Locus of Control Associations with Autobiographical Memory as Measured by Free and Directed Memory Recall

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Abstract

Reduced specificity of memory retrieval has been explained by self-ruminative thinking. However, the relationship between autobiographical memory and other psychological variables has been less frequently assessed. The relationship between personality variables and memory retrieval could also vary in function of task requirements. The main aim of this work was to explore personality traits related to self-perceptions that could explain a specific trend of retrieval: Locus of Control, Self-valoration, Life Satisfaction and Rumination. Furthermore, these relationships were explored under directed and free recall conditions. From the analysed variables, an Internal Locus of Control explained significantly specificity of recall in both conditions (free and directed recall). Rumination was explained by Life Satisfaction and specific memories obtained under free-recall conditions. These results suggest that probable effects of Locus of Control and self-perceptions on specificity of memories should be considered for its inclusion on memory search explicative models.

Keywords: Attribution, Autobiographical memory, Rumination, Self-perception

1. Introduction

Autobiographical memory mediates our identity construction process, provides resources to face future uncertainty situations and can play an enormous role in our present and future emotional status. This

psychological construct has been supported by the development of the Self-Memory System (Conway & Pleydell-Pearce, 2000) and the CaR-FA-X (Williams, 2006) theoretical models. Autobiographical memories are considered transitory dynamic mental constructions generated from an underlying knowledge base which is sensitive to cues (Conway & Pleydell-Pearce, 2000). Research derived from these models has been focused on the causes that could explain differences in autobiographical recovering (personality, events or moods) and in the cognitive or emotional underlying mechanisms (Williams, 2006).

It is agreed that individuals with emotional disorders experience difficulties in generating specific memories of events to lists of word cues or an enhanced tendency to retrieve overgeneral autobiographical memories (OGM) when asked to retrieve specific memories of events in response to cue words (Williams & Broadbent, 1986). This overgenerality in autobiographical memory has been found to correlate with the prediction of persistence of depression (Brittlebank, Scott, Williams, & Ferrier, 1993; Dalgleish, Spinks, Yiend, & Kuyken, 2001). Overgenerality could be considered as a trait marker, rather than a state marker, that makes people vulnerable for depression (Brittlebank et al., 1993). However, it is not yet concluded whether difficulties in being specific could be an after-effect of trauma or of depression (*scarring hypothesis*) or, alternatively, may be an antecedent, making the development of depression or post-traumatic stress disorder more likely following a negative event (*vulnerability hypothesis*) (Williams et al., 2007). The Autobiographical Memory Test (AMT), as a procedure to obtain autobiographical memories in response to cue words, has been less frequently applied in non-clinical groups. However, the value of OGM as a vulnerability factor for depression has been also observed in samples that are not suffering from clinical significant pathology, predicting, for example, emotional (depressed) reactivity to stressful life events as a failed in vitro fertilisation treatment (Van Minnen, Wessel, Verhaak, & Smeenk, 2005) or showing a greater increase in depressive symptoms after a period of negative events among students with high levels of OGM (Gibbs & Rude, 2004). From an experimental perspective, a stressful puzzle task produced more subjective distress in high-specific than in low-specific individuals (Raes, Hermans, de Decker, Eelen, & Williams, 2003; Raes, Hermans, Williams, & Eelen, 2006). These results suggest that OGM not only constitutes a vulnerability factor for prolonged depression or depressive relapse, but also likely represents a marker of depressed reactivity and, possibly, a vulnerability factor for a first onset of depression in never-depressed individuals (Raes, Hermans, Williams, & Eelen, 2007; Serrano, Latorre, & Gatz, 2007).

The most analyzed variable in relation with depression is rumination when the overgeneral effect has been interpreted from a more emotional perspective, such as the *Affect Regulation Hypothesis* described by Raes et al. (2006). The variable rumination has been considered as part of a repressive cognitive strategy which distract subjects attentional resources to more self-focused aspects as a major explicative factor (Watkins, Teasdale, & Williams, 2000; Williams, 2006). Subjects with a more specific retrieval style showed greater mood disturbance after experimental manipulation of frustration (Raes et al., 2003). After a negative event, high-specific people thought more frequently about it and thought it more unpleasant and disturbing to find themselves thinking back to the negative event (Raes et al., 2006). Abstract, evaluative (or ruminative) thinking is a crucial underlying process of OGM also in nonclinical individuals (Raes, Watkins, Williams, & Hermans, 2008). However, rumination has been also found to be correlated with measures of happiness, unhappiness and atoneness of memories (Teasdale & Green, 2004), suggesting that reflective self-focus could be associated with psychological health. Indeed, analytical rumination might be conceptualized as some form of problem solving (Segal, Williams, & Teasdale, 2002).

The role of self-esteem on specificity has been observed with over-general memory increases across repeated trials in individuals with low self-esteem relative to those with high self-esteem (Roberts, Carlos, & Kashdan, 2006). Recently, it has been shown that AMT cues that reflect self-guided content were negatively correlated to specificity in individuals with a history of major depression (Crane, Barnhofer, & Williams, 2007), suggesting that self-related semantic information is more likely to prompt a shift to processing of information generating more self-related semantic information. Previous studies have suggested that certain personality correlates of depression, such as low self-esteem, appear to have greater impact than others on overgenerality vs. specificity (Roberts et al., 2006). In fact, practice in autobiographical memory for specific events increased specificity of retrieval, life satisfaction and diminished hopelessness and depressive symptoms among inpatients with depressive symptomatology (Raes, Williams, & Hermans, 2009; Serrano, Latorre, Gatz, & Montañés, 2004).

Locus of control has been less frequently studied in relation to specificity of retrieval. However, a strong sense of control over the environment is considered an important component of well-being and promotes resilience to stress (Windsor, Anstey, Butterworth, & Rodgers, 2008). They found that personality variables, as behavioral approach, was positively related to perceived control and may be protective against negative life events. Furthermore, self-efficacy partially mediated the relationship between stress and physical health (Montpetit &

Bergeman, 2008). This is congruent with results of a study comparing Internal vs. External respondents in past and future life events (Hentschel, Sumbadze, & Shubladze, 2000). Externals reported more events in the past and internals more events for the future. It was hypothesised that given that internals want to be in control of their actions, they report more future events, as past events can no longer be controlled.

The hypothesis that self-focused cognitive processes result in the retrieval of less specific memories has been tested (Watkins et al., 2000); however, it has not been tested as a function of task demands. It is hypothesised that the lack of relationship between memory specificity and depression in non-clinical respondents could be due to the particular way in which the AMT is being administered (extensive instructions, provision of practice trials, and repeated prompting specificity) (Raes et al., 2007, p. 498). It is acknowledged that processes described in the CaR-FA-X model would have little impact on involuntary memory (Williams et al., 2007).

The current work aims to explore the relationship between autobiographical memory, perceived control, self-perception and rumination. Additionally, possible differences in such relationships in function of task demands (directed and free recall) will be also studied. To sum up, what makes a non-depressed person be specific in his or her memory recall? Could the memory task conditions introduce some differences in the relationship between personality variables and specificity of memory retrieval?

We expected a positive relationship between specific memory and positive self-perception, supporting its role as a protective personality variable against negative events. Rumination should be negatively related to specific memories, subtracting subjects' attentional resources. However, the relationship between personality variables and memory retrieval could vary in function of directed or free recall conditions.

2. Method

2.1 Participants

90 subjects decided voluntarily to collaborate on the experimental sessions. The data from subjects who did not complete the two experimental sessions and/or reported a current depressive episode or they reported a depressive episode among the three last years were not included in the data analysis. These emotional reports were corroborated administering the short version of BDI (BDI-SF; Beck & Beck, 1972) to all participants. Subjects did not report traumatic situations, relevant physical diseases or current medication intake. Finally, 75 subjects (24 men) in a range between 19-32 years (M=21.25; SD=3.72) were considered for the analysis (see Table 1).

2.2 Materials

Autobiographical Memory Test (AMT; Williams & Broadbent, 1986). The AMT was used in a written format. Participants were given a booklet with 15 pages. On the first page, the instructions were displayed; the next two pages included the practice items: car and tree. Instructions and words were also read by the experimenter and an explanation period was introduced at the end of the instructions and at the end of practice words to ensure the subject's task understanding. Words were presented alternating positive and negative items and positioning neutral items in the middle and at the end of the list. Participants were asked to write down a memory. When the 60-s time limit for a cue was reached, participants were instructed to turn to the next cue.

For the directed condition the instructions were: *I am interested in your memory for events that have happened in your life. In this questionnaire one word will appear on each page. For each word, I want you to remember an event, happening or thing that has happened to you that the word reminds you of. The event can have occurred recently (past week) or a long time ago when you were a child. It may be something important or trivial (without importance). One more thing: the memory should be* ***specific*** *(something lasting less than a day and have occurred in a particular moment and place). For example in response to a word "good", it wouldn't be correct to respond: "I always enjoy a good party" because one is not referring to a specific event, although it would be correct to respond: "I spent a very good time at Juan's party last Friday" (because this was a specific event that happened in a concrete place and moment and lasted less than a day). It is also important to obtain a memory or event different for each word. If you use the same memory for more than one word the memory will be considered invalid. Before start let's try with two practice words.* For free recall condition the instructions were exactly the same, removing the definition of specific memory and the examples.

Responses were rated as *specific* when they referred to an event that would have occurred on a particular day at a particular time and place, as *extended*, when they referred to a period of time longer than a day, as *categoric*, when they referred to repeatedly occurring class of events, as *semantic associate*, when they referred to an association that did not mention an event, or as *omission* for non responses or repeated events.

BDI-SF. The short version of Beck Depression Inventory (BDI-SF; Beck & Beck, 1972) is composed by 13

items and has shown a good internal consistency reliability results (e.g., Knight, 2006).

Rumination. The Visual Analogue Rumination Scale (VARS; Raes et al. 2007) derived from the Rumination on Sadness Scale (RSS; Conway, Csank, Holm, & Blake, 2000) was used to assess rumination in this study. Raes et al. (2007) reported a high correlation of VARS scores with scores on widely used rumination scales as the RSS (Conway et al., 2000) or the Ruminative Response Scale (RRS; Nolen-Hoeksema & Morrow, 1991). In our sample, BDI scores were correlated positively to VARS ($r = 0.36$, $p = .001$), contributing to the external validation of this short rumination scale. The items of the VARS were: "I have difficulty getting myself to stop thinking about how sad I am", "I get absorbed in thinking about why I am sad and find it difficult to think about other things", "I repeatedly try to figure out, by doing a lot of thinking, what might be the causes of my sadness" and "I keep thinking about how I feel, to understand myself and my sad feelings better".

Locus of Control. The Causal Dimension Scale (Russell, 1982) is designed to assess how the attributor perceives the cause of an achievement outcome in terms of the locus of causality, stability and controllability dimensions. The measure consists of nine semantic differential scales, with three of the scales assessing each causal dimension. In the current study, subjects were asked about the causes of the results (success and fails) they obtain in their life. Evidence of reliability and validity was reported by Russell, McAuley and Tarico (1987).

Self-Valoration (SV). Based on a classic study of Kuhn and McPartland (1954) and following the suggestions of the work by Conway (2005), subjects were requested to complete 6 sentences that started with an "I am.." with the first things that come to mind without change or select anything. Afterwards, they had to rate from 0 (very negative) to 10 (very positive) such personal traits in the same order they had reported. An average of these six self-assessments was obtained for each subject to compute results of this test.

Life Satisfaction. The Subjective Happiness Scale (Lyubomirsky & Lepper, 1999) assesses the participants´ perception of their happiness (e.g., "In general, I consider myself…"), which are rated on a 1 (*not a very happy person*) to 7 (*a very happy person*) scale. This scale has high test-retest validity over periods and convergent validity with measures of depression, life satisfaction (Lyubomirsky & Lepper, 1999) and authenticity (Wood, Linley, Maltby, Baliousis, & Joseph, 2008).

2.3 Procedure

Subjects were recruited through public announcements by faculty members at local colleges. Students were informed that a psychological study about memory and personality variables would be conducted and that at the end of the experiment they will be informed about study objectives and some psychological variables functioning. No credits for participation were offered. They were explicitly given the option of opting out.

The testing sessions took place in the students' own classes and with the support of the responsible professor. When the experimenters arrived at each classroom, general information about the study and study procedures was presented to ensure subjects' understanding of testing processes. At the first meeting, half of the subjects (randomly selected) were taken to a different classroom accompanied by a second experimenter. Half of the subjects (n=37) in their first session received the AMT application with specific instructions (directed recall) and the other half (n=38) performed the AMT with non-specific instructions (free recall). Three weeks later (exactly) the same physical subjects distribution was employed and the subjects produced responses to the same list of words with a different instruction. After the second AMT administration, questionnaires of psychological history and personality variables were administered.

2.4 Data Analysis

Differences in function of task demands were explored by means of a repeated measures ANOVA, with the variable "recall" (directed/free) as within-subjects factor. Relationships between variables were explored by Pearson product-moment correlations. In order to explore possible causal relations, multiple linear stepwise regressions were conducted. Stepwise regressions only keep into the model the variables that explain significantly the variance of the dependent variable. We did not find significant differences in general or specific retrieval by gender so it was removed from analyses.

3. Results

3.1 Instructions Effects

A main effect for the variable "recall" was found ($F(1,70) = 52.98$, $MSE = 248.84$, $p <. 000$), with higher specific memories in the directed recall condition compared to the free recall condition.

3.2 Mood and Specificity of Recall

Specific memories did not correlate with emotional status assessed by the BDI-SF scale. BDI-SF scores were

positively correlated with VARS scores (r = 0.36, p = .001) and negatively with Life-Satisfaction (r = -0.38, p = .001). However, rumination (VARS scores) showed a negative non-significant correlation with specific memories obtained by direct recall (r = -0.12, p = .286) but a positive and almost significant relationship with specific memories obtained by means of free recall (r = 0.21, p = .063). Additionally, Rumination was negatively related to semantic associations produced in free recall situation (r = -0.27, p = .017).

3.3 Self-perceptions and Specificity

Of the pool of subjective variables assessed in this study, the Internal Locus of Control was the only one related to specificity maintaining a similar relationship under both conditions (r = 0.25, p = .028, directed recall; r = 0.23, p = .039, free recall). In addition, the Internal Locus of Control was positively correlated with Self-Valoration (r = 0.30, p = .008) and Life-Satisfaction (r = 0.27, p = .017). A high Self-Valoration obtained by the self assessments that subjects assigned to their own descriptors was related to a high Life-Satisfaction (LS) (r = 0.39, p = .001) and negatively with Rumination (r = -0.28, p = .014). Rumination scores correlated negatively with Life-Satisfaction (r = -0.38, p = 0.001).

3.4 Regression Models

In order to explore personality variables that could explain specificity trends, a series of stepwise regressions were conducted (see Table 2). When we introduced for analyses the variables Internal Locus of Control, Rumination, Life-Satisfaction and, Self-Valoration, only an Internal Locus of Control explained significantly the variance of memory specificity due to directed recall (6.5% of variance). However, in conditions of free recall, the variance of specific retrieval is explained by Internal Locus of Control and Rumination (11% of variance).

The marginally significant positive correlation between Rumination and specific retrieval for the free recall condition and the high negative correlation between Life-Satisfaction and Rumination led us to set up the hypothesis of a different role of rumination in non-clinical samples in function of the conditions where the specific recovery is obtained. The Stepwise analyses of regression kept into the model the Life-Satisfaction and the specific retrieval obtained in free-recall condition as the variables which significantly can explain the variable Rumination (20.5% of variance approximately).

4. Discussion

In the current study, we were interested in the role of specificity of memory as a protective factor for mood disturbance. In order to check possible mechanisms that can prevent people from vulnerability to emotional distress, we examined the relationship between specificity in recovery and different personality variables. Internal Locus of Control (ILC) and Rumination are factors that can help people to maintain a specific memory recovery style. ILC was significantly correlated with specific retrieval independently of the way memories were obtained. Subjects who perceived a higher capacity to change the results for future events trusting in personal factors were more specific in their responses. Additionally, a high ILC was related to a high Self-Valoration and Life-Satisfaction supporting its role as a protective factor for depression. The relationship between Internal Locus of Control and specificity of retrieval could be also related to the motivational nature of memory. Subjects with an ILC style would pay more attention on instructions details as they think that the task outcome depends on their own effort, especially in our study where the motivation was intrinsic as subjects were not rewarded with external academic credits. It has been proposed that individuals differ in the extent to which their attention is captured (Conway & Kane, 2001) and a greater attention control is necessary to achieve greater specificity that could be facilitated by an internal LC ability to maintain goal-relevant information throughout the hierarchy. Future research should test differences in AMT performance in function of motivational variables.

It was also very interesting the relationship between specificity and rumination variables found in this study. Although it has been tested that self-focused cognitive processes may result in the retrieval of less specific memories (Watkins et al., 2000), this relationship could vary in function of task demands. In our sample, the free specific retrieval in the non-specific instructions situation was positively related to rumination and some of this specific retrieval joined to life-satisfaction was necessary to explain the rumination scores. We suggest that when the self-focused cognitive processes are concentrated on situational aspects that can have a future effect on future events results, rumination can act as a protective factor for depressive reactivity. Additionally, depressive reaction could be avoided reinforcing an ILC focused on elements of the situation which depend on the subject and with the residual specific retrieval used to keep congruent internal goals necessaries for a stable self-esteem. Researches in the field of rumination increasingly agree that analytical rumination might indeed be conceptualized as some form of problem solving (Segal et al., 2002). Some forms of ruminative self-focus (reflective) are associated with psychological health (Teasdale & Green, 2004; Trapnell & Campbell, 1999). An internal locus of control could become the way of problem solving which is related to a higher specificity in

retrieval. Subjects need to recover specific events in order to analyze past problems and to select personal resources to avoid past mistakes and this is facilitated with an internal way of examine past experiences. This is congruent with results of a study where Externals reported more events in the past and Internals more events for the future (Hentschel et al., 2000), suggesting that given that internals want to be in control of their actions, they report more future events, as past events can no longer be controlled. Furthermore, research has shown that overgeneral recall has a deleterious effect on effective problem solving (e.g., Pollock & Williams, 2001). An internal locus of control where subjects perceived that their outcome depends on their acts would implement more efforts to solve future problems instead of remaining involved in determining causes of negative mood, past failures, and current problems (depressive rumination).

The fact that specific recovery could explain rumination is also congruent with results about degree of mood disturbance following experimental manipulation of frustration which was greater in those participants with a more specific retrieval style (Raes et al., 2003). After a negative event, high-specific people thought more frequently about it and thought it more unpleasant and disturbing to find themselves thinking back to the experimented negative event (Raes et al., 2006). An Internal Locus of Control could be necessary to determine what things of the past must be changed coping with the negative event and feelings and preventing negative reinforcement of functional avoidance of remembering unpleasant past experiences. This ILC function can also fit with SMS model (Conway & Pleydell-Pearce, 2000). Internals would process past events activating sensory-perceptual information from the episodic memory system to detect what could change of the past to have an effect on future events (as things that happened and will happen depend on myself) and would contextualize information from the long-term self in a more positive perspective associated to higher levels of self-perception (life-satisfaction, positive self-valoration). In contrast, the increased salience of abstract autobiographical information stored in the long-term self highly processed increases the likelihood that individuals will respond with such information when asked to retrieve memories to cue words (Crane et al., 2007). In our sample, subjects who were more conscious of their ruminative style when they were down showed lower well-being and self-valoration. Probably, the consciousness of the possible initiation of ruminative processes is the first step to try to control rumination in unfavourable situations. Cognitive resources must then used to keep high self-perception and life-satisfaction recovering useful specific events. Internal Locus of Control would exert the function of delivery strategies to keep such positive status. ILC would contribute to the demand of coherence (Conway, 2005) in a motivated memory related to a stable, integrated self with a confirmatory past that yields a consistent and rich life story (Bluck & Habermas, 2001). This coherent self will have high self-esteem and a strong positive sense of well being (Conway, Singer, & Tagini, 2004). Based on the assumption that autobiographical memory functions to maintain "adaptive correspondence", they suggested that autobiographical event knowledge is easier to access if it is consistent with current working goals. Our results are in agreement with this contribution leading us to suggest that the internal locus of control could establish in subjects working goals based on the specific information of the past in order to plan future actions.

The differences found in this research in function of task requirements made difficult the comparison with previous research using the standard AMT administration. At the same time, such results establish that would be very interesting to extend the results of free recall and its relationship with emotional and self-perceptive variables. The effects of ILC on specificity in this study were of correlational nature suggesting that future research assessing the experimental effects of control over task resolution on specificity of retrieval could be very interesting. The current results have been found using a non-clinical population although a more accurate testing comparing subjects with different clinical status (never depressed, previously depressed, depressed) should be implemented in future research. The implications for preventive intervention contributed in this study should be also experimentally tested developing therapeutical intervention programs based on improvements of Internal Locus of Control, self-esteem and reflective ruminative thinking.

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Table 1. Sample characteristics (Mean and Standard Deviation)

Variables	M (S.D.)
Age	21.25 (3.72)
*B.D.I-SF**	3.32 (2.72)
VARS	16.82 (9.79)
Locus of Control	19.72 (3.86)
Self-Valoration	6.97 (1.24)
Life Satisfaction	19.96 (3.52)

* Short version of Beck Depression Inventory (Beck & Beck, 1972).

Table 2. Regression Models

	Variable/s included	*B*	*SE B*	*ß*	*t*	*p*
Model 1	Internal Locus of Control	0.13	0.06	0.26	2.25	.028
Model 2	Internal Locus of Control	-0.20	0.09	0.26	2.34	.022
	Rumination	0.07	0.03	0.24	2.15	.035
Model 3	General Life Satisfaction	-1.11	0.29	-0.40	-3.79	.000
	Specificity in non-specific condition	0.79	0.35	0.24	2.27	.026

Model 1: Dependent variable: Specificity obtained by directed recall (R^2 = .065, F (1,74) = 5.09, p= .028).

Model 2: Dependent variable: Specificity obtained by free recall (R^2 = .114, F (2,74) = 4.63, p = .013).

Model 3: Dependent variable: Rumination (R^2 = .205, F (2,74) = 9.29, p < .000).

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