

# Is the negative always that bad? Or how emotion regulation and integration of negative memories can positively affect well-being

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## Abstract

**Objective:** The purpose of this study was to determine whether coherent integration of negative memories into the self could positively predict well-being over time, and whether certain emotion regulation strategies could facilitate this coherent integration. In turn, coherent integration of negative memories was expected to further facilitate adaptive emotion regulation strategies over time.

**Method:** A total of 303 participants took part in this longitudinal study. At Phase 1, they completed measures of emotion regulation and well-being. Three months later, they described the memory of the most negative event they experienced since Phase 1, and completed measures assessing its integration. One month later, participants completed the well-being measures again, and another month later, their emotion regulation was reassessed.

**Results:** Adaptive emotion regulation predicted adaptive memory integration, which in turn led to increases in well-being and adaptive emotion regulation. Contrariwise, the incapacity to adaptively regulate emotions predicted poor memory integration, which in turn led to decreases in well-being.

**Conclusion:** The way people regulate their negative emotions acts as an individual difference influencing how negative memories are integrated into the self, which can in return alter well-being and emotion regulation capacity over time.

## KEYWORDS

emotion regulation, integration process, negative memories, well-being

## 1 | INTRODUCTION

Difficult negative events are an integral part of every individual's existence. Since these negative events can be encoded in our memory system, the memory of a negative event can be remembered for a very long time. Past research has shown that negative memories can greatly influence people's well-being. Indeed, when they are recalled, memories lead to a reexperience of the experiential components characterizing them (i.e., emotional charge, motivational properties, Conway & Pleydell-Pearce, 2000), and this reexperience impacts situational well-being. For instance, the conscious

recall of a negative memory can lead to an immediate decrease in mood and well-being (Houle & Philippe, 2017; Philippe, Koestner, Beaulieu-Pelletier, Lecours, & Lekes, 2012). Moreover, memories can influence people's sense of well-being over time (Houle & Philippe, 2017; Milyavskaya, Philippe, & Koestner, 2013; Philippe et al., 2012). In other words, a single negative memory can continue to constantly influence and decrease well-being months after the event of this memory has occurred (Philippe & Bernard-Desrosiers, 2017). However, some individuals have experienced a handful number of negative events in their lives but they still, nevertheless, display a high level of well-being (e.g., Fredrickson,

Tugade, Waugh, & Larkin, 2003). Would it thus be possible for negative memories to also positively influence people's sense of well-being? What are the individual differences that enable people to gain well-being from their negative memories, and how?

The present study is aimed at answering these questions by looking at the way people integrate their negative memories into their self, as well as the influence of emotion regulation on this integration process. More precisely, the purpose of the study was to determine whether the manner, in which memories of past negative events are integrated into people's self-concepts could in turn predict changes in well-being over time. Additionally, we sought to establish whether emotion regulation could represent an individual difference influencing the integration of negative memories, and whether this integration could also further influence emotion regulation in return. This study will thus ascertain how the integration of memories of important negative events is the central tenant of an important feedback loop in the processing of negative emotional situations, which can fuel well-being and build more adaptive emotion regulation strategies. It will also underscore how certain emotion regulation strategies can sustain memory integration, a key process at the heart of the construction of the self.

## 1.1 | The integration of memories into the self and well-being

According to many authors, memories can play a fundamental role in the construction of people's self and identity (e.g., Conway, Singer, & Tagini, 2004). Memory integration is the process that occurs when memories are integrated into the person's self in a coherent way and this process can facilitate well-being. Indeed, the self-memory system (Conway & Pleydell-Pearce, 2000) specifies that life events are initially encoded as episodic memories and can be integrated into the autobiographical knowledge base and the conceptual self when they link with other existing mental representations at these levels. The impossibility to link emotional episodic memories to the autobiographical knowledge base, because of conflicting information for instance, can lead to memory intrusions (Conway, Meares, & Standart, 2004), that is, involuntary recalls of details of a negative past event (Brewin, 1998). Self-determination theory (SDT: Ryan & Deci, 2017) further specifies that memory integration occurs when individuals start by acknowledging and accepting aspects of their past, present, and future. It then becomes possible for them to bring these aspects into harmony within their identity to form a coherent sense of self (Weinstein, Deci, & Ryan, 2011; Weinstein, Przybylski, & Ryan, 2013). The literature thus suggests that individuals need to coherently integrate the memories of their past experiences to build a coherent sense

of self and thereby gain well-being. More specifically, SDT proposes that acceptance of a past experience is the first step in this process and the self-memory system underscores that memory intrusions are a marker of poor memory integration.

Recent research by Kaap-Deeder and colleagues (2016) empirically showed that acceptance and intrusion could be distinguished, as the absence of poor integration is not a guaranty of the presence of adaptive integration. Corroborating Weinstein and colleagues (2011), they showed that acceptance of a negative past event reflects an adaptive integration of negative memories. They also showed that intrusions could serve as an independent indicator of poor integration, as highlighted by other research (Ehlers & Clark, 2000; Michael, Ehlers, Halligan, & Clark, 2005).

However, not all past experiences are equally easy to integrate. On the one hand, it is well known that memories of positive events lead to greater mood and well-being when they are recalled and over time (Houle & Philippe, 2017; Philippe & Bernard-Desrosiers, 2017; Philippe et al., 2012), and people are generally willing to acknowledge and accept positive memories and integrate them into their self, as they are not usually self-threatening (Weinstein et al., 2011). Negative memories, on the other hand, are typically more difficult to integrate than positive memories because they can be particularly painful to remember (Gillihan, Kessler, & Farah, 2007; Philippe et al., 2012) and can reflect aspects of people's identity with which they are not happy about and that they do not necessarily want to accept (Pals, 2006; Weinstein et al., 2011). However, not only negative events are inevitable and constitute an integral part of human life, but the memories of these negative events are also often more likely than positive ones to provide people with a sense of meaning and to lead to greater psychological growth (McLean & Thorne, 2003; Pals, 2006). For instance, memories of past conflicts have been found to be associated with gaining insights about one's life, as well as learning important lessons (McLean & Thorne, 2003). In this sense, it seems crucial to better understand how negative memories, through their coherent integration into people's self, can promote well-being and growth, rather than only lead to the adverse outcomes they are more usually associated with.

Research has indeed shown that integration of negative memories was associated with well-being (Weinstein et al., 2011), life satisfaction, maturity, wisdom, and ego-resiliency (Pals, 2006). Unfortunately, most of the existing studies on the integration of negative memories have only investigated memories of distant past events, and the designs used were mostly cross-sectional or assessed well-being at only one time point, thus, limiting our understanding of the direction of the effect. In response to this, several memory researchers have underscored the importance of conducting longitudinal studies to disentangle how this memory integration process can lead to changes in people's well-being over time (McAdams

& McLean, 2013; Pals & McAdams, 2011). Accordingly, we propose to longitudinally investigate whether adaptive versus poor integration of negative memories can indeed predict changes in well-being. Moreover, we also sought to determine what individual differences could influence this adaptive versus poor negative memory integration.

## 1.2 | Regulation of negative emotions and the integration of negative memories

While the literature seems clear on the idea that adequate integration of negative memories should facilitate well-being over time, the factors influencing memory integration are not very well known. We suggest that the way people process and regulate their emotions and the negative events they experience is likely to alter the way they will encode these events in memory and thereby affect how they will integrate these memories into their self.

Recent research in the field of SDT (Ryan & Deci, 2017) has suggested that regulation of negative emotions can influence how people process and experience negative and self-threatening experiences (Roth et al., 2014; Ryan et al., 2006). Furthermore, several SDT authors have proposed that the capacity to regulate, process, and make sense of emotional experiences, particularly the negative ones, is central to well-being (e.g., Ryan & Deci, 2001). They insist, like many other emotion theorists (e.g., Ekman, 1992; Gross, 2015), that negative emotions are essential informational inputs, which can guide people's actions, but also contribute to psychological growth (Ryan & Deci, 2017). Accordingly, negative emotions need to be acknowledged, taken into account, and adaptively regulated, rather than denied or suppressed. The emotion regulation model proposed by SDT focuses on three different styles of emotion regulation: integrative regulation, dysregulation, and controlling regulation (Roth et al., 2014).

Integrative regulation refers to a more adaptive emotion regulation style. It is characterized by Openness, interest, and tolerance toward new emotional material or situation, even if they are self-threatening (Roth et al., 2014; Ryan et al., 2006). Thus, people who present an integrative regulation style are more able to experience negative emotions and events without being defensive, and should in turn adaptively reflect on their negative experiences and use the memories of those experiences to facilitate their psychological well-being and growth over time. Past studies have shown that integrative emotion regulation was related to more volitional and less defensive functioning when participants were instructed to reflect and write about an induced self-threatening situation (Roth et al., 2014).

Dysregulation is characterized by a lack of capacity to adequately and effectively regulate negative emotions, and

by an emotional overflow when facing new negative experiences. People who present this style can be unable to function or perform as usual when they are confronted by emotional situations (Roth et al., 2014). As negative experiences are highly self-threatening for them, they should be less capable to reflect on them, and the recall of memories of such experiences should be each time highly emotionally disturbing, which should lead to decreases in well-being overtime. Dysregulation has been found to be related to defensiveness when participants were instructed to reflect on an induced self-threatening situation (Roth et al., 2014).

Controlling regulation is characterized by a rigid intolerance toward negative emotions and situations, and by a strong desire to hide, ignore, and suppress any negative emotions that could be experienced (Roth et al., 2014). Accordingly, individuals with a controlling regulation style should not be able to acknowledge and elaborate past negative events. Empirically, controlling regulation has also been found to be related to defensiveness and emotional suppression following an induced self-threatening situation (Roth et al., 2014).

We, therefore, argue that the way individuals regulate their negative emotions can influence how they process the negative events they experience, and thus, have an impact on how they will encode, integrate into their memory system, and remember the memories of these past events. More specifically, we propose that the regulation of negative emotions can affect individuals' capacities to adaptively integrate their negative memories into their self.

Researchers have indeed suggested that an adaptive integrative process first requires nondefensiveness toward emotions and emotional material (Roth & Assor, 2010; Weinstein, Przybylski, & Ryan, 2013). Accordingly, integrative emotion regulation, which is a more adaptive regulation style associated with Openness, interest, and acknowledgment of negative experiences, should facilitate the acceptance and the integration of negative memories into the self. Contrariwise, dysregulation, which is characterized by a lack of emotion regulation capacities and emotional overflow, should lead to poor memory integration, notably emotional memory intrusions. Finally, controlling regulation is associated with a desire to suppress and repress negative emotions and with a denial of negative experiences. As such, people with a controlling regulation style should not be able to accept and adaptively integrate their negative memories, as they are not even capable of acknowledging them. However, because they deny and repress negative situations and their emotional charge, these individuals are unlikely to report memory intrusions.

Weinstein and colleagues (2011, 2013) have also suggested the existence of the reverse effect by proposing that the integrative process could positively affect self-regulation and lead to a greater capacity to adaptively regulate emotions. Furthermore, past studies have shown that memories are frequently used as resources to guide people's emotions when

confronted by novel and self-threatening situations (Philippe, Koestner, Lecours, Beaulieu-Pelletier, & Bois, 2011; Philippe, Lecours, & Beaulieu-Pelletier, 2009), and that they can facilitate emotional Openness (Houle, Philippe, Lecours, & Roulez, 2017; Pillemer, 2003). We, therefore, argue that a more coherent and adaptive integration of negative memories should in return facilitate people's capacities to regulate their emotions and predict improvements in emotion regulation over time.

## 2 | THE PRESENT STUDY

The present study had three purposes. First, we sought to determine whether regulation of negative emotions could represent an individual difference impacting adaptive versus poor integration of negative memories. Second, we aimed at verifying whether adaptive versus poor memory integration could in turn predict changes in people's well-being over time. The third purpose was to establish whether adaptive memory integration could ultimately facilitate the adoption of a more adaptive and integrative emotion regulation on the long-term.

To assess changes in well-being and emotion regulation over time, a longitudinal design in four phases was used. At Phase 1, participants completed self-report scales assessing well-being and emotion regulation strategies of negative emotions. Three months later, at Phase 2, they described the memory of the most negative event they had experienced since Phase 1, rated it for valence and significance, and completed measures assessing the integration of this memory. Following Kaap-Deeder, Vansteenkiste, Petegem, Raes, and Soenens (2016), we assessed integration of the past negative event with the two indicators discussed in the Introduction; acceptance and intrusion. One month later, at Phase 3, participants completed again the well-being measures assessed at Phase 1 and, at Phase 4, another month later, they were administered the measure of emotion regulation once more. In the present longitudinal design, emotion regulation and well-being were assessed before the event of the negative memory even occurred: they were thus not influenced by this event. Consequently, the present design could better capture the influence of a specific negative memory integration on changes in well-being and emotion regulation.

### 2.1 | Purpose 1

Determine whether emotion regulation can impact negative memories' integration.

1a Integrative emotion regulation was expected to positively predict acceptance of the negative event memory (an

indicator of adaptive integration). Integrative regulation was also expected to either be unrelated or negatively related to intrusions of the negative event memory (an indicator of poor integration).

1b Dysregulation was hypothesized to positively predict memory intrusions and to either be unrelated or to negatively predict memory acceptance.

1c As controlling regulation is characterized by a desire to suppress and ignore negative emotions and situations, this emotion regulation style was expected to be either not related or negatively related to acceptance, and to be either not related or positively related to intrusions.

### 2.2 | Purpose 2

Verify whether memory integration can predict changes in well-being over time.

2a Memory acceptance was hypothesized to predict an increase in well-being over time.

2b Contrariwise, memory intrusions were expected to predict a decrease in well-being.

### 2.3 | Purpose 3

Assess whether memory integration can in turn alter emotion regulation over time.

3a Memory acceptance was expected to predict an increase in the level of integrative emotion regulation over time.

3b Intrusions were hypothesized to predict an increase in dysregulation over time.

All the above hypotheses were expected to hold while controlling for memory valence and significance. These variables were used to control for potential differences of importance and negativity in participants' reported memories.

## 3 | METHOD

### 3.1 | Participants

A Monte Carlo analysis was performed to determine the required sample size. Given the longitudinal nature of the study and the small effect sizes expected, we judged that a minimum power of .70 was sufficient. Based on past studies on the influence of memories on well-being over time (Philippe & Bernard-Desrosiers, 2017; Philippe et al., 2012), standardized regression coefficients between .15 and .20 were expected for each of the associations we hypothesized. The



stability of the variables assessed at different phases (autoregressive coefficients) was expected to be between .60 and .70 over 4 or 5 months. The analysis unveiled that a sample size of 300 participants would yield power between .70 and .91 to detect significant coefficients between .15 and .20 for all the hypothesized associations. Accordingly, a total of 303 (80% female) community-dwelling participants ( $n = 239$ ) and graduate/undergraduate students ( $n = 64$ ) took part in the study. Their age ranged from 18 to 81 years old ( $M = 35.68$ ,  $SD = 14.51$ ). Given the longitudinal design and the multiple assessments, there was 16% of missing data over the four phases of the study. However, Little's MCAR test was nonsignificant:  $\chi(17) = 11.54$ ,  $p = .82$ . This suggested that the missing data patterns were not dependent of any other variables of the study. Hence, the model was analyzed using maximum likelihood under MCAR as estimation method (Little & Rubin, 2002) with Mplus 7.3.

## 3.2 | Measures: Phase 1

### 3.2.1 | Well-being

Five scales were used to assess well-being. The Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985) measured hedonic well-being (7-point scale, ranging from 1 to 7), a short version of the Psychological Well-Being Scale (PWB; Ryff & Keyes, 1995) measured eudaimonic well-being (7-point scale, ranging from 1 to 7), a short 13-item version of the Beck Depression Inventory (BDI; Beck & Beck, 1972) measured depressive symptoms (4-point scale, ranging from 0 to 3), a short 6-item version of the Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988) measured participants' subjective state of anxiety (4-point scale, ranging from 0 to 3), and the 10-item Symptom Checklist (SCL-10R; Rosen et al., 2000) measured various psychological symptoms (5-point scale, ranging from 0 to 4). All these scales have been previously used together in an index of well-being (e.g., Philippe & Bernard-Desrosiers, 2017; Philippe, Dobbin, Ross, & Houle, 2017). Moreover, a factorial analysis, using Maximum Likelihood, revealed one factor (eigenvalue: 3.38) in the present study data. All scales loaded on a single factor of well-being, with all factor loadings  $>.61$ . Accordingly, the scales were standardized and averaged in a single index of well-being. Alpha was .88 at Phase 1.

### 3.2.2 | Emotion regulation of negative emotions

Emotion regulation of negative emotions was assessed with the scale developed by Roth and colleagues (2009, 2014).

This scale has been used in previous studies and demonstrated adequate evidence of validity and reliability in various samples (Eilott, Assor, & Roth, 2006; Roth, Assor, Niemiec, Ryan, & Deci, 2009, Roth & Assor, 2012; Roth et al., 2014; Roth, Shane, & Kanat-Maymon, 2017). Participants indicated their degree of agreement with 20 items, regarding the way they generally perceive and experience negative emotions. Ratings were made on a 7-point Likert scale (1 = *disagree strongly*; 7 = *agree strongly*). The original scale evaluated the regulation of a specific emotion (e.g., fear). However, as we were interested in a broader emotional range, we slightly adapted the items so they would measure the regulation of negative emotions in general, by replacing the word "fear" with "negative emotions." An integrative emotion regulation subscale was assessed by seven items, and a sample item was "Sometimes, feeling negative emotions helps me to understand important things about myself." A dysregulation subscale was assessed by six items, and a sample item was "I often behave under the influence of my negative emotions, even if I don't want to behave like that." Finally, a controlling regulation subscale was assessed by seven items, and a sample item was "Usually, I ignore my negative emotions." To confirm the structure of this adapted scale, a confirmatory factor analysis was conducted with Robust Maximum Likelihood as estimation method. The model included three latent variables (Integrative regulation, Dysregulation, and Controlling regulation), each comprising six or seven items. The model also estimated six covariances among the measurement errors of the items that were similarly formulated. Fit indices were satisfactory: Satorra-Bentler  $\chi^2 = 344.79$ ,  $df = 161$ ,  $p < .01$ , Comparative Fit Index (CFI) = .93, Root Mean Square Error of Approximation (RMSEA) = .06 [.05; .07], Standardized Root Mean Square Residual (SRMR) = .08. Factor loadings were all significant and ranged from .45 to .87 for integrative regulation, from .49 to .89 for dysregulation, and from .52 to .86 for controlling regulation. Alphas were .88 for integrative regulation, .85 for dysregulation, and .89 for controlling regulation.

## 3.3 | Measures: Phase 2

### 3.3.1 | Negative memory

Instructions were adapted from previous studies on memories (Philippe et al., 2012; Singer & Salovey, 1993). Participants were invited to describe:

*A personal memory of the most negative event that you experienced since this study's first phase (about three months ago), which is significant (important) for you. Describe generally what happened, where it happened, who*

*you were with (if anyone), and how you and other people reacted. What was your role and what were the consequences of your reaction and/or your behavior during this event? Provide enough details so we can understand what happened, like if you had to tell it to someone.*

Participants described their memory in a provided text-box and there was no length limit. A total of 35.30% of the memories described by participants were about major interpersonal conflict (e.g., two former spouses having a major conflict regarding who should have the legal custody of their child), 23.10% were about a substantial stress (e.g., a woman whose husband has been recently sentenced to 2 years of prison, while they were trying to have a child), 14.50% were about one's own physical or psychological illness or the one of a significant other (e.g., a person who received a diagnosis of fibromyalgia), 13.90% were about a significant loss (e.g., unexpected breakup after 10 years of marriage), 8.60% were about an important failure (e.g., a person who performed poorly at a job interview and did not get the job), 2.00% were about a disturbing social event (e.g., a shooting at a mosque located in the person's neighborhood), and finally, 2.30% of the memories described were about more minor unpleasant events (e.g., a person bored by her job).

### 3.3.2 | Negative memory valence

Participants were asked to rate the personal valence of the event they described on a 7-point Likert scale ( $-3 = \textit{very negative}$ ;  $+3 = \textit{very positive}$ ).

### 3.3.3 | Negative memory significance

The significance of the negative event memory was assessed with a single item: "To what extent the negative event you just described is significant (important) for you?", rated on a 5-point Likert scale, ranging from 1 (*Not at all*) to 5 (*Very*).

### 3.3.4 | Negative memory adaptive integration: Acceptance

Four items were used to measure acceptance of the negative event described (Kaaop-Deeder et al., 2016; Weinstein et al., 2011). Ratings were made on a 7-point Likert scale, ranging from 1 (*disagree strongly*) to 7 (*agree strongly*). Sample items were "I accept the experience I had" and "I embrace that this event is a part of my past." Alpha was .83 for acceptance in this study.

### 3.3.5 | Negative memory poor integration: Intrusion

The intrusion subscale of the Impact of event scale (Horowitz, Wilner, & Alvarez, 1979) assessed intrusions related to the negative event. Five items were used and participants rated the extent to which they experienced each difficulty presented, in relation to the negative memory they described. Ratings were made on a 5-point Likert scale, ranging from 1 (*Not at all*) to 5 (*Often*). Sample items were "I thought about it when I didn't mean to" and "Other things kept making me think about it." Alpha was .90.

## 3.4 | Measures: Phase 3

### 3.4.1 | Well-being

The same measures of well-being used at Phase 1 were administered once more to the participants. Alpha was .87 at Phase 3.

## 3.5 | Measures: Phase 4

### 3.5.1 | Emotion regulation of negative emotions

The measure of emotion regulation was completed again in Phase 4. Alphas at Phase 4 were .90 for integrative emotion regulation, .81 for dysregulation, and .92 for controlling regulation.<sup>1</sup>

## 3.6 | Procedure

The community-dwelling participants were randomly selected from a compiled list of people interested to participate in studies in psychology recruited across various public areas on the Island of Montreal (Canada), and were contacted through the email they provided when they subscribed to the list. The graduate/undergraduate students were randomly selected from a list of students from various departments, and were recruited through their university email. All participants were invited to take part in a study of four phases about negative memories and well-being. At Phase 1, participants completed an online questionnaire, in which they responded to diverse measures of well-being, and a measure of emotion regulation. About 3 months later ( $M = 2.70$  months,  $SD = 20.71$  days),<sup>2</sup> they were contacted again and completed an online questionnaire, in which they were asked to describe the memory of the most negative event they experienced since the first

phase of the study. They reported how many weeks had passed since the occurrence of the event of their memory to ensure that all participants followed the instructions and described the memory of an event that occurred after Phase 1. Afterward, they rated this negative memory for valence, significance, acceptance, and intrusion. About a month later, ( $M = 1.30$  months,  $SD = 7.18$  days), at Phase 3, they completed the same well-being measures assessed at Phase 1. Finally, about one more month later ( $M = 1.47$  months,  $SD = 10.10$  days), participants responded to the fourth phase of the study, and filled the emotion regulation measure again.<sup>3</sup> As an incentive, at each phase completed, they were entered into a draw for three prizes of \$100, for a total of four draws of three prizes.

## 4 | RESULTS

Table 1 reports means, standard deviations, and correlational results of all study variables. To determine the impact of emotion regulation on memory integration, and the effect of this memory integration on changes in well-being and emotion regulation over time, a path analysis was conducted. In the model, well-being at Phase 1 was used as an exogenous variable, to control for the initial level of well-being and to model changes in well-being over time. The three emotion regulation styles (integrative regulation, dysregulation, and controlling regulation) were also modeled as exogenous variables. These exogenous variables were modeled to predict acceptance and intrusion of the negative memory, as assessed 3 months later. The valence and the significance of the memory were also included in the model at this level as control variables. Covariances among Phase 2's variables (acceptance, intrusion, memory significance, and valence) were added to the model. Well-being at Phase 3 was modeled to be predicted by acceptance, intrusion, significance, and valence. Finally, the three emotion regulation styles measured at Phase 4 were modeled as endogenous variables and placed at the end of the model. All possible paths were initially estimated in the model, yielding a just-identified model.

Figure 1 shows the final model. To facilitate its comprehension, only significant paths ( $p < .05$ ) were included in the figure, and the covariances among the variables assessed at Phase 2 were also excluded. However, these covariances were all significant at  $p < .01$  (coefficients  $>.37$  and  $<-.15$ ). Regarding our first purpose, which was to determine whether emotion regulation could influence the integration of negative memories, results unveiled that our three hypotheses were generally confirmed. Indeed, integrative emotion regulation at Phase 1 positively predicted acceptance of the negative memory and its significance. Contrariwise, dysregulation at Phase 1 positively predicted memory intrusions,

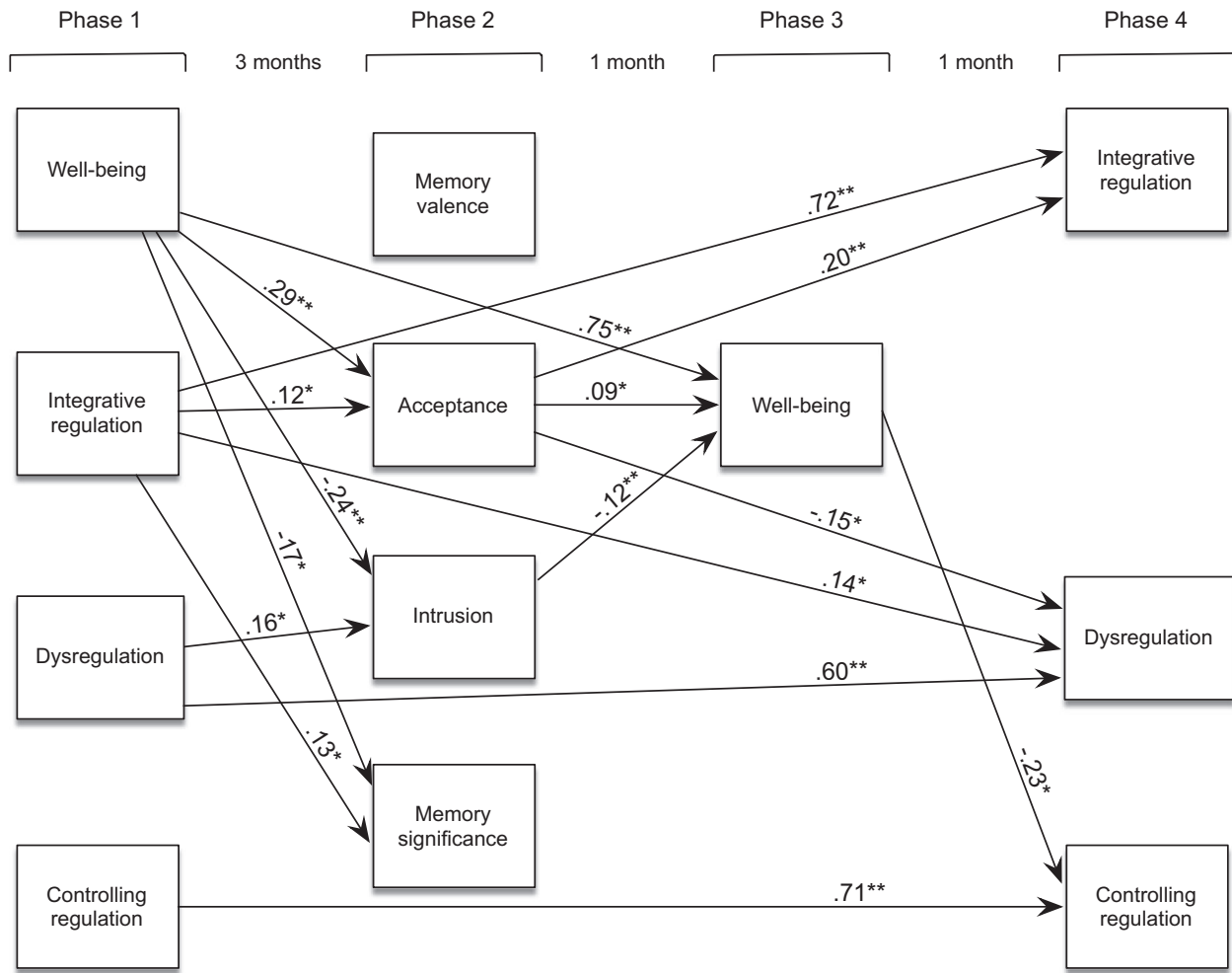
**TABLE 1** Means, standard deviations, and correlations

	<i>M</i>	<i>SD</i>	Range	1	2	3	4	5	6	7	8	9	10	11
Well-being, Phase 1 (1)	.00	.83	Z-score	-										
Integrative regulation, Phase 1 (2)	5.59	.93	1-7	.19**	-									
Dysregulation, Phase 1 (3)	3.91	1.68	1-7	-.54**	-.04	-								
Controlling regulation, Phase 1 (4)	3.53	1.77	1-7	-.21**	-.38**	-.03	-							
Negative memory significance (5)	4.00	1.03	1-5	-.11	.11	.04	-.04	-						
Negative memory valence (6)	-1.92	1.31	-3 to +3	.14*	.09	-.10	-.13*	-.18**	-					
Acceptance (7)	5.04	1.41	1-7	.39**	.21**	-.27**	-.18**	-.16**	.40**	-				
Intrusion (8)	2.70	1.17	1-5	-.32**	-.05	.29**	-.01	.41**	-.33**	-.41**	-			
Well-being, Phase 3 (9)	.00	.81	Z-score	.87**	.23**	-.54**	-.19**	-.13*	.15**	.45**	-.40**	-		
Integrative regulation, Phase 4 (10)	5.70	.93	1-7	.31**	.78**	-.13*	-.31**	.15**	.10	.35**	-.05	.31**	-	
Dysregulation, Phase 4 (11)	3.82	1.50	1-7	-.46**	.06	.72**	-.07	.05	-.11	-.34**	.32**	-.50**	-.07	-
Controlling regulation, Phase 4 (12)	3.41	1.85	1-7	-.19**	-.31**	.01	.73**	.01	-.16**	-.15**	.04	-.22**	-.34**	.00

Note:  $n = 303$ . Range stands for the possible range of the Likert scale used.

\* $p < .05$ ;

\*\* $p < .01$ .



**FIGURE 1** Path analysis displaying the effects of emotion regulation (integrative regulation, dysregulation, and controlling regulation) on negative memory's acceptance, intrusion, valence, and significance, and the effects of acceptance and intrusion on changes in well-being and emotion regulation over time.  $n = 303$ ,  $*p < .05$ ,  $**p < .01$ . Non-significant path coefficients are not shown for the sake of clarity, as well as covariances among memory's acceptance, intrusion, valence. These covariances were all significant at  $p < .01$  (coefficients  $> .37$  and  $< -.15$ )

and controlling regulation was not associated with any indicator of memory integration. Additionally, well-being at Phase 1 was positively related to acceptance and negatively to intrusions and significance. Thus, it appears that emotion regulation actually corresponds to an individual difference impacting the way people integrate their negative memories, since integrative regulation led to more adaptive integration of the negative memory, whereas dysregulation led to poorer memory integration. These associations were also independent of participants' baseline level of well-being at the beginning of the study.

Concerning our second purpose, which was to investigate whether memory integration could predict changes in well-being over time, results revealed that our two hypotheses were supported. Indeed, acceptance of the negative memory positively predicted increases in well-being at Phase 3. Conversely, intrusions predicted decreases in well-being at Phase 3. Well-being at Phase 1 was also positively associated

with well-being at Phase 3. These results were obtained while controlling for the chosen memory's valence and significance. Thus, the way people integrate their negative memories seems to be a key factor influencing their well-being over the following months.

Regarding our third purpose, which was to assess whether memory integration could in turn affect emotion regulation over time, results revealed that acceptance effectively led to an increase in integrative regulation at Phase 4. An unexpected result was that acceptance also predicted decreases in dysregulation at Phase 4. Thus, adaptive memory integration facilitated adaptive emotion regulation over time, not only by increasing integrative regulation, but also by additionally decreasing dysregulation. Integrative regulation at Phase 1 was positively related to integrative regulation at Phase 4, while dysregulation at Phase 1 was positively related to dysregulation at Phase 4. However, a surprising finding was that integrative regulation at Phase 1 led to an increase in



**TABLE 2** Bootstrap estimates and 95% confidence intervals of the indirect effects tested in the model

	Unstandardized estimates	95% confidence intervals	Standardized estimates
Integrative regulation (P1) → Acceptance → WB (P3)	.067	[.005; .192]	.011
Dysregulation (P1) → Intrusion → WB (P3)	−.088	[−.207; −.019]	−.019
Integrative regulation (P1) → Acceptance → Integrative regulation (P4)	.025	[.002; .060]	.025
Integrative regulation (P1) → Acceptance → Dysregulation (P4)	−.024	[−.072; −.001]	−.018

Note: WB = Well-being; P1 = Phase 1; P3 = Phase 3; P4 = Phase 4.

dysregulation at Phase 4 as well. Yet, as shown in Table 1, these two variables were not correlated, and this increase appears to be the product of a suppression effect.<sup>4</sup> Contrary to what we expected, memory intrusions were not related to increases in dysregulation at Phase 4. Acceptance of a negative memory thus appears to be the favored process through which memory integration can facilitate more adaptive emotion regulation over time.

An additional finding was that controlling regulation at Phase 4 was positively predicted by controlling regulation at Phase 1, but was also negatively predicted by well-being at Phase 3. Therefore, higher level of well-being at Phase 3 was associated with a decrease in the use of controlling regulation strategies over time.<sup>5</sup>

To evaluate whether the indirect effects of integrative regulation and dysregulation on well-being at Phase 3 and on emotion regulation at Phase 4 were significant, bootstrapping analyses were performed, using 5,000 resamples. Table 2 presents the results. All 95% confidence intervals excluded the value zero, hence indicating that all the indirect effects tested were significant at  $p < .05$ . More specifically, integrative regulation at Phase 1 indirectly increased well-being at Phase 3, through its effect on memory acceptance. Conversely, dysregulation at Phase 1 indirectly decreased well-being at Phase 3, through its impact on memory intrusions. Moreover, integrative regulation at Phase 1 indirectly increased integrative regulation at Phase 4 and indirectly decreased dysregulation at Phase 4, through its effect on memory acceptance.

## 5 | DISCUSSION

The purpose of the present study was to determine whether negative emotion regulation strategies could influence how people can integrate memories of past negative events into their self, and how this memory integration could in turn predict changes in well-being and emotion regulation over time. Results evinced that participants who presented an integrative emotion regulation style reported more significant negative memories, but also reported higher acceptance of the

negative event they described in their memory. In turn, this memory acceptance led to an increase in participants' well-being over time. Acceptance of the negative memory also predicted an increase in integrative emotion regulation over time, as well as a decrease in dysregulation. Contrariwise, participants with a dysregulation style reported experiencing more intrusions related to their negative memory, and this poorer memory integration led in turn to a decrease in their well-being over time. Finally, controlling regulation was not associated with memory integration, neither adaptive nor maladaptive.

### 5.1 | Emotion regulation as an individual difference influencing memory integration

The present study is one of the first to explore the individual differences influencing the integration of negative memories. The results suggest that emotion regulation is a key factor influencing whether individuals adaptively or poorly integrate into their self the negative past events they experienced. Indeed, it seems that the capacity to fully acknowledge and be open to negative emotions and events can provide people with greater reflexivity toward these events and the negative emotions experienced, without perceiving these events as self-threatening. Consequently, they can more readily accept the negative events they experienced and recognize them as an important and normal component of their lives, which can inform them about themselves and the world they live in.

Contrariwise, poorer emotion regulation capacities can lead individuals to feel overwhelmed by negative emotions and situations. This emotional overflow appears to obstruct the processing of negative events and to provoke memory intrusions. Researchers have suggested that intrusive traumatic memories can serve an emotional processing function, such that the intrusion would be a way for the person to relive an overwhelming event in an attempt to make more sense of what happened (Brewin, Dalgleish, & Joseph, 1996; Krans, Naring, Becker, & Holmes, 2009). Hence, it is possible that, for dysregulated people, intrusions sought to facilitate a better processing and comprehension of the negative event

experienced, in order to overcome the emotional overflow associated with it. However, many studies, such as the present one, have shown that even though intrusions may attempt to serve this emotional processing function, they are usually associated with negative outcomes on the long-term, such as severe psychological symptoms (for an overview, see Brewin, Gregory, Lipton, & Burgess, 2010). In the end, it thus appears that intrusions are generally more deleterious for the person than adaptive.

Finally, the suppression and repression of negative emotions seems to prevent both acceptance and intrusions related to the memories of negative events. At the short-term level, controlling regulation may be more adaptive than dysregulation in terms of preventing symptoms (low well-being) and perhaps limit the emotional pain associated with the emotional overflow that accompanies dysregulation. However, this denial of negative emotions and situations leads individuals to completely ignore an important part of what they experience, which prevents the formation of a coherent and flexible self. Over time, the chronic use of suppression is likely to lead to an impoverish self and hinder psychological growth, as shown by the negative cross-sectional association between controlling regulation and well-being. Our study thus provides additional evidence concerning the importance of acknowledging and taking into account negative emotions, as adaptive regulation of these emotions can facilitate the acceptance and integration of the negative events we experience in our everyday life.

Another concept that seems closely related to emotion regulation and integration in SDT is motivation, and more precisely autonomous motivation. Indeed, autonomy has been shown to correlate with greater self-awareness (Weinstein, Przybylski, & Ryan, 2012), emotional Openness and receptivity (Hodgins & Knee, 2002). Roth and colleagues (2019) have also recently proposed that integrative emotion regulation is associated with volitional functioning and could be facilitated by a more autonomy-supportive environment. Thus, motivation and emotion regulation appear to show similar patterns in people, and could be two different avenues facilitating the integration of negative memories into the self. Future research could investigate whether they would each independently predict memory integration over time.

## 5.2 | The integration of negative memories can predict changes in well-being

The present results are the first, to our knowledge, to establish that the adaptive versus poor integration of a personal negative memory can predict changes in well-being over time. Indeed, past research has only suggested that the integration of a negative memory from a distant past was correlated with greater well-being and maturity. Our longitudinal

study investigated changes in well-being over time instilled by memory integration, and thereby showed that the integration of negative recent events can impact people's level of well-being on the long-term.

On the one hand, adaptive negative memory integration increased participants' well-being. Indeed, negative situations and events can reveal important information to people about themselves and others, which can allow them to learn and grow from these negative events over time (McLean & Thorne, 2003; Pals, 2006). Therefore, if individuals are able to accept, reflect on, and thus, integrate past negative experiences—rather than only perceive them as a threat for the self—it becomes possible to gain a sense of well-being from these experiences.

On the other hand, poor integration of a negative memory led to decreases in well-being over time. Literature on memories proposes that the frequent and repetitive recall of a negative memory can lead to frequent decreases in positive mood, which can, in turn, over time, negatively affect one's stable sense of well-being (Adler, Philippe, Lodi-Smith, & Houle, 2016; Houle & Philippe, 2017; Philippe et al., 2012). Additionally, many authors have suggested that intrusive memories are difficult to incorporate into the person's autobiographical knowledge, which is the part of the self which represents the conceptual knowledge the person has about one's life, such as general events, lifetime periods, and important life themes and goals (Conway & Pleydell-Pearce, 2000; Conway, Singer, et al., 2004). It is this autobiographical knowledge that acts to attenuate the prompt activation of memories by various environmental cues (Conway, Meares, et al., 2004). Since intrusive memories are often not embedded and contextualized in the autobiographical knowledge (or only weakly), they are more easily and frequently activated by the environment (Ehlers, Hackmann, & Michael, 2004). Thus, negative memories that are not coherently integrated into the person's self are more likely to be frequently recalled, to reactivate the negative emotions experienced during the initial event, and thereby to frequently induce mood decreases and ultimately reduce well-being over time. Overall, our results highlight that people can experience many negative events in their lives, but if they adaptively and coherently integrate them into their self, they can ultimately gain well-being through them. This finding may underscore an important mechanism through which resilience operates (Fredrickson et al., 2003).

Although the longitudinal design of the present research allowed us to highlight the directionality of the hypothesized effects, memory integration could still be a proxy for a third variable. Hence the present findings cannot confirm causality. Future research with experimental designs will be needed to manipulate memory integration and confirm its effect on well-being.

### 5.3 | Memory integration can influence emotion regulation strategies over time

Another important finding of the present research is that adaptive integration of negative memories appears to facilitate the adoption of a more adaptive and flexible emotion regulation style on the long-term. To this day, very few studies have assessed the impact of memories on emotion regulation and none, to our knowledge, has investigated how a specific personal memory could lead to changes in emotion regulation over time.

The present findings suggest that the capacity to accept and integrate negative memories into a coherent sense of self can provide individuals with greater capabilities to cope with negative situations and to regulate their negative emotions on the long-term. Memories can indeed serve as resources onto which people can rely on to guide their emotions, thoughts, and behaviors when facing new situations (Houle & Philippe, 2017; Philippe et al., 2009, 2011; Pillemer, 2003). In fact, memories of past events represent a useful source of information about the possible consequences associated with experiencing negative emotions and situations. If a person has been able in the past to adaptively regulate his/her emotions in a difficult situation and to afterward accept and integrate this event and grow from it, this person can then assume that positive consequences can ultimately emerge from negative events. This could, therefore, enhance interest and Openness toward negative emotions and situations in the future. Hence, there appears to be a feedback loop between emotion regulation and memory integration: a more adaptive emotion regulation style can lead to a more adaptive memory integration, which can in return lead to even more adaptive emotion regulation. This highlights how memories of past events can influence the way people process emotional information in the present.

However, intrusions related to negative memories did not predict an increase in dysregulation over time as we expected. It thus seems that the capacity to process and accept negative past events is more substantial in the prediction of changes in emotion regulation over time than poor integration of negative memories. However, even though the memories described in our study were subject to intrusions, they were not specifically traumatic memories. Consequently, it is possible that the impact of intrusions on emotion regulation over time could have been dampened. Research on traumatic intrusive memories would be needed to better capture the effect that poor memory integration and intrusions can have on changes in emotion regulation over time.

## 6 | LIMITATIONS

Some limitations of the present study need to be underscored. First, the present findings need to be generalized with

caution, as there were more females than males in our sample. In addition, females might have been more interested in participating in a study on negative memories than males, thus, creating a self-selection bias. Second, the design of this study was built to assess changes in well-being and participants described a negative memory that occurred after the first phase of the study. While this memory's significance and valence were controlled for in the analyses, it is possible that the memories assessed were not as central to participants' self than some other older negative memories. As such, the memories assessed in this study could have been less difficult to adaptively integrate, as compared to more self-central ones. However, on average, participants rated their memory as quite significant for them (see Table 1), and the memories described were generally about significant themes—we can thus reasonably presume that the memories reported were fairly important and central for the majority of the participants. Third, we did not control in our analyses for the arousal of the memory, which could have played a role in the results obtained. Arousal has indeed been found to have an impact on how an event is recalled (Smith, Bibi, & Sheard, 2003), but the effect that memory arousal can have on general well-being over time remains unknown. Future research could investigate this association. Fourth, all scales used in the present study were self-reported. It is possible that individuals who wanted to suppress and deny their negative emotions and the negative events they experienced were biased in their evaluation of their own capacities to regulate their emotions, as well as of their acceptance of a past negative event. Future research could be conducted with indirect measures of emotion regulation and memory acceptance to overcome this limitation.

In sum, the present study is the first to establish that the way people regulate their negative emotions represents an important individual difference influencing how they will adaptively or poorly integrate negative memories into their self. Moreover, it demonstrates that this integration of negative memories can in turn lead to changes in well-being and emotion regulation strategies over time. Accordingly, it suggests that the negative is indeed not always that bad, as individuals can gain well-being from the negative events they experience, provided that they are able to acknowledge and be open to these experiences, in order to adaptively integrate them into a coherent sense of self.

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## CONFLICT OF INTEREST

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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## ENDNOTES

- <sup>1</sup> At each phase, following the measures described above, a few additional measures were also assessed, but were not analyzed in the present study (e.g., networked memories).
- <sup>2</sup> At each phase, we sent one invitation to participants, and then, emailed two reminders to the non-respondents at an interval of one week. Therefore, the average period of time between Phases 1 and 2 was three months, but respondents could complete Phase 2 up to a maximum of one month after the first invitation. This strategy was used to maximally reduce attrition.
- <sup>3</sup> All questionnaires were completed in French, using validated French versions of each scale. The only scale that was not already validated in French was the acceptance scale of four items, which we translated using a back translation method (Vallerand, 1989).
- <sup>4</sup> An alternative explanation is that since integrative regulation is characterized by openness and interest toward negative emotions, it can thereby lead individuals to fully experience negative emotions. In cases where such an openness does not lead to more acceptance of a negative event and to greater well-being over time, the person could start to perceive this event as self-threatening, which could increase dysregulation over time. Accordingly, we tested the significance of the interaction between integrative regulation and acceptance, but the result of this interaction was not significant. Thus, this alternative explanation seems unlikely.
- <sup>5</sup> The same model was tested again with only the significant paths. Fit indices for this model were satisfactory: (29) = 32.91, *ns*; CFI = 1.00; RMSEA = .02 [.00; .05]; SRMR = .04. The results of this simplified model were virtually the same as the full-identified model.

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