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# Specifying What Makes a Personal Memory Unique Enhances Emotion Regulation

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During recollection of past experiences, the way autobiographical information is processed affects the intensity of the emotion aroused. Two main hypotheses were proposed in this respect: One focuses on the type of information activated during retrieval; the second is centered on the mode of processing at work. This article defends the notion that both perspectives need to be integrated to predict emotional arousal during autobiographical recollection. The authors explored the consequences on emotional feeling intensity by manipulating the type of information processed, together with the cognitive mode activated (specific vs. general level of processing). Results support previous findings that voluntarily specifying memories reduces emotional intensity. However, this was observed only when the details that make the event unique were processed.

*Keywords:* autobiographical memory, specificity, emotional schema, contextual details, emotional intensity

Sometimes the recollection of past personal experiences reinstates the intensity of the emotional feelings originally experienced, whereas on other occasions emotional arousal is attenuated or absent. Given humans' propensity to re-evoke their emotions (Rimé, Finkenauer, Luminet, Zech, & Philippot, 1998), identifying the factors determining the extent to which emotions are (re)experienced during the construction of a personal memory is fundamental to our understanding of emotion regulation. Two main hypotheses have been developed regarding this issue: The first one states that the extent to which emotion is aroused during autobiographical memory retrieval depends on the type of information activated during recollection (e.g., Foa & McNally, 1996; Lang, Melamed, & Hart, 1970; Schaefer & Philippot, 2005). The other hypothesis poses that emotion arousal during memory retrieval is a function of the cognitive mode activated (e.g., Borkovec, Ray, & Stöber, 1998; Philippot, Baeyens, Douilliez, & Francart, 2004; Watkins & Moulds, 2005). Until now, these two lines of research have been investigated separately. However, there is a third unexplored possibility: Emotion arousal during the recollection of past personal experiences would be best explained by the conjunction between the specific cognitive mode activated and the type of information processed. From this perspective, in the present article we explore the consequences on emotional feeling intensity by manipulating the type of information processed, together with the cognitive mode activated.

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According to recent models of memory (e.g., Conway & Pleydell-Pearce, 2000; Schacter, Norman, & Koutstaal, 1998), personal memories rely on different types of information, including sensory, perceptual, semantic, and spatiotemporal information, integrated by constructive processes. The goals and representations of an individual at the time of encoding, rehearsal, and retrieval constrain how control or executive processes integrate these distinct types of information into a memory. In turn, control processes determine the extent to which these components will contribute to the construction of a specific memory. This approach suggests that some memories contain more potentially emotional information (e.g., the sensory, perceptual, and semantic features of an emotional experience) whereas others are more factual, containing more contextual and spatiotemporal details. Consequently, during memory construction, emotional feelings would vary in intensity, as a function of the type of memory details activated.

In agreement with this perspective, several authors have proposed a dual representation model of memory in which emotional and nonemotional features of a given experience are represented separately in different memory systems (e.g., Brewin, Dalgleish, & Joseph, 1996; Conway & Pleydell-Pearce, 2000). According to Conway and Pleydell-Pearce (2000), human autobiographical memory has evolved in two distinct systems to allow the capacity to re-evoke past emotional experiences without necessarily reactivating the potentially strong emotional state initially experienced. Several multilevel cognitive models of emotion have also postulated that emotional information can be processed on at least two distinct levels: a *schematic* level and a *propositional* level (Leventhal, 1984; Philippot et al., 2004; Power & Dalgleish, 1997; Teasdale, 1999). These two levels differ in the nature of the information they contain, and their outputs lead to different emotional consequences. The schematic level is responsible for "hot" emotional activation and has an automatic connection with bodily response systems. It is at this level that emotional responses are generated by the activation of a schema; that is, a generic repre-

sentation that integrates sensory, perceptual, and conceptual elements typical of a given category of emotional experiences (for a review, see Philippot et al., 2004). The content of a schema can be viewed as the records of communalities abstracted from various emotional experiences. The propositional level is responsible for the volitional and control processing of declarative and semantic knowledge about an emotional experience. Information processed at this level includes discrete concepts about the different elements of emotional situations and emotion knowledge. The sole activation of this level would not lead to emotional arousal.

The willful construction of an emotional memory implies the activation in the episodic buffer (Baddeley, 2000) of propositional information, thus, without necessary emotional reaction. However, because of repetitive contingent activation, some conceptual elements from the propositional system have been strongly associated with a schematic representation (Philippot et al., 2004). For example, for some individuals suffering from a panic disorder, the concept of "heart attack" may be systematically activated during the arousal of their panic schema. With repetition, the concept of "heart" becomes automatically associated to the panic schema, explaining why the simple viewing of the word "heart" can trigger the panic schema in these individuals. Thus, during retrieval, the access to some concepts in the propositional network will automatically activate connected schema and, through this activation, will generate emotional arousal.

Some conceptual information is more susceptible to being associated to a schema. Schemata are generic structures containing elements repeatedly experienced across several emotional experiences of a similar kind. As a consequence, focusing on elements that have been encountered many times during a given kind of emotional experience (e.g., perceptual, sensory, and semantic information pertaining to the emotional implication of an event) should facilitate the activation of a schema. In contrast, focusing on the details describing a specific event in terms of its uniqueness, such as its spatiotemporal context, is unlikely to activate elements that have been associated to an emotional schema. On the basis of the aforementioned considerations, during memory construction a focus on cues that contain schema-related information should lead to greater emotional intensity than a focus on schema-irrelevant information.

Congruent with this notion, a previous study has stressed the importance of the type of information activated during the specification of emotional information. Lang, Melamed, and Hart (1970) have reported that, during a mental imagery task, intense emotions were observed when participants were instructed to activate information related to the emotional responses (e.g., heart accelerations, urge to flee a situation) but not when they were instructed to focus on the situational and contextual characteristics of the emotional situation. Similar evidence has been provided by a recent study (Schaefer & Philippot, 2005) exploring the phenomenal characteristics of emotional autobiographical memories. Participants completed the Memory Characteristics Questionnaire (Johnson, Foley, Suengas, & Raye, 1988) after the re-evocation of emotional and neutral memories. Self-report and physiological measures assessed the emotional state at retrieval. Emotional intensity was found to be correlated with the evocation of the emotional details of the event, such as sensory, perceptual, and semantic elements of the situation, but not with its contextual features, such as spatiotemporal details of the event. In other words, more intense emotions were observed when memory specification concerned schema-relevant information but not when schema-irrelevant information was activated. However, these results have to be interpreted cautiously because of their correlational nature. Our aim in the present study is to test this hypothesis empirically by constraining participants to focus on either emotional or contextual details of an event during the recollection of an autobiographical memory.

The alternative hypothesis is that the mode under which emotional information is processed partly determines emotion regulation capacities. In that context, a particularly relevant aspect concerns the degree of specificity or concreteness at which emotional information is processed (Borkovec et al., 1998; Philippot et al., 2004; Stöber & Borkovec, 2002; Teasdale, 1999; Watkins & Moulds, 2005). Indeed, a growing number of researchers have observed the presence of an overgeneral/abstract mode of processing information in clinical populations with emotional disorders. For instance, worries in generalized anxiety disorder have been described as general verbal thoughts characterized by more abstract and less visual thinking (Borkovec et al., 1998). Stöber and Borkovec (2002) have demonstrated that the reduced concreteness of worrisome thoughts is related to poor social problem solving and impaired emotional processing in anxiety. This observation led us to conclude that a more specific and concrete style of thinking might contribute to a reduction of pathological worry. Like worries, ruminations in depression are recurrent self-related negative thinking patterns characterized by reduced concreteness (Watkins & Moulds, 2005). In studies manipulating the mode of self-focused rumination, Watkins has gathered evidence that, whereas an abstract focus on the causes and consequences of mood and symptoms is a maladaptive type of rumination, a concrete focus on the experience of specific symptoms decreases overgeneral autobiographical memory and improves problem solving and self-esteem in depression (Moberly & Watkins, 2006; Rimes & Watkins, 2005; Watkins, 2004; Watkins & Moulds, 2005; Watkins & Teasdale, 2001).

From the same perspective, Williams and Broadbent (1986) have observed that, when asked to recall specific autobiographical memories (e.g., "My wedding day"), respondents who had previously attempted suicide tended to retrieve more categoric overgeneral memories that are summaries of repeated events (e.g., "Arguments with my wife"). Numerous studies have found the presence of an overgeneral retrieval mode in other clinical populations suffering from emotional disorders (for a review, see Williams et al., 2007). To account for this phenomenon of overgeneral memory, Williams (1996) proposed that individuals who have experienced traumatic events during childhood develop an overgeneral retrieval style to avoid the reactivation of painful feelings associated with these specific experiences. This hypothesis is based on the assumption that retrieving past events in a less specific way minimizes the affect associated with these memories. In the short run, this avoidance strategy should concur with emotion down-regulation. However, in the long run, overgenerality would result in adverse consequences such as the maintenance of emotional vulnerability (e.g., Brittlebank, Scott, Williams, & Ferrier, 1993; Dalgleish, Spinks, Yiend, & Kuyken, 2001; Peeters, Wessel, Merckelbach, & Boon-Vermeeren, 2002), deficits in social problem solving (e.g., Goddard, Dritschel, & Burton, 1996), and difficulties in imagining the future specifically (Williams et al., 1996).

Another explanation of the overgenerality bias is suggested by the strategic inhibition hypothesis (Philippot et al., 2004), the central prediction of which is that voluntarily specifying emotional

information necessitates a down-regulation of emotional arousal that would otherwise disrupt the cognitive processes engaged in memory search. Indeed, when the retrieval of a specific memory is deliberate, a "generative" mode of accessing memories is activated. This generative retrieval is a time-consuming and effortful process involving executive processes (Conway & Pleydell-Pearce, 2000). It is considered to be a staged, hierarchical process in which an intermediate or generic description is first recollected. This intermediate description is then used to search for more specific events by comparison with the retrieval target. If the retrieval process is too demanding, because of insufficient executive resources as hypothesized for some clinical conditions, the process of specification is prematurely interrupted, leading to the recollection of a general memory (Dalgleish et al., in press; Williams et al., 2006).

As outlined earlier, if intense emotions are (re)experienced during the process of generative retrieval, they disrupt and may eventually abort the process of specification. An important implication is that, to prevent such a disruption, specific autobiographical memory construction necessitates the inhibition of the emotional features of the information to be specified (Philippot et al., 2004). In contrast, because the recollection of general memories is less demanding, the access to generic abstract emotional experiences can occur without the inhibition of the structure responsible for emotion activation. Thus, although the two perspectives reviewed assume that the mode of processing causally influences emotional intensity, they state opposite predictions with respect to the relationship between memory specificity and emotional regulation. Indeed, the strategic inhibition hypothesis (Philippot et al., 2004) proposes that voluntarily processing emotional information at a concrete specific level should result in less emotional intensity than remaining at a general level, whereas the opposite is predicted by the affect regulation hypothesis (Williams, 1996).

Several lines of evidence support the strategic inhibition hypothesis. In a brain imaging study (Schaefer et al., 2003), the level of specificity at which emotional standard scripts were performed during a mental imagery task was manipulated. The results showed that the general mode was associated with more intense emotional feelings, greater increases in heart rate, and more activation of the ventromedial prefrontal cortex, a brain region involved in the activation of emotion (e.g., Bechara, Damasio, Damasio, & Lee, 1999), compared with the specific mode of processing. Consistent with this finding, Philippot, Schaefer, and Herbette (2003) have observed that priming a specific (vs. overgeneral) access mode to autobiographical memory led to less intense emotions during subsequent re-evocations of personal emotional memories using mental imagery or during the watching of emotional film clips. This observation has been recently replicated in a study in which emotion was induced by a failure experience with the Tangram Puzzle Task (Raes, Hermans, Williams, & Eelen, 2006) and in two other studies in which anxiety was induced by a difficult public performance (Philippot, Baeyens, & Douilliez, 2006). In summary, the repeated observation, with different paradigms, of an emotional inhibition induced by the voluntary specification of emotional information provides some indications of the robustness of the phenomenon.

None of these studies, however, has controlled for the qualitative content of the information specified during the recollection. In addition, the two studies that have addressed the issue of the effect of a specific versus general mode of processing on autobiographical memories (Philippot et al., 2003; Raes et al., 2006) have induced a specific mode by asking participants to recollect specific autobiographical memories as defined by Williams (1996). It is interesting to note that this definition of specificity focuses on the features that make an episode unique, such as information about the specific place and time at which the event took place. Considering the generic structure of emotional schemata, this spatiotemporal information is less likely to activate a schema than the recall of perceptual, sensory, and semantic elements pertaining to the emotional implications of the situation.

In those studies, a decrease in emotional intensity was observed, maybe not only because of the specific mode of processing, but also because memories were described in their factual specificity. More generally, experimentally manipulating specificity in autobiographical retrieval reveals consequences for the content of the information activated. It is possible that the voluntary activation of specific memories favors the recuperation of unique schema-irrelevant information. In contrast, a general process is likely to activate information centered on generic aspects of the experience and, thus, more susceptible to be related to a schema and to trigger an emotional response.

As a consequence, we propose that it is the conjunction between a particular mode of processing and a particular type of information processed that should lead to reduced emotion during autobiographical recollection. More precisely, a decrease in emotional intensity is expected when a specific mode of processing is applied to information unrelated to emotional schemata. From this perspective, the present studies were designed to test directly (a) the hypothesis that the degree of specificity plays a fundamental role in the effectiveness of emotional regulation during autobiographical recollection, and (b) the hypothesis that the type of information specified, rather than just specification per se, determines the effect of retrieval processes on emotion. To this aim, in three studies, we examined the differential effect of an induced mode of processing (specific vs. general) applied on either schema-relevant or schema-irrelevant information on the emotional intensity felt during the re-evocation of emotional autobiographical memories.

## Study 1

Participants were invited to recollect aloud specific versus general emotional personal past events in response to cue words. In addition, they were randomly assigned to one of three experimental conditions: specific processing of emotional information (emotional specification), specific processing of contextual information (contextual specification), and general processing of emotional information (general). In the specific conditions, a set of questions prompting emotional versus contextual aspects of the event were asked during memory construction to examine the effect on the nature of the information recollected. In the general condition, questions prompted generic emotional information. The intensity of the emotion felt during the procedure of re-evocation was the dependent measure. It was predicted that feeling intensity would decrease in the contextual specification group, compared with the two other groups. To ensure that there were no differences between participants of the three experimental conditions in their natural style of retrieval (low vs. high specific), We administered a French version of the Autobiographical Memory Test (AMT: TeMA; Neumann & Philippot, 2006). Participants also completed the

Beck Depression Inventory (BDI; Beck & Steer, 1987) and the State–Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, et al., 1983) to control for levels of depression and anxiety, respectively.

## Method

### Participants

Fifty-four undergraduate students (13 men, 45 women) took part in the experiment for course credit. Their ages ranged from 18 to 21 years ($M = 18.79$, $SD = 0.91$). They were randomly assigned to one of the three experimental conditions, with 18 participants in each condition. There were no differences among conditions in terms of age, $F(2, 53) = 0.14$, *ns*, or gender, $\phi(51) = .37$, *ns.*

### Materials

*Self-reported emotional intensity.* We assessed the global intensity of the emotions felt during the recollection stage using a 9-point Likert-type scale ("When I was describing my memory, I felt . . .") ranging from *no emotions at all* (1) *to very intense emotions* (9). Participants were asked to rate themselves on this scale according to what they really felt during the recollection task and not according to what they thought they should have felt.

*Visual Analogue Mood Scales (VAMS; McNally, Litz, Prassas, Shin, & Weathers, 1994).* We assessed the current mood after each recollection of a memory by inviting participants to rate themselves on seven 9-point scales corresponding to different mood adjectives (*happy, anxious, in a bad mood, angry, sad, emotionally aroused,* and *in a positive mood*), on which 1 indicated that the participant did not felt this emotion at all and 9 indicated that he felt this emotion extremely.

*The STAI and the BDI.* The STAI (Spielberger et al., 1983) and the BDI (Beck & Steer, 1987) were used to assess state anxiety and the level of depressive symptoms, respectively.

*AMT: TeMA.* The AMT: TeMA is a validated French version (Neumann & Philippot, 2006) of the AMT (Williams & Broadbent, 1986), consisting of 10 emotional cue words (5 negative, 5 positive). The cues were presented in a fixed order, alternating positive and negative words (cue words are available from Pierre Philippot). Participants were asked to retrieve a specific memory in response to each cue (i.e., refer to a past event that had happened at a particular place and time and that had lasted less than a day). Before the task, we conducted a practice trial involving two cue words to ensure that instructions were well understood. In this experiment, the TeMA was used in a written format in which the cue words were printed on separated sheets in a booklet. Participants were instructed to write down their responses. Participants were given 60 s for each cue. After the time limit, participants were asked to turn to the next page. Participants were not prompted.

Responses that were not categorized as specific memories were coded either as general (comprising "extended" memories of events that lasted longer than a day and "categoric" memories referring to repeated events) or as omissions (failures to recall a specific memory within the time limit). The number of specific first responses to all cue words was used as the dependent measure. A sample of 30% of the responses was rated a second time by an independent rater. Interrater agreement of 98.7% was obtained.

### Procedure

The experiment was conducted in two separate sessions: a collective pretest and an individual experimental session. During the first session, participants were told that the study concerned the ability to retrieve personal memories. The TeMA was administrated to all participants. Next, they completed the STAI and the BDI. The experimental session took place 2 weeks after the first session. Participants were tested individually. They were seated in an armchair, and the room's lighting was dimmed. They were separated from the experimenter by a partition. The experimental task comprised four trials involving the recall of two positive and two negative autobiographical memories. Each trial included six stages. The first stage was a 1-min relaxation baseline. In the second stage, participants were asked to evaluate their emotional state (baseline) with the self-reported emotional intensity scale. In the third stage, participants were asked to retrieve a specific or a categoric general memory (depending on the experimental condition) and to describe it aloud for at least 1 min. A specific memory referred to one particular situation, whereas a general memory referred to a type of event experienced repeatedly in the past (Williams, 1996). All verbatim responses were recorded, and participants who provided specific memories in the general condition or general memories in the specific condition were excluded from the study. The proportion of such mistakes was very low (3.7%). The exact instructions for the specific and for the general processing conditions are given in the Appendix.

During the memory construction, participants were invited to respond orally to a series of questions asked by the experimenter. Questions differed among the three conditions. In the emotional specification condition, questions focused on sensory, perceptual, and semantic elements related to the emotions experienced during the situation (e.g., "Do you remember what you felt during this situation? Do you remember what you thought? Do you remember your bodily sensations when the event took place? Do you remember how did you react during this situation?"). In the contextual specification condition, questions focused on spatiotemporal features of the event (e.g., "Do you remember the spatial arrangement of peoples and/or objects around you? Do you remember where the event took place? Do you remember when the event took place?"). In the general condition, participants also answered a series of questions, but the questions focused on general impressions to avoid any specification of one particular situation (e.g., "What kind of feelings do you have in general in those situations? What kind of thoughts? What general images come to your mind? What is generally your reaction to this type of situation?"). The mean amount of time for the re-evocation of a memory was 3 min 2 s and did not differ significantly among conditions, $F(2, 53) = 0.78$, *ns*. Immediately after each re-evocation, participants were asked to fill in the self-reported emotional intensity scale and the VAMS.

This procedure was repeated four times with four different emotional cue words (two positive, two negative). Two lists of four emotional cue words were randomly assigned across participants (List A: *happy, angry, accepted, lonely*; List B: *proud, unhappy, rejected, surrounded*). Cues were presented in a fixed order, alternating positive and negative words. Finally, after the retrieval task, participants were debriefed and thanked for their participation.

### Results

#### Group Differences

No differences were found among the groups concerning the number of specific memories provided at the TeMA during the first session, $F(2, 53) = 1.55$, *ns*. Also, the three groups did not differ in their scores on the BDI, $F(2, 53) = 0.01$, *ns*, or on the STAI for state anxiety, $F(2, 53) = 0.50$, *ns*.

#### Manipulation Check

We performed a manipulation check to ensure that orally describing past emotional memories elicited significant emotional feelings in our participants. We predicted that the first measure of emotional intensity (Time 1, baseline) would be lower than after the recollection of each of the four memories (Times 2 to 5). An analysis of variance (ANOVA) with time (Time 1 to Time 5) as the within-participant factor was computed on the self-rated emotional intensity scores (Time 1: $M = 3.48$, $SD = 1.82$; Time 2: $M = 6.22$, $SD = 1.39$; Time 3: $M = 6.63$, $SD = 1.59$; Time 4: $M = 6.39$, $SD = 1.87$; Time 5: $M = 6.42$, $SD = 1.65$). A main effect of time was observed, $F(4, 51) = 40.11$, $p < .001$, $\eta^2 = .44$, with emotional intensity judged higher after the task than before. Contrasts showed that Time 1 differed significantly (at $p < .001$) from all other times. These results show that the oral recollection task elicited significant emotional arousal.

#### Effect of the Experimental Condition on Emotional Intensity

A mixed-design 3 (emotional specification vs. contextual specification vs. general condition) × 2 (positive vs. negative memories) ANOVA computed on the emotional intensity scores revealed a main effect of experimental condition, $F(2, 51) = 13.49$, $p < .001$, $\eta^2 = .35$. There was neither a significant effect of valence, $F(1, 51) = 1.11$, *ns*, nor a significant Valence × Experimental Condition interaction, $F(2, 51) = 0.74$, *ns*. Follow-up analyses indicated that less emotional intensity was reported in the contextual specification condition, $t(34) = -5.04$, $p < .001$, than in the general and in the emotional specification conditions, $t(34) = 3.52$, $p < .005$. No difference was found between the latter two conditions, $t(34) = -1.61$, *ns*. This pattern of results is illustrated in Table 1.

#### Effect of the Experimental Condition on the VAMS

A series of 3 (experimental condition) × 2 (valence) repeated measures ANOVAs were computed on participants' ratings of the seven VAMS items. There were significant effects of valence for all VAMS scores (all $ps < .005$), indicating that the recollection of positive memories activated positive emotions, whereas the recollection of negative memories activated negative emotions. Except for emotional arousal, $F(2, 51) = 7.08$, $p < .005$, $\eta^2 = .21$, there were no significant effects of condition. There were no significant Valence × Condition interactions on VAMS scores (all $ps > .07$). As can be seen in Table 2, participants were less emotionally aroused when asked to specify contextual details of past events than when they had to describe emotional details, $t(34) = -2.68$, $p < .05$, or remain at a general level of processing information, $t(34) = -3.21$, $p < .005$.

Table 1
*Means (and Standard Deviations) of the Emotional Intensity Ratings as a Function of Valence and Experimental Condition in Study 1*

| Autobiographical memories | Contextual specification | Emotional specification | General condition |
|---|---|---|---|
| Positive | 5.55 (1.12) | 6.31 (1.19) | 7.06 (1.29) |
| Negative | 5.61 (1.23) | 6.89 (1.29) | 7.08 (1.02) |

### Discussion

The results of Experiment 1 support the notion that remaining at an overgeneral categoric level of processing leads to more intense feelings than when voluntarily specifying emotional memories. This is congruent with previous findings (Philippot et al., 2003, 2006; Raes et al., 2006; Schaefer et al., 2003). However, as predicted, it is only when contextual information is activated during the specification of an event that emotional intensity is significantly decreased. The fact that a high level of emotion was observed in the emotional specification condition suggests that the use of a specific mode of processing cannot solely account for the less intense emotional feelings observed in the contextual specification condition. Indeed, the present findings suggest that the inhibition of emotion activation might only take place if a specific mode of processing is applied to contextual/schema-irrelevant information. Nonetheless, as this experiment is the first to test this hypothesis, replications of these results are necessary to ensure their robustness. Furthermore, the absence of a control condition does not permit us to determine whether emotional intensity decreases during the specification of the contextual features of an event or remains at an initial level with the two other experimental conditions increasing.

## Study 2

The second experiment was designed to replicate the findings of Study 1 in a larger sample and with the inclusion of a no-processing control condition. Its aim was to investigate whether specifying contextual information during emotional memory retrieval reduces emotional intensity, compared with a general processing condition and a

Table 2
*Means (and Standard Deviations) of the Ratings on the Visual Analogue Mood Scales as a Function of Experimental Condition in Study 1*

| Mood | Contextual specification | Emotional specification | General condition |
|---|---|---|---|
| Happy | 4.84 (1.23) | 5.50 (1.07) | 5.06 (1.39) |
| Sad | 2.75 (1.18) | 3.17 (1.54) | 3.82 (1.86) |
| Anxious | 3.00 (1.43) | 3.33 (1.81) | 4.07 (1.92) |
| Angry | 2.40 (1.43) | 2.23 (1.52) | 2.67 (1.06) |
| Emotionally aroused | 3.70 (1.85) | 4.11 (1.65) | 5.63 (1.44) |
| In a positive mood | 5.40 (1.81) | 6.15 (1.23) | 5.62 (1.44) |
| In a negative mood | 2.27 (1.28) | 2.28 (1.31) | 2.98 (1.44) |

control condition in which the mode of processing and the type of information content was not yet manipulated.

## Method

### Participants

One hundred sixteen university psychology student volunteers (86 women, 30 men) were recruited and randomly assigned to the contextual specification ($n = 39$), general ($n = 39$), or control condition ($n = 38$). Their ages ranged from 17 to 23 years ($M = 18.39$; $SD = 0.98$). There were no differences among conditions in terms of age, $F(2, 115) = 0.01$, *ns*; or gender, $\phi(105) = .29$, *ns.*

### Procedure

The procedure was similar to Experiment 1 but with a few exceptions. First, the emotional specification condition was omitted, and a control condition was added. Second, scales measuring the level of avoidance, rumination, and vividness induced by the recollected memory were added to explore possible mediators. The first session, comprising the completion of the TeMA, the STAI and the BDI, was identical to Experiment 1. The experimental task for the contextual specification condition and for the general condition replicated the same conditions as in Experiment 1. As in Experiment 1, all verbatim responses were recorded, and participants who provided specific memories in the general condition or general memories in the specific condition were excluded from the study. The proportion of such mistakes was very low (3.2%).

In the control condition, the level of specificity at which memories were recollected was not experimentally manipulated. Participants were simply asked to retrieve memories in response to cue words (which were the same as the other conditions). An example of both types of memories (specific and general) was provided. The order of presentation of each type of example was counterbalanced across participants. As in the specific and general processing conditions, participants were asked to describe aloud their memory for at least 1 min. After the re-evocation, instead of answering questions, participants were invited to continue to think about the event for a moment. Participants from the control condition reported more specific memories ($M = 2.39$; $SD = 1.05$) than general memories ($M = 1.56$; $SD = 1.11$) or omissions ($M = 0.05$; $SD = 0.22$). However, across the four trials, a large majority of those participants (87%) retrieved mixed type of memories (including specific and general) instead of only specific (10%) or only general (3%) memories.

The mean time for the whole task was 3 min 54 s by cue and did not differ significantly among conditions, $F(2, 115) = 1.52$, *ns.* Immediately after each re-evocation, participants completed the self-reported emotional intensity scale and the VAMS. Additionally, participants completed self-report scales indicating (a) to what extent participants were still thinking about the event (rumination), (b) to what extent they tried to avoid thinking back about the event (avoidance), and (c) to what extent their memory was vivid, utilizing 9-point Likert-type scales ranging from 1 (*not at all*) to 9 (*extremely*). Finally, participants were thanked and debriefed.

## Results

We analyzed the results for Experiment 2 using a statistical approach similar to that used with the results for Experiment 1.

### Group Differences

The three groups did not differ in their scores on the BDI, $F(2, 113) = 1.14$, *ns*, or on the STAI for state anxiety, $F(2, 113) = 0.43$, *ns*; nor did they differ with regard to the number of specific responses on the TeMA, $F(2, 113) = 1.87$, *ns*.

### Manipulation Check

Consistent with the successful induction of emotional feelings during the retrieval task, an ANOVA (with time as the within-participant variable) revealed a significant main effect of time (Time 1: $M = 3.54$, $SD = 1.97$; Time 2: $M = 5.96$, $SD = 1.77$; Time 3: $M = 6.46$, $SD = 1.83$; Time 4: $M = 5.51$, $SD = 1.95$; Time 5: $M = 5.93$, $SD = 2.13$) on the ratings of emotional intensity, $F(4, 110) = 45.10$, $p < .001$, $\eta^2 = .29$. Contrasts showed that baseline emotional intensity at Time 1 was significantly lower (at $p < .001$) than all other emotional intensity measures.

### Effect of the Experimental Condition on Emotional Intensity

As predicted, a mixed-design 3 (specific vs. general vs. control) $\times$ 2 (positive vs. negative memories) ANOVA with emotional intensity as the dependent variable showed a main effect of condition, $F(2, 113) = 20.33$, $p < .001$, $\eta^2 = .26$. A significant effect of valence was also found, $F(1, 113) = 7.58$, $p < .01$, $\eta^2 = .06$, with participants judging the negative memories as more emotionally intense than the positive memories. However, the Valence $\times$ Condition interaction was not significant, $F(2, 113) = 2.87$, *ns*. Follow-up analyses indicated that participants from the contextual specification condition experienced less emotional feeling intensity during the retrieval task than did participants from the general condition, $t(75) = -6.88$, $p < .001$; and from the control condition, $t(76) = -3.51$, $p < .005$. In addition, more emotional intensity was reported in the general processing condition, compared with the control condition, $t(75) = 2.56$, $p < .05$. In fact, the general and the control conditions only differed on emotional intensity scores for positive memories, $t(75) = 2.64$, $p < .05$, whereas no significant difference was found between the conditions for the recollection of negative memories, $t(75) = 1.65$, *ns*. This pattern of results is illustrated in Table 3.

### Effect of the Experimental Condition on the VAMS

A series of 3 (experimental condition) $\times$ 2 (valence) ANOVAs computed on participants' self-ratings of the seven specific emotions of the VAMS showed that, except for emotional arousal ($p = .09$), there were significant effects of valence for all VAMS scores,

Table 3
*Means (and Standard Deviations) of the Emotional Intensity Ratings as a Function of Valence and Experimental Condition in Study 2*

| Autobiographical memories | Contextual specification | Control condition | General condition |
|---|---|---|---|
| Positive | 5.07 (1.32) | 5.72 (1.72) | 6.44 (1.27) |
| Negative | 5.01 (1.13) | 6.45 (1.45) | 6.94 (1.64) |

all $ps < .001$. This indicates that the recollection of positive memories activated positive emotions, whereas the recollection of negative memories activated negative emotions.

However, as in Experiment 1, emotional arousal was the only item that differed significantly among conditions, $F(2, 113) = 7.32$, $p < .005$, $\eta^2 = .06$. No other effects were significant. As reported in Table 4, participants from the contextual specification condition were less emotionally aroused during the recollection of their memories than participants from the general processing condition, $t(75) = -4.35$, $p < .001$; and from the control condition, $t(75) = -3.56$, $p < .005$. No differences were found regarding this issue between the general and the control conditions, $t(75) = 0{,}99$, *ns*.

### *Effect of the Experimental Condition on Rumination, Avoidance, and Vividness*

A mixed-design 3 (condition) × 2 (valence) ANOVA on rumination ratings showed no effect of valence, $F(1, 113) = 0.006$, *ns*; and no significant difference between experimental conditions, $F(1, 113) = 0.16$, *ns*. The Valence × Condition interaction was also not significant, $F(2, 113) = 0.58$, *ns*. The mixed-design 3 (condition) × 2 (valence) ANOVA on avoidance ratings yielded a significant effect of valence, with negative memories being much more avoided than positive ones, $F(1, 113) = 186.24$, $p < .001$, $\eta^2 = .62$. However, there was no significant difference between experimental conditions, $F(1, 113) = 0.12$, *ns*, nor was there a significant interaction, $F(2, 113) = 1.11$, *ns*. In summary, these results indicate that the differences found between experimental conditions on reported emotional intensity reported cannot be explained by those factors (rumination and avoidance).

The mixed-design 3 (condition) × 2 (valence) ANOVA on vividness ratings revealed that participants judged their negative memories to be more vivid than their positive memories, $F(1, 113) = 6.82$, $p < .05$, $\eta^2 = .06$. A significant effect of condition was also observed, $F(2, 113) = 4.16$, $p < .05$, $\eta^2 = .07$. The interaction was not significant, $F(2, 113) = 1.59$, *ns*. Follow-up analyses revealed that memories were judged to be less vivid in the contextual specification condition than in the control, $t(76) = -2.89$, $p < .01$; and general conditions, $t(76) = -2.01$, $p < .05$. No significant differences were found between the last two conditions, $t(75) = -1.15$, *ns*. This pattern of results is illustrated in Table 5. Analyses of covariance (ANCOVAs) were thus computed on the emotional intensity ratings, with the vividness score as a covariate, within each valence condition. The introduction of this covariate did not modify the pattern of the results.

Table 4
*Means and Standard Deviations of the Ratings on the Visual Analogue Mood Scales as a Function of Experimental Condition in Study 2*

| Mood | Contextual specification | Control condition | General condition |
|---|---|---|---|
| Happy | 5.18 (1.57) | 4.67 (1.41) | 4.78 (1.46) |
| Sad | 3.36 (1.79) | 3.42 (1.71) | 3.28 (1.67) |
| Anxious | 3.26 (1.64) | 3.66 (1.50) | 3.58 (1.84) |
| Angry | 2.33 (1.49) | 1.99 (1.05) | 2.07 (1.15) |
| Emotionally aroused | 3.66 (1.45) | 4.89 (1.60) | 5.27 (1.79) |
| In a positive mood | 5.82 (1.62) | 5.21 (1.37) | 5.41 (1.71) |
| In a negative mood | 2.40 (1.54) | 2.43 (1.24) | 2.42 (1.25) |

### *Discussion*

Overall, Study 2 replicates the results of Study 1. Specifying contextual information during the retrieval of an autobiographical memory reduces emotion intensity, compared with describing the situation at a general level of processing. In agreement with this finding, participants from the specific condition reported less emotional arousal on the VAMS and evaluated their memories as being less vivid than in the other conditions. Furthermore, the inclusion of a control condition allows us to determine that the specific mode of processing inhibited the natural course of emotional arousal. On ratings of emotional intensity, the scores of the no-processing control condition fell between the two other conditions. Nevertheless, the degree of emotion reported in the control condition was closer to the one reported in the general condition than that reported in the specific condition. Indeed, emotional intensity scores differed between the general and the control conditions only for positive memories but not for negative ones. In addition, no differences were found between those conditions for ratings of emotional arousal. These results provide evidence of a causal link between emotional intensity and contextual specification, an observation that is consistent with a previous correlational study (Schaefer & Philippot, 2005). In addition, the results extend this observation by indicating that specifying contextual information during the recollection of an emotional memory has an active inhibitory effect on emotion intensity.

Another important issue is that, in Study 1, the condition of emotional specification led to similar effects on emotional intensity as the general condition. Indeed, participants from both conditions reported more intense emotion than in the contextual specification condition. A common feature of the general and emotional specification conditions is the type of information selected during retrieval. Indeed, in both cases, participants were asked to report their thoughts, feelings, images, and reactions associated with a past event. Thus, regardless of whether this information was referring to a single event or to repeated events, the activation of this type of generic information induced an emotional response. These findings are consistent with our hypothesis that the perceptual, sensory, thought, and feeling elements that had been activated in those conditions should facilitate schema activation.

An important assumption regarding this issue is that the information recollected in the emotional specification condition must contain a generic meaning to activate a schema. Indeed, as explained in the introduction, emotional schemata are generic structures integrating prototypical elements abstracted from various emotional experiences. Thus, if the emotional specification condition has led to schema activation, this suggests that the information detailed had a generic meaning. It is plausible that the memory details described in this condition, even if they were reported in the context of a particular situation, have been experienced in many other instances of that emotion. For example, some details of a specific worry experienced before an important job interview (e.g., tight throat, heart racing) can be similar to aspects of other repeated worries in other circumstances, such as waiting for an oral exam.

An interpretation of the results of Study 1 is that the general and the emotional specification conditions would have led to greater emotion intensity because both have induced the recollection of

Table 5
*Means (and Standard Deviations) of Ratings of Self-Reported Rumination, Avoidance, and Vividness as a Function of Valence and Experimental Condition in Study 2*

| | Rumination | | Avoidance | | Vividness | |
|---|---|---|---|---|---|---|
| Condition | Positive AM | Negative AM | Positive AM | Negative AM | Positive AM | Negative AM |
| Contextual specification | 4.64 (1.99) | 4.94 (1.94) | 1.76 (1.36) | 4.41 (2.23) | 4.63 (2.12) | 4.96 (2.03) |
| Control | 4.90 (1.65) | 4.59 (1.78) | 1.36 (0.78) | 4.78 (2.58) | 5.74 (1.39) | 5.85 (1.86) |
| General | 4.65 (1.62) | 4.60 (1.82) | 1.51 (0.88) | 4.38 (2.24) | 4.96 (2.13) | 5.87 (1.92) |

*Note*. AM = Autobiographical memories.

generic information, which is associated with, and thus more likely to activate, the emotional schema. In contrast, the specification of spatiotemporal details of an event, as they are unique to the specific experience considered, should not be related to the schema and thus would not facilitate its activation. To explore this hypothesis, we conducted a third experiment in which, during the recollection of a specific autobiographical memory, participants were asked to describe the unique versus prototypical features of that event. It was predicted that the specification of the prototypical features of a situation, because they are schema relevant, should lead to more emotional feelings intensity than the recollection of unique features of the same event.

## Study 3

Using the same general procedure as Studies 1 and 2, we asked participants to recollect aloud personal emotional memories in response to cue words. In contrast to the previous studies, this time all participants had to recollect specific memories. In addition, in the two experimental conditions, participants were asked to retrieve strictly the same kind of information (e.g., thoughts, feelings, reactions). The uniqueness versus prototypical status of the memory elements reported was manipulated between participants: In a specific processing of prototypical information condition (prototypic condition), participants were constrained to recall the elements of the target event that had been experienced several times on other occasions. In other words, they had to extract from a specific situation elements that had been repeatedly encountered in other situations. In the "specific processing of unique information" condition (unique condition), the memory elements reported were those conferring to a situation its specificity and uniqueness. Thus, participants were invited to provide memory details that were unique to the target event and that had not been experienced on other instances. Finally, a control no-processing condition replicated the control condition of Study 2. It was predicted that emotion would be less intense in the unique condition than in the two other conditions.

### *Method*

#### *Participants*

A total of 92 undergraduate university students (78 women, 14 men) took part in the experiment for course credit. They were randomly assigned to the unique ($n = 30$), prototypic ($n = 30$), or control conditions ($n = 32$). Their ages ranged from 17 to 39 years ($M = 18.71$, $SD = 2.36$). There were no differences in terms of age, $F(2, 91) = 1.61$, *ns*; or gender, $\phi$ (90) = .47, *ns*, among conditions.

#### *Procedure*

The general outline of the procedure of Study 3 was similar to that followed in Study 2, except that in all conditions, participants were asked to retrieve specific autobiographical memories, and the instructions during recollection were different.

The first session, comprising the completion of the TeMA, the STAI, and the BDI, was similar to Studies 1 and 2. In the experimental task, after 1 min of relaxation, participants completed the first self-report measure of emotional intensity (Time 1, baseline). Then, in all conditions, participants were asked to retrieve a specific autobiographical memory in response to an emotional cue word and to describe it aloud for at least 1 min. All verbatim responses were recorded, and participants who recollected general memories instead of specific memories were excluded from the data (proportion of such mistakes = 4.16%). For both processing conditions, after retrieval, participants listened to a series of questions to which they had to respond orally. In the unique condition, participants had to think about what made that event distinct from other events. Questions focused on what feelings, thoughts, images, bodily responses, and reactions were particular to that situation, defining it in its uniqueness (e.g., "What kind of thoughts did you have in that specific occasion and that conferred to that situation its particularity? Did you have in that specific occasion particular reactions that happened only in this situation? Can you describe the specific atmosphere that makes that situation unique?"). In the prototypic condition, participants were invited to think about the elements that had been already experienced on other occasions. Questions also focused on feelings, thoughts, images, bodily responses, and reactions associated with that situation but that had been encountered repeatedly (e.g., "What kind of thoughts did you have in this situation that you already had on other occasions? Did you have some reactions in that situation that you already had on other occasions? Is the atmosphere of that situation reminding you of other occasions? Can you describe this atmosphere?"). In the control no-processing condition, the instructions were identical to those used in Study 2. Participants from the control condition retrieved many more specific memories ($M = 3.47$, $SD = 0.76$) than general memories ($M = 0.44$, $SD = 0.72$) and omissions ($M = 0.09$, $SD = 0.30$). Among those participants, a majority recollected only specific memories (59%), whereas the others retrieved mixed types of memories, including specific and general (41%).

The mean time for the whole task was 4 min 8 s and did not differ significantly among conditions, $F(2, 91) = 0.74$, *ns*. After the task,

participants completed the self-report emotional intensity scale (Time 2); the VAMS; and the scales measuring the level of avoidance, rumination, and vividness associated with their memory. This procedure was repeated four times with the same cues as those used in Studies 1 and 2. Participants were then thanked and debriefed.

## Results

### Group Differences

There were no differences among conditions regarding the number of specific memories retrieved on the TeMA, $F(2, 91) = 1.20$, *ns*. Also, no differences were found among conditions for the BDI, $F(2, 91) = 0.96$, *ns*; or for the STAI, for state anxiety, $F(2, 92) = 0.46$, *ns*.

### Manipulation Check

Consistent with the successful induction of emotional feelings during the retrieval task, an ANOVA (with time as the within-participant variable) revealed a significant main effect of time (Time 1: $M = 3.91$, $SD = 1.92$; Time 2: $M = 6.03$, $SD = 1.73$; Time 3: $M = 6.84$, $SD = 1.53$; Time 4: $M = 6.16$, $SD = 1.72$; Time 5: $M = 5.98$, $SD = 2.12$) on the ratings of emotional intensity, $F(4, 91) = 46.59$, $p < .001$, $\eta^2 = .36$. Contrasts showed that baseline emotional intensity at Time 1 was significantly lower (at $p < .001$) than for all other emotional intensity measures.

### Effect of the Experimental Condition on Emotional Intensity

A mixed-design 3 (condition) × 2 (positive vs. negative memories) ANOVA computed on the emotional intensity scores showed a main effect of condition, $F(2, 89) = 11.98$, $p < .001$, $\eta^2 = .22$. A significant effect of valence was also found, $F(1, 89) = 4.63$, $p < .05$, $\eta^2 = .05$, indicating that participants judged the negative memories to be more emotionally intense than the positive memories. However, the Valence × Condition interaction was not significant, $F(2, 89) = 2.50$, *ns*. Follow-up analyses showed that participants from the unique condition reported less emotional intensity than participants from the prototypic condition, $t(58) = -4.13$, $p < .001$; and from the control no-processing condition, $t(60) = -2.76$, $p < .01$. No significant differences were found between the prototypic and the control conditions, $t(60) = 1.44$, *ns*. This pattern of results is illustrated in Table 6.

### Effect of the Experimental Condition on the VAMS

A series of 3 (condition) × 2 (valence) ANOVAs computed on participants' self-ratings of the VAMS showed significant effects of valence for all VAMS measures (all $ps < .005$), except for the emotion arousal item ($p = .1$). As expected, the recollection of positive memories induced positive emotions, whereas the retrieval of negative memories activated negative emotions.

The effects of the experimental condition were significant for the items "anxious," $F(2, 89) = 6.57$, $p < .005$, $\eta^2 = .14$; "in a negative mood," $F(2, 89) = 3.20$, $p < .05$, $\eta^2 = .08$; and "emotionally aroused," $F(2, 89) = 4.42$, $p < .01$, $\eta^2 = .09$. As reported in Table 7, participants from the unique condition were less anxious, $t(58) = -3.74$, $p < .001$; and less emotionally aroused, $t(58) = -4.54$, $p < .001$; than participants from the prototypic condition, $t(60) = -3.03$, $p < .005$; and from the control condition, $t(58) = -4.14$, $p < .001$. Finally, participants from the control condition scored higher on the negative mood item than those from the prototypic condition, $t(60) = -2.51$, $p < .05$. No other differences were significant.

### Effect of the Experimental Condition on Rumination, Avoidance, and Vividness

A mixed-design 3 (condition) × 2 (valence) ANOVA computed on the self-rated rumination scores showed no effect of valence, $F(1, 86) = 2.50$, *ns*; or condition, $F(2, 86) = 1.95$, *ns*; nor was there a significant interaction, $F(2, 86) = 2.19$, *ns*. The 3 (condition) × 2 (valence) ANOVA computed on avoidance ratings yielded a significant effect of valence, $F(1, 86) = 60.68$, $p < .001$, $\eta^2 = .44$, with negative memories being much more avoided than positive ones. There was no significant effect of condition, $F(2, 86) = 0.97$, *ns*; nor was there a significant interaction, $F(2, 86) = 0.27$, *ns*.

A 3 (condition) × 2 (valence) ANOVA on self-rated vividness scores showed that participants judged their negative memories to be more vivid than their positive memories, $F(1, 83) = 16.30$, $p < .001$, $\eta^2 = .16$. There was also a significant main effect of condition, $F(2, 83) = 48.65$, $p < .001$, $\eta^2 = .54$. However, the Valence × Condition interaction was not significant, $F(2, 83) = 2.70$, *ns*. Follow-up analyses showed that memories were scored as less vivid in the unique thinking condition than in the prototypical thinking, $t(58) = -4.54$, $p < .001$; and control conditions, $t(56) = -6.97$, $p < .001$. In addition, participants judged their memories as more vivid in the prototypical thinking condition than in the control condition, $t(55) = 2.65$, $p < .05$. This pattern of results is illustrated in Table 8. ANCOVAS were thus computed on the emotional intensity ratings, with the vividness score as a covariate,

Table 6
*Means (and Standard Deviations) of the Emotional Intensity Ratings as a Function of Valence and Experimental Condition in Study 3*

| Autobiographical memories | Unique condition | Control condition | Prototypic condition |
|---|---|---|---|
| Positive | 5.43 (1.53) | 6.36 (1.18) | 6.55 (1.39) |
| Negative | 5.52 (1.05) | 6.44 (1.65) | 7.39 (1.32) |

Table 7
*Means (and Standard Deviations) of the Ratings on the Visual Analogue Mood Scales as a Function of Experimental Condition in Study 3*

| Mood | Unique condition | Control condition | Prototypic condition |
|---|---|---|---|
| Happy | 4.94 (1.59) | 5.17 (1.36) | 5.03 (1.56) |
| Sad | 3.59 (1.66) | 3.38 (1.40) | 3.20 (1.45) |
| Anxious | 2.84 (1.39) | 4.08 (1.97) | 4.15 (3.27) |
| Angry | 2.28 (1.03) | 2.63 (1.12) | 2.14 (1.04) |
| Emotionally aroused | 3.12 (1.15) | 4.47 (1.33) | 4.96 (1.22) |
| In a positive mood | 5.53 (1.86) | 5.63 (1.44) | 5.48 (1.73) |
| In a negative mood | 2.14 (1.08) | 2.72 (1.13) | 1.90 (0.98) |

within each valence condition. The introduction of this covariate did not modify the pattern of the results.

### *Discussion*

The pattern of results of Study 3 is congruent with the hypothesis that recollecting specific unique information during the description of a memory reduces emotional intensity. Indeed, a reduction of emotionality was observed when participants were instructed to focus on the memory elements that make an event unique but not when they had to focus on prototypical and generic elements. Another finding supporting this claim is that participants from the unique condition reported less anxiety and emotional arousal on the VAMS than in the other conditions. Finally, memories described in their uniqueness were judged to be less vivid than in the other conditions. Considering previous findings of a strong relationship between arousal and vividness (e.g., Bywaters, Andrade, & Turpin, 2004), this observation supports the notion that the recall of unique memory details decreases emotionality.

Replicating the findings of Study 2, we found that participants' tendency to think back about their memories (rumination) or to try to suppress them (avoidance) did not differ among conditions. This suggests that, in these studies, the reduction of emotionality during retrieval cannot be explained by a decrease in rumination and/or avoidance. However, it is possible that simply asking people to rate the extent to which they were still thinking about the event is not sufficient to tap the processes involved in rumination. In addition, recent data suggest that there are distinct types of rumination, some adaptative and others maladaptative (e.g., Moberly & Watkins, 2006; Watkins & Moulds, 2005). It is interesting that, as for autobiographical memory, it seems that the relationship between rumination and emotional vulnerability is determined by qualitative aspects (i.e., *how* one thinks about an event) rather than quantitative aspects (i.e., *how often* one thinks about an event). Future studies should evaluate the possible mediating role of rumination in the relation between autobiographical memory specificity and emotion regulation by assessing different types of rumination.

Results also show that emotional intensity differed significantly between the unique and the control conditions but not between the control and the prototypic conditions. These findings suggest once again that emotional arousal is not boosted when processing generic information but actively reduced when specifying unique information during memory construction.

Both experimental conditions (unique and prototypic) were similar in the type of memory (specific) and of memory details (thoughts, feelings, reactions, etc.) requested. Consequently, we can assume that, as predicted, it is the generic versus unique nature of the information activated during the description of a memory that is responsible for the effects observed in emotional feelings intensity. Consistent with our rationale, focusing on elements that are unique to a specific situation should not activate generic structures such as emotional schemata, explaining the effects observed.

## General Discussion

In the present studies, we investigated whether, during autobiographical memory recollection, focusing on memory elements that have a generic content leads to greater intensity of emotions than focusing on unique memory details that confer to a situation its distinctiveness. The data support this prediction. Studies 1 and 2 have shown that the intentional access to general categoric memories or to generic aspects of a specific event favor the generation of an emotional state. In contrast, the voluntary activation of unique episodic information focusing on the singularity of an event decreases emotional intensity. In those experiments, the uniqueness of the past events reported was prompted with requests to describe the situational aspects of an event, such as its spatiotemporal elements. Those spatiotemporal facets are usually considered the characteristics of the uniqueness of a situation (e.g., Tulving, 1983). However, in these studies, the spatiotemporal and unique aspects were confounded.

In Study 3, we experimentally manipulated the distinctiveness of the memory elements recalled, independently of the kind of information activated, by requesting participants to focus on singular elements or on generic elements of a past emotional event. Results have shown that it is specifically the focus on what makes an event unique that reduces emotional intensity. Specifying generic details does not lead to such a reduction. This effect has been observed for the retrieval of both negative and positive events. Despite their methodological variations, the three present studies are clearly consistent with the same basic finding: The determining factor in emotion generation during memory retrieval is the generic versus the unique nature of the information activated. This finding is consistent with the central assumption underlying this article that, during retrieval, the expression of emotion is constrained by the generic structure of emotional schemata.

One may argue that a limitation of the present studies is their dependence on self-report measures of mood, making them vulnerable to experimental demand. Although demand effects can never be completely ruled out, it is implausible that the effects observed here are due to experimental demand, because our predictions are counterintuitive. Indeed, Philippot et al. (2006) have

Table 8
*Means (and Standard Deviations) of Self-Reported Rumination, Avoidance, and Vividness Ratings as a Function of Valence and Experimental Condition in Study 3*

| | Rumination | | Avoidance | | Vividness | |
|---|---|---|---|---|---|---|
| Condition | Positive AM | Negative AM | Positive AM | Negative AM | Positive AM | Negative AM |
| Unique | 4.26 (1.95) | 5.25 (1.63) | 2.35 (1.07) | 4.16 (1.92) | 4.27 (0.76) | 4.93 (0.70) |
| Control | 5.72 (1.43) | 5.32 (1.76) | 1.63 (1.33) | 4.07 (1.47) | 6.38 (1.38) | 6.52 (1.65) |
| Prototypic | 4.75 (1.84) | 5.27 (1.80) | 1.99 (1.02) | 4.21 (1.13) | 6.82 (1.11) | 7.77 (1.54) |

*Note.* AM = Autobiographical memories.

demonstrated in two studies that people hold a naïve theory that specifying emotional experiences arouses acute feelings, whereas staying at a general level of description reduces its emotional effect. Consequently, it seems unlikely that our participants would have responded following a hypothesis that is opposite of their naïve theory.

One could also argue that the administration of the STAI and BDI in the first session, thus 2 weeks before the experimental session, is problematic. Given the delay, the possibility that state differences existed between groups at the time of completion of the experimental tasks cannot be ruled out. However, it seems implausible that such differences would be observed in three consecutive studies conducted with different (healthy) participants. In addition, in all three studies, the participants were randomly allocated to one of the three experimental conditions. We believe that the consistent effects observed are not due to differences between groups in depressive mood or anxiety.

As reviewed earlier, the literature proposes two main theoretical perspectives regarding how the process of autobiographical memory retrieval affects the generation and regulation of emotion. The first perspective states that emotional intensity during retrieval is a function of the mode of processing activated. In agreement with this "mode of processing" approach, several studies have found a decrease in emotional intensity when a specific mode was activated (Philippot et al., 2003; Raes et al., 2006; Schaefer et al., 2003). The other rationale posits that emotional arousal during recollection depends on the nature of the information processed. Consistent with this "content of information" approach, previous studies have observed that more intense emotional states at retrieval were associated with the recollection of sensory, perceptual, and semantic memory details but not with the retrieval of spatial and temporal information (Schaefer & Philippot, 2005) or with the focus on emotional responses rather than on characteristics of the situation (Lang et al., 1970).

The pattern of the present results supports the notion that, far from being exclusive from each other, both approaches need to be integrated to understand the relationship between emotional intensity and autobiographical recollection. Indeed, results of these three studies have demonstrated that a specific mode of processing cannot solely account for a decrease in emotionality. The process of specification has to focus on contextual schema-irrelevant information to prevent the activation of an emotional schema that would result in emotional activation. In addition, the results of Study 3 suggest that the determining factor is not the mere content of the information activated during specification but rather the uniqueness of that information, the very fact that this information is not associated with an emotional schema which, by definition, consists of generic information. Because unique information can only be recollected when a specific mode of processing is activated, emotion regulation during autobiographical memory processing is best explained by an integration of the "content information" approach (e.g., Foa & McNally, 1996; Lang et al., 1970; Schaefer & Philippot, 2005) and the "mode of processing" approach (e.g., Borkovec et al., 1998; Philippot et al., 2004; Watkins & Moulds, 2005).

This theoretical proposal is congruent with Conway and Pleydell-Pearce's (2000) model of autobiographical memory, which postulates two modes of accessing autobiographical memories. An automatic mode, labeled *direct retrieval*, occurs when a representation from the event-specific level of the autobiographical knowledge base is automatically activated by a cue and linked to the working-self goals of the individual. This direct retrieval is almost instantaneous (less than 3 s) and requires few cognitive resources. As the salient event-specific elements often have a strong link to emotional schemata, this type of recall frequently triggers emotional arousal, resulting in specific emotional memories. Nevertheless, most of those directly retrieved memories do not describe the whole episode but contain some very specific and vivid details. The intrusive recollection of flashback in posttraumatic stress disorder constitutes an extreme form of directly retrieved specific vivid memories (Brewin, 2001). According to our main hypothesis, if the recollection of direct specific memories reinstates vivid emotion, it is because they contain generic information susceptible to activate connected schema. However, this assumption remains to be directly tested empirically in future studies.

The second mode of retrieval, labeled *generative retrieval*, refers to the volitional construction of a memory. This mode of access was the one at work in the three present studies, because participants were explicitly and voluntarily engaged in an effortful process of retrieval. According to Conway (1996), this generative mode of retrieval is a top-down search process in which an intermediate description is first recollected. At this early stage, event records are general scripts summarizing the knowledge about a category of similar experiences. Those general representations are regarded as categoric memories referring to repeated occasions (e.g., "my tennis lessons"). The similarity between this type of generic information and the content of a schema is striking. Thus, cues recollected at this level may easily activate an emotional schema. This theoretical rationale would explain why emotional intensity was elevated in the general condition (Studies 1 and 2).

In Conway and Pleydell-Pearce's (2000) model, after accessing general representations, if sufficient executive resources are available, generative processes are utilized to help them pursue their search until a specific pattern of activation emerges from the autobiographical knowledge base. At this lowest stage of the hierarchy, memories refer to specific occasions. Emotional arousal would then depend on the type of cue activated in the episodic buffer during the process of retrieval. One can assume that the search for specific past events often implies the activation of episodic elements such as spatiotemporal information that would facilitate the selection of one particular occasion over others (Tulving, 1983). Indeed, memory details referring to when or where an event happened would be precious elements to reconstruct the puzzle and succeed in the search. In that case, the focus on the episodic features that are unique to a given emotional situation would not lead to an emotional activation, because such information is not related to a schema. In contrast, if the search primes content pertaining to the emotional response, the generic nature of those memory details is very likely to activate the associated schema, leading to an increase in emotionality. Specifying generic information during retrieval triggers emotions, but specifying unique information does not. This observation points to the need when studying autobiographical memory to distinguish between the specification of a memory in an episodic sense (i.e., detailing information about the specific time and place at which an event took place) and specification in a schematic sense (i.e., detailing information pertaining to the core emotional features of an event). Those two ways of understanding specificity are often

confounded in the literature, although they lead to reverse emotional consequences.

As explained in the introduction, the strategic inhibition hypothesis (Philippot et al., 2004) states that the specific processing mode inhibits the activation of emotional arousal to prevent a disruption of the interference-sensitive executive processes implied in memory search. Other recent theories in the autobiographical memory literature have pointed to the need for inhibiting irrelevant information to protect against interference during the construction of a specific memory (e.g., the Car-FA-X model; Williams, 2006). Various studies, using different methodologies, have consistently found that voluntarily specifying emotional information result in a decrease in emotional intensity (Philippot et al., 2003, 2006; Raes et al., 2006; Schaefer et al., 2003); however, little is known about the mechanisms underlying this inhibition. To our knowledge, these are the first studies that experimentally address this issue and provide preliminary evidence that emotional feelings are inhibited because of the type of information activated under certain modes of specific processing. More precisely, the recollection of specific autobiographical memories often occurs without reinstating the emotions originally experienced, because most of the attentional resources engaged in the process of specification are concentrated on unique episodic information that is not susceptible to feedback in an emotional schema.

According to the rationale developed earlier, in depressed patients, as in other clinical populations suffering from emotional disorders (for a review, see Williams et al., 2007), overgeneral memory may contribute to emotional vulnerability. Depressed patients typically access intermediate generic representations of the past but stop their search prematurely to activate specific experiences. Consistent with the finding that the recall of generic information often elicits an emotional response, when depressed patients attempt to recollect emotional autobiographical memories, they may be confronted with vivid emotion more often than the normal population. With time, those patients may learn that recollecting past events—upsetting events, in particular—is extremely painful without having the opportunity to experience that it can be tolerable and even useful for interpersonal problem solving when more specific information is accessed (e.g., Goddard et al., 1996).

Thus, the present findings suggest that training patients to specify personal past experiences and encouraging them to note the distinctiveness of those episodes may have potential clinical applicability in reducing emotional vulnerability. However, we conducted the present studies with normal participants. In future research, we will investigate the implication of these findings for the processing of emotional information in clinical contexts, such as in an intervention based on imaginal exposure. In particular, our data suggest that the intensity of the emotion induced during imaginal exposure may be modulated by the type of information on which the client is instructed to focus voluntarily. This offers to the therapist a means for adapting the emotional distress inducted by such exposure to a sustainable level for the client and thus maximize the development of self-efficacy and minimize the possibility of drop-out. Still, the present approach that is based on favoring a type of attentional focus, on a certain kind of information, is congruent with recent developments in experimental psychopathology, such as recent attentional retraining interventions (Yiend & MacIntosh, 2004).

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## Appendix

### Instructions for the Specific and General Processing Conditions

The instructions for the two specific processing conditions were as follows:

I will ask you to retrieve a specific event that you have experienced in the past. I will say the nature of this event more precisely in a second. I would like you to describe what happened during this situation. I would like you to describe each aspect of your memory as it comes to your mind. You will try to relive this event as if you are still living it. I will also ask you to describe the event for at least one minute. In order to help you, after your description, I will ask you a series of questions. Please try to answer all of these questions if possible. Now, I would like you to recall as quickly as possible an event that you have personally experienced and during which you have felt [cue word].

The instructions for the general processing condition were as follows:

I will ask you to retrieve a type of event that you have experienced in the past. I will say the nature of this type of event more precisely in a second. I would like you to describe what happened generally during this situation. I would like you to describe each aspect that comes spontaneously to your mind in relation with this type of event. You will try to relive this type of event as if you are still living it. I will also ask you to describe this type of event for at least one minute. In order to help you, after your description, I will ask you a series of questions. Please try to answer all of these questions if possible. Now, I would like you to recall as quickly as possible the type of event that you have personally experienced and during which you have felt [cue word].

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