment. Each participant then provided a negative self-defining memory (see below), which was used as the content for rumination induction. Immediately after the induction, they scored their self-focus and feelings of sadness and happiness (at that moment). Finally, they completed the CAPS again.

*Self-defining memory task.* Following the procedure proposed by Singer and Moffit (1991), participants were asked to describe their three most negative self-defining memories and score them from 0 to 6, according to vividness, negativity and arousal. The memory with the highest negativity score was selected for the rumination task. Thus, during the rumination induction time, participants ruminated about their most negative self-reported memory following an analytical or an experiential approach as described in the next section.

*Procedure for the rumination induction of negative self-defining memories.* Participants were randomized to one of the two experimental conditions (analytical vs. experiential). We based the rumination induction on the procedure used in previous studies (Watkins & Teasdale, 2004). All the participants were asked to focus their thoughts for 30 minutes on the content of the negative self-defining memory previously selected. They were guided constantly by means of a series of 28 questions (focused on sensations and feelings) adapted from studies by Nolen-Hoeksema and Morrow (1993). During the induction, participants in the analytical group were directed using questions focusing on Why? (e.g. Why did I have those feelings at that moment?), while participants in the experiential group were guided using questions based on How? (e.g. How did I feel at that moment?)

### Sadness and happiness scales

After the induction, participants scored their feelings of sadness and happiness on a visual analogue scale of 0 (absence of emotion) to 100 (maximum presence of emotion).

### Self and abstract focused thinking

After the induction, participants scored from 0 to 100 the degree of self-focus (“I would like you to assess to what extent you focused on yourself during the task”) and abstract thinking (“I would like you to assess to what extent you were thinking in an abstract way, that is, thinking in general, with concepts, terms or ideas which are difficult to define, during the task”) achieved

during the task. These items aimed to measure cognitive processing of autobiographical information during the induced rumination period.

### Statistical analyses

To examine the differences between the participants in the two experimental conditions (analytical vs. experiential), we conducted one-way ANOVAs and Chi-square tests. The effects of the rumination induction were analyzed using multivariate repeated measures analyses (MANOVAs), with “experimental condition” (analytical vs. experiential) as the between-subjects variable, and “time” (pre vs. post-induction) as the within-subjects variable. As dependent variables, we included the associated frequency, distress and intrusiveness of the anomalous perceptions, all measured on the CAPS, as well as self-reported sadness and happiness obtained from the visual analogue scales. Group differences in analytical and self-focused thinking perceived engagement during the induction time, were calculated by One-Way ANOVAs.

## RESULTS

### Anomalous perception of reality

Regarding total CAPS scores, a significant interaction was found between “type of rumination induction” (analytical vs. experiential) and “time” (pre-test vs. post-test) factors,  $F(1,106) = 8.96$ ,  $p = 0.003$ ,  $\eta_p^2 = 0.08$ . Time factor was not significant,  $F(1,106) = 1.51$ ,  $p = 0.220$ ,  $\eta_p^2 = 0.01$ . Post-hoc analyses showed that the anomalous perception scores for participants who followed the experiential induction process decreased significantly post-induction  $F(1,51) = 9.85$ ,  $p = 0.003$ ,  $\eta_p^2 = 0.16$ , while the total anomalous perception scores (CAPS) in the analytical condition increased, but not significantly,  $F(1,55) = 1.44$ ,  $p = 0.234$ ,  $\eta_p^2 = 0.03$  (see Table 2).

Regarding frequency of anomalous perceptions, the main factor “Time” and the interaction “Time  $\times$  Type of rumination induction” effects, were significant,  $F(1,109) = 7.64$ ,  $p = 0.007$ ,  $\eta_p^2 = 0.07$ ,  $F(1,109) = 4.16$ ,  $p = 0.044$ ,  $\eta_p^2 = 0.04$ , respectively. In addition, the post-induction reported frequency of anomalous perception was significantly higher only in the analytical rumination group  $F(1,56) = 9.02$ ,  $p = 0.004$ ,  $\eta_p^2 = 0.14$ , compared to pre induction scores of frequency.

Although the factor “Time” was not significant for reported distress  $F(1,108) = 0.44$ ,  $p = 0.581$ ,  $\eta_p^2 = 0.03$ , the interaction between “Time  $\times$  Type of rumination induction” was statistically significant,  $F(1,108) = 5.57$ ,  $p = 0.020$ ,  $\eta_p^2 = 0.05$ . However, post hoc analyses showed that participants’ level of distress generated by the anomalous experiences declined marginally significantly only in the experiential condition group,  $F(1,52) = 3.59$ ,  $p = 0.064$ ,  $\eta_p^2 = 0.06$ .

Results on intrusiveness showed a significant interaction between “Time  $\times$  Type of rumination induction” factors,  $F(1,108) = 4.37$ ,  $p = 0.039$ ,  $\eta_p^2 = 0.04$  without significant effects for the “Time” factor,  $F(1,108) = 0.23$ ,  $p = 0.633$ ,  $\eta_p^2 = 0.00$ . Thus, participants from the experiential condition reported decreased intrusiveness of anomalous perceptions after induced rumination,  $F(1,52) = 4.12$ ,  $p = 0.046$ ,  $\eta_p^2 = 0.07$ .

Table 2. Effects of induced rumination of negative self-defining memories in the two experimental conditions

	Group	
	Analytical (n = 57) (M, SD)	Experiential (n = 54) (M, SD)
Pre-test		
Total anomalous perceptions	9.95 (6.36)	9.44 (5.74)
Frequency	21.89 (19.16)	20.15 (15.56)
Distress	21.26 (18.87)	19.21 (13.99)
Intrusiveness	18.89 (17.87)	17.06 (13.65)
Happiness	69.46 (16.01)	67.59 (18.52)
Sadness	22.04 (19.84)	23.24 (22.17)
Post-test		
Total anomalous perceptions	10.27 (6.85)	8.67 (5.44)
Frequency	24.84 (22.89)	20.60 (16.97)
Distress	22.32 (20.64)	17.51 (12.72)
Intrusiveness	19.84 (20.12)	15.55 (12.94)
Happiness	61.43 (20.48)	65.93 (19.86)
Sadness	33.51 (25.24)	31.30 (24.18)

### Post-induction emotion perception

The factor “Time” (pre versus post induction) was significant on self-reported sadness evidencing that scores on self-reported sadness increased significantly after induction in both experimental conditions,  $F(1,109) = 31.14$ ,  $p < 0.001$ ,  $\eta_p^2 = 0.22$ . However, the interaction between “Time” and “Experimental group” factors was found not significant,  $F(1,109) = 0.95$ ,  $p = 0.331$ ,  $\eta_p^2 = 0.01$ .

Regarding self-reported happiness, the factor “Time” was also significant, with self-reported happiness decreasing significantly in both groups,  $F(1,108) = 8.51$ ,  $p = 0.004$ ,  $\eta_p^2 = 0.07$ . The interaction between “Time” and “Experimental group” was marginally significant,  $F(1,108) = 3.66$ ,  $p = 0.058$ ,  $\eta_p^2 = 0.03$ . Analysis of the evolution of happiness scores in each experimental group showed that in the analytical (abstract) group, happiness decreased significantly after induced rumination,  $F(1,55) = 11.12$ ,  $p = 0.002$ ,  $\eta_p^2 = 0.17$ , whereas, decrease in happiness was not significant in the experiential group  $F(1,53) = 0.53$ ,  $p = 0.469$ ,  $\eta_p^2 = 0.01$ .

### Analytical and self-focused thinking reported after the rumination induction

We found no statistically significant differences between the experimental conditions groups in analytical thinking ( $F(1,109) = 2.18$ ,  $p = 0.143$ ,  $\eta_p^2 = 0.02$ ) or self-focused thinking ( $F(1,109) = 0.07$ ,  $p = 0.791$ ,  $\eta_p^2 = 0.00$ ) on self-perceived reported use of these kind of thoughts during the induced rumination period.

## DISCUSSION

The main aim of this study was to observe the effect of analytical and experiential rumination of negative self-defining memories. Our results show that experiential, or concrete, rumination of negative self-defining memories generates a decrease in anomalous perception of reality and associated distress and

intrusiveness for this experience. Thus, we can state that experiential rumination can have positive consequences on schizotypic symptoms such as a decrease in anomalous perception of reality. In addition, the different rumination processing style effects were obtained regardless the amount of self-focus generated at both conditions. This result is relevant as self-focus has been considered a trigger factor of deleterious effects of rumination (Nolen-Hoeksema, 1991). However, our results support previous findings highlighting that self-focus itself is not maladaptive in patients with negative symptoms (Watkins & Teasdale, 2004).

The results of this study support the use of interventions focused on repetitive thought (either in the form of preoccupation or rumination) in the prevention of emotional disorders such as anxiety and depression, especially as the mere emergence of repetitive thought has been shown to be a risk factor for the maintenance of psychopathology (Topper, Emmelkamp & Ehring, 2010). Watkins (2008) developed one of these interventions, based on an adaptation of Cognitive Behavioral Therapy (CBT). Known as Rumination-Focused Cognitive-Behavioral Therapy (RFCBT), it is used to help patients evaluate the usefulness of rumination of repetitive negative thoughts, teaching and training them in the most effective processing style (Watkins *et al.*, 2011). Thus, one of the main contributions of the current research, compared to previous work, is the validation of an appropriated way to increase self-awareness on negative past autobiographical experiences that, in addition, reduces anomalous perceptions of reality. Broadly speaking, and in light of our results, we may suggest that it is not only the content itself, but the way individuals think about certain events, which may cause regulatory consequences, as proposed by Watkins and Teasdale (2004). Consequently, it is important to identify not only the valence of content but also the rumination style: abstract or concrete. Concrete rumination focused on illness (causes and consequences) has been associated with depressive symptoms in schizophrenia patients (Thomas, Ribaux & Phillips, 2012), with negative symptoms (Halari *et al.*, 2009), and with distress associated with auditory hallucinations (Badcock *et al.*, 2011). Other studies suggest that rumination in schizophrenia patients is mainly focused on improving aspects such as awareness of illness (Lalova, Baylé, Grillon *et al.*, 2013) or rigid thinking (Johnson, Penn, Fredrickson, Meyer, Kring & Brantley, 2009).

Regarding the emotional effects of rumination, previous studies reported that the induction of abstract repetitive thought increased emotional reactivity, decreased emotional processing and negative self-appraisal (Rimes & Watkins, 2005). In the current study, we found that, after the induced rumination, feelings of sadness increased in participants in both experimental conditions (analytical and experiential), while feelings of happiness decreased. Rumination may exacerbate dysphoric mood (Watkins & Baracaia, 2002). However, although we found no differences between the two conditions as regards increased sadness, it is worth noting that feelings of happiness decreased more in participants in the analytical group compared to those in the experiential group. These results are in agreement with the effects of the Autobiographical Emotional Memory Task (AEMT), which demands recalling and writing about intense emotional experiences to experimentally induce emotions. Using this task, writing about a sad experience,

compared to a positive one, not only produced a negative affect but also generated other incidental emotions such as disgust, fear or anger (Mills & D'Mello, 2014). Thus, compared to concrete rumination, abstract rumination in healthy population may result in decreased mood state. The different emotional reactions generated by the recovery of self-defining memories may be related to factors such as personality, wellbeing or self-esteem (Sutin & Robins, 2005). In the same vein, recent studies (Houle, Philippe, Lecours & Roulez, 2017) have found that the way of organizing self-defining memories in complex networks of memories may be utilized for emotion regulation.

Regarding limitations, it must be taken into account that the induction time was small and, although in the expected direction, those participants in the analytical condition were not more involved in abstract thinking than participants from the experiential condition. Consequently, future research should increase the time and/or number of sessions to test long-term effects of rumination induction and distinguish those effects from the results obtained in the current study where a here-and-now instruction was used. Although participants were instructed and prompted to answer the anomalous perceptions questionnaire following a state (right now) instruction, the written formulation of items from the CAPS (Bell *et al.*, 2006) could lead to a trait interpretation (e.g. "Do you ever . . ."). Future research should test effects of rumination with a reformulation of CAPS items or prove those induced effects using a different psychotic-like symptoms scale focused on the present perceptions/symptoms assessment. Generally speaking, more research is required on the explanatory mechanisms of the effects of differential components of rumination and worry. In addition, the current work should not be considered as an intervention. It is a preliminary experimental study designed to identify which autobiographical processing mode is more related to psychotic symptoms. Moreover, due to the current sample characteristics, the generalization of the obtained results to patients groups, must be taken cautiously. Future research should be able to test the specific effects of long-term abstract or concrete rumination using different stimuli.

The results of the current study support the possibility of redirecting maladaptive repetitive thought towards forms of adaptive rumination, not only in depression treatment, but also to reduce schizophrenia symptoms or as prevention techniques for people at risk for schizophrenia. Accordingly, rumination is considered a metacognitive coping strategy observed in young people at risk of psychosis (Bright, Parker, French *et al.*, 2018).

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