



Remembering events related to close relationships, self-growth, and helping others: Intrinsic autobiographical memories, need satisfaction, and well-being



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ABSTRACT

The present research examined the relationships between memories with intrinsic versus non-intrinsic themes, need satisfaction, and well-being. In Study 1, participants ($n = 244$) who included intrinsic themes when asked to describe an autobiographical memory reported greater well-being than participants who did not. The degree of need satisfaction characterizing these memories mediated the relationship between intrinsic memories and well-being. In Study 2, participants ($n = 126$) were assigned to describe a memory characterized by intrinsic (e.g., helping others) or extrinsic (e.g., popularity) values. Need satisfaction characterizing the intrinsic, but not extrinsic, memories, was associated with well-being. Describing an intrinsic (but not an extrinsic) memory positively increased situational well-being. Need satisfaction in the intrinsic memories predicted the subsequent increase in well-being.

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1. Introduction

Specific life experiences influence people not only through the actual events, but also through the memories that they generate. Important life experiences become encoded as autobiographical memories and remain associated with certain cognitions and emotions experienced during the initial event (Conway, 2008; Conway & Pleydell-Pearce, 2000). These autobiographical memories are connected to identity and characterized by affective intensity, vividness, repetitiveness, linkage to other memories, and enduring concerns or conflicts (Singer & Salovey, 1993). As such, people's autobiographical memories can shed light on the meaning that they make of their lives (McAdams, 2001) and the content and themes of autobiographical memories can be analyzed to inform people's psychological adjustment and well-being (Adler & Poulin, 2009; Blagov & Singer, 2004; Lilgendahl & McAdams, 2011). Previous research has demonstrated that the events we remember have an impact on our well-being through their affective valence (Bernsten, Rubin, & Siegler, 2011), themes of redemption, contamination (Adler & Poulin, 2009; McAdams, Reynolds, Lewis, Patten, & Bowman, 2001), agency and communion (Adler, Skalina, & McAdams, 2008; Bauer & McAdams, 2004), and whether they satisfy our basic psychological needs (Philippe, Koestner,

Beaulieu-Pelletier, & Lecours, 2011), among other factors. In this paper, we examined whether memory content linked to different types of values (intrinsic, non-intrinsic, extrinsic) relate differently to well-being and whether the degree to which these memories are need-satisfying can account for the relationship between memory content and well-being.

Coding autobiographical memories has allowed researchers to examine the relationship between memory content and well-being. Using Thorne and McLean's (2001) scoring system to categorize life events, researchers found that memories of relationship disruption (break-ups, divorce, separation, interpersonal conflict) are associated with the amount of distress that individuals experience (Blagov & Singer, 2004). Researchers have analyzed memories for themes of contamination, in which people describe positive events turning bad, and redemption, in which negative events become positive, and found that they relate differently to well-being (McAdams et al., 2001). Among college students and midlife adults (35–65), redemption sequences were associated with well-being, whereas contamination sequences predicted lower well-being among midlife adults. Redemptive themes were particularly important for the well-being of emerging adults, compared to older adults (McLean & Lilgendahl, 2008). Well-being was also associated with greater closure and redemption themes among adults writing about the 9/11 terrorist attacks (Adler & Poulin, 2009). Similarly, coherent positive resolution of difficult life experiences

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was related to life satisfaction through increasing ego-resiliency among women in midlife (Pals, 2006).

Although researchers have looked at motives within memories (e.g., McAdams, Hoffman, Day, & Mansfield, 1996; Woike & Polo, 2001) and different value orientations are implicit in previous research examining autobiographical memory (e.g., Thorne & Michaelieu, 1996), little research has specifically examined different types of values within memories. This is surprising given that memories have been shown to contribute to people's identity (Singer & Salovey, 1993) and values are an important aspect of identity (Hitlin, 2003). Self-determination theory's distinction between intrinsic and extrinsic values provides an interesting framework for analyzing memory content because a large body of research has shown that the two types of values are differentially related to people's well-being and quality of life (see Kasser, 2002; Lokes, 2012 for reviews). However, only two studies to our knowledge (Bauer & McAdams, 2004; Bauer, McAdams, & Sakaeda, 2005) have examined memories and well-being in this manner.

Drawing from humanistic theories (Maslow, 1954; Rogers, 1964), self-determination theory distinguishes between intrinsic values, which are thought to be inherently satisfying and congruent with basic psychological needs, and extrinsic values, which tend to be engaged in as a means to an end and depend on the contingent reaction of others (Deci & Ryan, 2000; Kasser, 2002). Researchers have confirmed the categorization of values into intrinsic and extrinsic pursuits through factor analyses (Kasser & Ryan, 1996), structural equation modeling (Lokes, Gingras, Philippe, Koestner, & Fang, 2010), and multidimensional scaling analyses (Grouzet et al., 2005). Intrinsic values for self-development, close relationships, and helping others tend to group together and oppose extrinsic values for financial success, status or popularity, and an attractive image, which also tend to group together.

Researchers have demonstrated that the intrinsic versus extrinsic content of goals and values have an impact on people's well-being and quality of life. When individuals place greater priority on intrinsic values, for self-development, close relationships, and helping their community relative to extrinsic values for wealth, status, and image, they experience greater well-being (Kasser, 2002; Kasser & Ryan, 1993, 1996). Importantly, this relationship has also been demonstrated experimentally. Compared to participants who wrote about their daily activities, participants randomly assigned to reflect on intrinsic values experienced an immediate gain in well-being (Lokes, Hope, Gouveia, Koestner, & Philippe, 2012). Four-weeks later, the more that they had engaged in reflecting on their intrinsic values, the greater their well-being. Other experimental evidence showed that when participants achieved goals related to intrinsic concerns, they experienced increases in their well-being (Sheldon, Gunz, Nichols, & Ferguson, 2010). In contrast, achieving goals related to extrinsic concerns was unrelated to changes in well-being.

Bauer and his colleagues have used the framework of intrinsic versus extrinsic concerns in the study of autobiographical memories. They examined people's stories of changes in career and religion and found that intrinsic themes were associated with social-emotional well-being (Bauer & McAdams, 2004). In two further studies, Bauer et al. (2005) analyzed the autobiographical memories of college students and adults for themes of intrinsic concerns. In both samples of students and adults, they found that participants' well-being was related to the degree to which they described intrinsic memories when asked about a high point, low point, and a turning point in life. Intrinsic memories highlighted growth on personal, relational and societal levels. This work raises the following question: What is it about intrinsic memories that account for their association with well-being?

Self-determination theory posits that intrinsic versus extrinsic values are related to well-being through the degree to which they satisfy people's psychological needs (Kasser, 2002). To be psychologically healthy, a person needs to feel effective and efficacious (competent), volitional and authentic (autonomous), and connected and cared for by others and caring for others in turn (related). In support of self-determination theory, researchers found that the relationship between well-being and intrinsic and extrinsic values is mediated by whether a person's needs for competence, autonomy, and relatedness are satisfied (Niemi, Ryan, & Deci, 2009). Therefore, the relationship between intrinsic memories and well-being may be due to the degree to which these memories satisfy a person's needs. Recent research has highlighted the importance of need satisfaction in autobiographical memories, which predicts people's well-being over time (Philippe, Koestner, Beaulieu-Pelletier, Lecours, & Lokes, 2012; Philippe et al., 2011).

We extend previous research in several ways. First, we build on recent research demonstrating the importance of need-satisfaction in autobiographical memories (Philippe et al., 2011) in order to examine whether need satisfaction accounts for the relationship between intrinsic memories and well-being, found by Bauer et al. (2005). Second, we test the influence of intrinsic versus extrinsic memories on well-being using an experimental design. While a large body of research has shown that the degree to which people prioritize intrinsic over extrinsic concerns is associated with well-being (see Kasser, 2002; Lokes, 2012 for reviews), fewer studies have demonstrated this relationship experimentally (see Sheldon et al., 2010; Lokes et al., 2012 for exceptions). Importantly we extend the work of Bauer and his colleagues (Bauer & McAdams, 2004; Bauer et al., 2005) by examining whether it is the need-satisfying nature of intrinsic memories that more directly contributes to people's well-being.

2. Study 1

With study 1, our aim was to examine the values underlying autobiographical memories and their relationship with well-being. We hypothesized that individuals who spontaneously described an autobiographical memory related to intrinsic values would report greater general well-being and adjustment, compared to individuals who described a memory related either to non-intrinsic or extrinsic themes. We further expected need satisfaction in memories to account for the relationship between intrinsic memories and well-being. Based on past studies examining the distinction between intrinsic and non-intrinsic memories on well-being (e.g., Bauer et al., 2005), we expected medium effect sizes. The sample size of Study 1 was sufficiently large to detect such effects at an alpha of .05 and a power of .80.

2.1. Method

2.1.1. Participants and procedure

The sample was made up of 244 undergraduate students (147 women, 97 men) attending a Canadian university. Their mean age was 29.6 years ($SD = 9.32$ years). Participants completed an online questionnaire about personality and memory, which included a memory description, and measures of well-being, psychological adjustment, and need satisfaction, described below.

Participants were asked to report their well-being and adjustment before describing an autobiographical memory so that the description did not affect their well-being ratings. Following the memory description, they evaluated their need satisfaction in the memory. These data were previously used to examine need satisfaction in autobiographical memories (Philippe et al., 2011, Study 1). For the present study, participants' memories were coded for

themes of intrinsic and extrinsic values. The data were analyzed in relation to intrinsic versus non-intrinsic themes, and therefore there is no overlap with the results presented in Philippe et al. (2011).¹ As remuneration, participants were entered in a drawing for one of four prizes of \$125.

2.1.1.1. Autobiographical memory. As described in Philippe et al. (2011), instructions were derived from past research on self-defining memories (Singer & Salovey, 1993; Sutin & Robins, 2005). Participants were asked to describe in detail:

a personal memory of an event that occurred at least one year ago which was significant (important) for you. This memory should reflect your identity or who you are and should reveal something about how you perceive yourself generally. Choose a memory that often comes to your mind. This memory can be either positive, negative, or both.

2.1.2. Measures

The measures are described below. In Philippe et al. (2011), hedonic well-being (life satisfaction), eudaimonic well-being (self-acceptance, purpose in life, and personal growth scales, Ryff & Keyes, 1995) and an index of psychological adjustment were used to assess well-being. In the present study, eudaimonic well-being was not included due to its similarity to the construct of intrinsic values.

2.1.2.1. Life satisfaction. The 5-item Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985) was used. Cronbach's alpha coefficient was .85.

2.1.2.2. Psychological adjustment. As described in Philippe et al. (2011), psychological adjustment was assessed through the use of three measures. A one-item measure of self-esteem (Robins, Hendin, & Trzesniewski, 2001), three items ($\alpha = .61$) from the Beck Depression Inventory (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), and six items ($\alpha = .83$) from the Beck Anxiety Inventory measuring the subjective state of anxiety (see Osman, Kopper, Barrios, Osman, & Wade, 1997). All these items were transformed in z scores and averaged to create a psychological adjustment index for which the alpha was .85.

2.1.2.3. Need satisfaction in the memory. Following the description of the memory, each participant rated the level of psychological need satisfaction they experienced during the event of their memory on a 7-point Likert scale ranging from -3 (Strongly disagree) to $+3$ (Strongly agree) with 0 representing "Do not agree nor disagree or not applicable" – this latter option indicating that there was an equal level of both need satisfaction and need thwarting in the event or that the event was not characterized by either need thwarting or need satisfaction. They were provided with two items assessing each of the three psychological needs. Sample items include "I felt free to do things and to think how I wanted" (autonomy), "I felt skillful or capable" (competence), and "I felt connected to one or more people" (relatedness). Intercorrelations between the items of autonomy, competence, and relatedness were .42, .74, and .51, respectively. Cronbach's alpha for the measure of need satisfaction was .82. The self-report measure of need satisfaction in the memory was shown to correlate highly with the same measure

coded by judges from the participants' memory narratives ($r = .70$). Results in the current study were virtually the same using the coded or self-reported measure. Therefore, we report on the self-reported data only, given that it is the typical measure of need satisfaction in memories (e.g., Philippe, Koestner, & Lekes, 2013; Philippe et al., 2012).

2.1.2.4. Intrinsic and extrinsic memory. Memories were coded for the presence of intrinsic and extrinsic values by two researchers. The coders, familiar with self-determination theory and blind to the participants' well-being ratings, reviewed the content of each memory, identifying whether they were characterized by intrinsic and extrinsic values. The judges were informed they could code a memory as both intrinsic and extrinsic or non-intrinsic and non-extrinsic if applicable. Intrinsic and extrinsic themes were based on the Aspiration Index (Kasser & Ryan, 1996), a 32-item questionnaire assessing intrinsic and extrinsic values and on self-determination theory's framework of values (Deci & Ryan, 2000). Coders used the items from the Aspiration Index as examples as well as their background knowledge of self-determination theory to guide the coding. They were also provided with specific instructions on what constituted an intrinsic theme. For example, describing a good time spent with a friend was not sufficient to be coded as intrinsic. To be coded as intrinsic, the focus had to be on the development of a new or enduring friendship.

Intrinsic themes included self-acceptance, a better understanding of oneself, or the acceptance of something about oneself, finding meaning in one's life, learning something new or deepening one's knowledge about something, helping an individual, a group of people or a community, and developing an intimate relationship (friendship or romantic). Examples of memories coded with intrinsic themes include the following excerpts from the memories of three participants:

- "As a retired police officer, I had the privilege of volunteering for the Canadian Organ Donors Association as a carrier."
- "I was starting a new internship. I had many mixed emotions. I felt excited but at the same time I was very stressed. I decided to dive in and apply myself, to stop worrying, that I was going to go regardless and that I should just dive in. In the end, coming home, I felt happy with my first day."
- "When my daughter was born, my partner had difficulty breastfeeding. During a month and a half, we had to wake every two hours (24 h per day). Despite the inconvenience, I felt useful because I was supporting my daughter and my partner. In fact, these efforts transformed into positive thoughts, into a feeling of accomplishment, and in a profound desire to form a strong family nucleus."

Extrinsic themes included seeking social recognition from one or more people or following the reception of a prize, popularity, financial success or gains, or the recognition of one's physical attractiveness. As an example, the following memory was coded as extrinsic: "I won a gold medal at the Quebec games. I was named team captain and the coach put a lot of pressure on me. In the end I performed well and made a name for myself in the elite world of sports."

The following two participant responses are examples of memories coded as nonintrinsic/nonextrinsic. In each case, there is not a clear intrinsic or extrinsic theme. Personal development may be involved, but it is not explicitly described or clear from the narrative.

- "I received the letter that I had been accepted to university. I was happy because I had been scared of not being accepted and during the waiting period I questioned what I would do if I weren't accepted and whether I would one day be able to have my chosen profession."

¹ Philippe et al. (2011) coded memories for intrinsic themes based on Bauer et al. (2005) in order to examine incremental validity only. In the present study, a more extensive coding scheme was used (see description of coding under measures). Philippe et al. (2011) examined intrinsic memories only and did not examine whether need satisfaction mediates the relationship between intrinsic memories and well-being.

Table 1
Results of *t*-tests on intrinsic and non-intrinsic memories: Study 1.

Variable	Intrinsic memories		Non-intrinsic memories		<i>t</i> (242)	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Need satisfaction	1.89	1.03	0.41	1.48	8.74	<.001
Autonomy	1.53	1.51	0.30	1.79	5.66	<.001
Competence	2.07	1.28	0.31	1.97	7.92	<.001
Relatedness	2.08	1.16	0.64	1.88	6.89	<.001
Life satisfaction	5.32	1.06	4.56	1.26	4.95	<.001
Psychological adjustment	0.21	0.60	−0.14	0.89	3.44	<.001

Note. Intrinsic memories, *n* = 141; non-intrinsic memories, *n* = 103.

- “Four years ago, I bought a duplex, on my own. The house was empty so I took a month to do renovations. I signed at the notary’s office on Wednesday October 1 and I remember the moment that I entered the house, on my own that morning. All of a sudden I realized how important a commitment it was.”

Inter-judge reliability (*kappas*) was *k* = .81 for intrinsic memories and *k* = .82 for extrinsic memories. Disagreements were discussed with the third author (who was not one of the two judges) and resolved.

2.2. Results

A total of 103 participants (42.2%) reported intrinsic memories (i.e. memories with intrinsic themes), whereas 141 (57.8%) described non-intrinsic memories, 10 of whom (4.1% of the total sample) reported extrinsic memories. Moreover, eight of these ten participants also described intrinsic themes along their extrinsic concerns. Given the low number of participants who described exclusively extrinsic memories, we analyzed our results in terms of intrinsic versus non-intrinsic memories. These results suggest that most people’s self-defining memories do not tend to focus on extrinsic concerns.

We conducted a set of *t*-tests to examine if there were differences between participants describing intrinsic versus non-intrinsic memories. Each *t*-test evaluated the differences on the following variables: autonomy, competence, and relatedness, total score of need satisfaction, life satisfaction, and psychological adjustment. Results of these analyses are shown in Table 1.² Participants who spontaneously described an intrinsic memory scored higher on all psychological needs and on life satisfaction and psychological adjustment (as compared to participants who did not describe a memory with an intrinsic-related theme).

Next, correlations were conducted to examine the relationship between need satisfaction and well-being for the participants who had described an intrinsic memory. Need satisfaction in intrinsic memories was positively correlated with life satisfaction ($r = .23, p < .05$) and psychological adjustment ($r = .21, p < .05$). Correlations between need satisfaction and well-being for participants who described a non-intrinsic memory also revealed to be significant, $r_s = .23$ and $.30, p_s < .05$ for life satisfaction and psychological adjustment, respectively. Taken together, these results revealed that intrinsic memories are characterized by greater need satisfaction than non-intrinsic memories, but that even at lower levels, need satisfaction in non-intrinsic memories can still contribute to well-being (i.e., slightly need satisfying memories will contribute to greater well-being, whereas need thwarting will detract from well-being).

We then examined the mediation effect of need satisfaction in intrinsic memories on well-being. First, we conducted a hierarchical regression with life satisfaction as the dependent variable using memory themes (intrinsic = 1; non-intrinsic = 0) at Step 1 and memory need satisfaction at Step 2. At Step 1, intrinsic memories were significantly associated with life satisfaction ($\beta = .30, p < .001$). At Step 2, need satisfaction was a significant predictor of life satisfaction ($\beta = .25, p < .001$). In addition, the beta coefficient of intrinsic memories was significantly lowered by the inclusion of need satisfaction ($\beta = .18, p < .001$). Bootstrapping analysis revealed that the 95% confidence interval [.123; .499] did not include zero, thus suggesting that the indirect effect was significant. Taken together those findings suggest that need satisfaction partially mediated the effect of the relationship between intrinsic memories and life satisfaction.

A second hierarchical regression was conducted on psychological adjustment using the same variables as above in each step. Again, intrinsic memories were significantly associated with psychological adjustment ($\beta = .21, p < .01$) at Step 1. At Step 2, need satisfaction was positively and significantly associated with psychological adjustment ($\beta = .31, p < .001$), whereas intrinsic memories were no longer significant ($\beta = .06, n.s.$). Bootstrapping analysis again revealed that the 95% confidence interval [.161; .540] did not include zero, thus suggesting that the indirect effect was significant and that memory need satisfaction mediated the relationship between intrinsic memories and psychological adjustment.

2.3. Brief discussion

Study 1 demonstrated that people who spontaneously include intrinsic themes of intimate relationships, helping their community, and self-development, experience greater well-being compared to people who do not include such themes. We further found that the satisfaction of three psychological needs mediated the relationship between intrinsic memories and well-being. However, need satisfaction did not fully mediate the relationship between intrinsic memories and life satisfaction, suggesting that other memory components may be involved in the relationship. Furthermore, the study design was correlational.

3. Study 2

Study 2 extends Study 1 in two ways. First, we use an experimental design to test whether remembering an event related to intrinsic values influences situational well-being compared to remembering an event related to extrinsic values. Second, Study 1 revealed that most people do not spontaneously describe extrinsic memories—only intrinsic and non-intrinsic memories. In Study 2, we modified our memory instructions to specifically target intrinsic or extrinsic memories. Researchers have suggested that happier people tend to frame their memories in terms of intrinsic

² An anonymous reviewer suggested that we control for neuroticism, given that this measure is available from the Philippe et al. (2011) dataset. Controlling for that variable in the analyses did not alter the results.

themes related to personal, relational, and societal growth (Bauer et al., 2005). We wanted to test whether an intrinsic memory can increase well-being, regardless of a person's general well-being. Can a person experience benefits to their well-being depending on whether they are asked to describe an intrinsic versus an extrinsic memory? We further wanted to examine whether need satisfaction accounted for the relationship between intrinsic memories and well-being and whether other memory components are involved.

We had three main hypotheses. First, based on self-determination theory (Deci & Ryan, 2000), we hypothesized that need satisfaction in intrinsic memories, but not in extrinsic memories, would correlate with general well-being, thereby extending the results of Study 1. While individuals may feel that memories with extrinsic themes satisfy their needs, for example feeling competent after winning a prize or feeling some relatedness when being recognized as popular, they depend on the contingent reaction of another (Kasser, 2002), which is not expected to relate to well-being. Second, we expected that individuals randomly assigned to write about a memory related to an intrinsic theme would experience greater situational well-being following their description than those assigned to write about a memory related to an extrinsic theme. Finally, we further expected that this increase in well-being following the description of an intrinsic memory would be predicted by the degree to which individuals felt that their basic psychological needs were satisfied during the event of the intrinsic memory that they described. Given that no prior study had examined the effect of describing an intrinsic versus extrinsic memory on situational well-being, a small effect size ($\eta^2 = .01$) was expected. The minimum sample size for the detection of such a small effect size within a 2×2 factorial ANOVA with two repeated measures at an alpha of .05 and a power of .80 is $n = 112$.

3.1. Method

3.1.1. Participants and procedure

Participants who took part in this study were 123 undergraduate students (105 women, 21 men) from a Canadian university. Their mean age was 24.54 years ($SD = 6.3$ years). Participants were contacted through their university e-mail and invited to participate in an online study about memory. As an incentive, they were entered in a drawing for one of three prizes of 125\$. They were informed that the questionnaire was on a secure Web site and were assured that their responses would remain anonymous and confidential. Participants were randomly assigned to describe a memory characterized by either intrinsic ($n = 60$) or extrinsic values ($n = 63$). First, participants completed a baseline measure of vitality, the Aspiration Index and a well-being measure. These measures were completed before describing the autobiographical memory so that the description did not affect the well-being ratings. Second, based on prompts, participants described either an intrinsic or an extrinsic memory (random assignment). Following the memory description, participants evaluated their need satisfaction in the memory and the characteristics of the memory, and finally rated their vitality a second time.

3.2. Measures

3.2.1. Intrinsic and extrinsic values

A shortened version of the Aspiration Index (Kasser & Ryan, 1996) used in other research (Lekes, Joussemet, Koestner, Taylor, & Gingras, 2011) served to measure participants' intrinsic and extrinsic values. Participants were instructed to rate the importance of 12 values on a 7-point Likert-type scale (1 = *not at all*, 7 = *totally*). Intrinsic values included: 'to have committed, intimate

relationships', 'to work for the betterment of society', and 'to grow and learn new things'. Extrinsic values included: 'to be admired by lots of different people', 'to be financially successful', and 'to have an image that others find appealing'. An intrinsic values score was created by averaging the six items pertaining to intrinsic values ($\alpha = .69$). The other half of the items were averaged to form a score of extrinsic values ($\alpha = .83$).

3.2.1.1. General well-being. As in Study 1, we used the Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985) to measure general well-being. The Cronbach's alpha coefficient was .85.

3.2.1.2. Vitality pre- and post-description. The state level version of the Subjective Vitality Scale (Ryan & Frederick, 1997) was used to assess well-being before and after describing their memory. A measure of vitality was used because well-being was assessed twice in a short time span and this measure is more sensitive to subtle changes in situational well-being, as compared to a measure of life satisfaction for instance (for a similar rationale, see Philippe et al., 2012, Study 3). Participants were instructed to respond to six items as a function of how they felt at the moment. A sample item is "Currently, I feel alive and full of life". For each item, participants were asked to move a slider and select a point along a linear continuum in which one end was labeled "Totally disagree" and the other "Totally agree". Their response was given a value between 0 and 100. This value was hidden from the participants, but was recorded by the computer. Such a scale was used in order to capture subtle subjective changes in vitality. Cronbach's alpha coefficient for vitality levels at pre-description was .93 and .94 at post-description.

3.2.1.3. Autobiographical memory. Participants were randomly assigned to either the intrinsic memory group or the extrinsic memory group. Participants from both groups were instructed to describe a memory. They were informed that the memory could be either positive, negative or both. They were encouraged to choose a memory that often came to mind and that was at least six months old. They were instructed not to take too much time to think of the perfect memory, but rather to choose one that spontaneously came to mind. All participants were asked to "describe in detail a personal memory of a specific event or a significant moment during which they had experienced or obtained things such as...". The intrinsic group was provided with the following examples:

a better understanding of yourself; acceptance of something about yourself; finding meaning in your life; learning something new or deepening your knowledge about something; helping someone, a group or a community; developing an intimate friendship or romantic relationship with someone.

The extrinsic group was provided with the following examples:

social recognition from one or more people or after receiving a prize; popularity; a financial gain (whether through working, winning a prize, or receiving money as a gift); succeeding in making a good impression toward one or more people; being recognized for your physical attractiveness.

The memories were subsequently coded as intrinsic or extrinsic by independent judges (blind to assigned condition), confirming that all participants understood the instructions and were able to describe either an intrinsic or an extrinsic memory, depending on the group they were assigned to. The following are excerpts of memories from two participants in the intrinsic group:

- "I went winter camping at the top of a mountain last winter. I realized how much energy I get from the mountains and how happy and free I feel when I am out in nature. In that moment

I discovered that I can find happiness in activities, far from the city, far from money, far from the stress of school. I shared this moment with someone who is now my boyfriend. We share this passion and it's what brings us close and united. For me, the mountain represents liberty and I need it! Through this expedition, I realized to what extent being out in nature is important to me and I have made it a priority."

- "About 6 months ago, I had a difficult break-up. About two months later, at a birthday celebration, a friend talked to me about her own break-up in positive terms, because it allowed her to evolve differently in life, etc. I think about this conversation often, since from that moment I began to feel that I could take on projects as I had done before, and that one day I would meet someone I was attracted to, by involving myself in projects that I'm passionate about. I renewed my social activism after this dinner."

The following are excerpts of memories from two participants in the extrinsic group:

- "When I was in high school, I won the personality prize three years in a row. I remember that each year several people came and told me that they were voting for me and I didn't believe it really. I didn't think I would win the prize. When they announced my name at the Gala, I couldn't believe it. I was happy to see that people appreciated me but I didn't think I deserved it. It gave me a lot of confidence. I earned a cheque of 50 dollars each time and each year my name was inscribed on a plaque that hung in the hall in front of the school chapel. I was very proud of myself."
- "I was at a happy hour in the school café. I was chatting with a guy, an acquaintance who I found attractive. During our chat, he told me that he found me super pretty. I remember that he seemed shy, which didn't necessarily correspond to his personality. I felt doubly flattered that he found me attractive since I thought the same thing about him. I looked at him, smiled, and said 'thank you.' This surprised me because I usually did not have confidence in my physical appearance. But this time I was inclined to accept the compliment rather than contest it."

3.2.1.4. Need satisfaction in the memory. Following the description of the memory, each participant was instructed to rate the level of psychological need satisfaction experienced when the event of the memory occurred using the same items used in Study 1. Items were averaged in an index score labeled need satisfaction in the memory ($\alpha = .87$).

3.2.1.5. Memory characteristics. Participants were asked to rate the vividness ("the memory of this event is still vivid and detailed in my mind"), the significance ("this event was important/significant for me"), the degree to which the memory recurs ("I have often thought about this event"), how often they had shared it ("I have often talked about this event to other people") and the frequency of involuntary recall ("this memory has come spontaneously to my mind in the past and I did not make any efforts for it to do so). The first four items were drawn from the Memory Quality Questionnaire (Alea & Bluck, 2007), whereas the fifth was taken from Rasmussen and Bernsten (2009). Participants were asked to rate all memory characteristics on a 7-point Likert-type scale ranging from 1 (*not at all*) to 7 (*totally*). Two categories of memory characteristics were constructed based on Alea & Bluck's (2007) and Baron and Bluck's (2009) factor analyses. *Personal significance* included vividness and significance, and *Rehearsal* was represented by rehearsal, sharing, and involuntary recall. For the personal significance category, the inter-item correlation was .45, $p < .001$,

and the inter-item correlations for the rehearsal category ranged from .26, $p < .01$ to .54, $p < .001$. Participants were also asked to rate the degree to which their memory was positive or negative on a scale ranging from -3 (*very negative*) to $+3$ (*very positive*).

4. Results

There were no significant differences between the two experimental groups (intrinsic versus extrinsic memories) on intrinsic and extrinsic values or on the well-being measures (life satisfaction and vitality Time 1). However, the two groups did differ on memory characteristics. Participants in the intrinsic group described memories that were more significant ($M = 6.25$ versus $M = 5.87$, $t[121] = 2.45$, $p < .01$) and more rehearsed ($M = 5.34$ versus $M = 4.71$, $t[121] = 2.88$, $p < .01$) than those in the extrinsic group. There were no differences between the two groups on valence ($t[121] = 1.72$, *ns*) and need satisfaction ($t[121] = 0.77$, *ns*). This latter finding is interesting given that we found significant differences between intrinsic and non-intrinsic memories in Study 1. In line with self-determination theory (Deci & Ryan, 2000; Kasser & Ryan, 1996), extrinsic values may provide some sense of satisfaction, but one that is compensatory and that does not fuel well-being.

To verify that postulate, hierarchical regression analyses were conducted on each group (intrinsic memory, extrinsic memory) to examine the association between need satisfaction and life satisfaction while controlling for age, gender, values, and other memory characteristics. Each regression was divided in two steps. At Step 1, age, gender, intrinsic values, extrinsic values, personal significance of the memory and rehearsal of the memory were entered. At Step 2, need satisfaction in the memory was included in the equation. The results of these regressions on life satisfaction are shown in Table 2. The first hierarchical regression was conducted on the intrinsic memory group. At Step 1, gender, general intrinsic values and memory significance were significantly associated with life satisfaction, $R^2 = .51$, $F(7,52) = 7.65$, $p < .001$. At Step 2, need satisfaction significantly predicted life satisfaction, $R_{change}^2 = .06$, $F(1,51) = 6.69$, $p < .05$. Overall, these results indicate that need satisfaction in intrinsic memories explains a significant and unique part of the variance of life satisfaction, over and above general values and other memory characteristics.

Next, a hierarchical regression analysis was conducted on the extrinsic memory group to examine the association between need satisfaction in extrinsic memories and life satisfaction. Each variable was entered in the same steps as the preceding regression. The regression analysis examined the predictive value of need satisfaction on life satisfaction and showed that gender and general extrinsic values were negatively associated with life satisfaction at Step 1, $R^2 = .33$, $F(7,55) = 3.84$, $p < .01$. Need satisfaction was unrelated to life satisfaction, $R_{change}^2 = .02$, $F(1,54) = 1.24$, *ns*. These results indicate that need satisfaction in extrinsic memories was not associated with life satisfaction. Taken together, the present findings suggest that only need satisfaction in intrinsic memories contributes to well-being.

To examine if the description of an intrinsic or extrinsic memory would have an immediate effect on situational vitality, we conducted a repeated-measures ANOVA. Gender and memory group were modeled as between-subject variables and the levels of vitality pre- and post-description served as within-subject variables. The plan was a 2 (memory group: intrinsic versus extrinsic) X 2 (gender: males versus females) X 2 (vitality: pre and post measures). Results showed that the level of reported vitality was significantly different between the pre- and post-description of the memory, $F(1,119) = 9.61$, $p < .01$. Vitality was significantly higher after the description of the memory ($M = 59.24$, $SD = 21.5$) than before ($M = 56.40$, $SD = 21.33$). Results also revealed a significant

Table 2
Hierarchical regressions analyses of values, memory characteristics and need satisfaction on life satisfaction: Study 2.

Groups	Steps	Variables	Life satisfaction			
			β	t		
Intrinsic memory	1	Age	-.14	-1.34		
		Gender (0 = female)	-.34	-3.25**		
		Intrinsic values	.28	2.50*		
		Extrinsic values	.10	1.03		
		Memory valence	.08	0.81		
		Personal significance	.31	2.51*		
		Rehearsal	-.07	-.61		
		Need satisfaction	.33	2.59*		
		Extrinsic memory	1	Age	.00	0.01
				Gender (0 = female)	-.32	-2.74**
Intrinsic values	.17			1.40		
Extrinsic values	-.35			-3.02**		
Memory valence	-.10			-0.87		
Personal significance	.22			1.47		
Rehearsal	-.03			-0.23		
Need satisfaction	.17			1.11		
Extrinsic memory	2					

* $p < .05$.

** $p < .01$.

vitality \times memory group interaction, $F(1, 119) = 5.54, p < .05$. Analysis of the simple effects of this interaction showed that vitality post-description ($M = 58.50, SD = 20.56$) was significantly higher than vitality pre-description ($M = 54.36, SD = 20.06$), but only after the description of the intrinsic memory, $t(59) = 3.66, p < .01$. There was no difference between post- and pre-vitality after describing an extrinsic memory, $t(62) = 0.56, ns$. Gender did not moderate any of these relationships and controlling for age and memory significance and rehearsal as covariates did not alter the results. Thus, these results indicate that the description of an intrinsic memory, but not an extrinsic memory, has a directive impact on people's situational vitality.

Finally, a hierarchical regression was conducted on the intrinsic memory group to examine if vitality post-description could be predicted by any of the variables used in the previous hierarchical regressions. Again, age, gender, general intrinsic values, general extrinsic values, personal significance of the memory and rehearsal of the memory were entered at Step 1. The general well-being measure (life satisfaction) was also included in order to control for the counter-explanation that happier people frame their memories with higher levels of need satisfaction. We also included vitality pre-description at Step 1 so that all independent variables predict changes in vitality between the pre- and post-description of the memory. Finally, need satisfaction characterizing the intrinsic memory was entered at Step 2. Results revealed a significant effect of general extrinsic values ($\beta = .13, p < .05$) on vitality post-description at Step 1. This result suggests that the description of an intrinsic memory could have an even more positive impact on vitality for those who generally endorse extrinsic values. No other variables were significant at Step 1. At Step 2, need satisfaction was found to be significantly positively associated with vitality post-description ($\beta = .16, p < .05$). This latter result suggests that the level of need satisfaction in an intrinsic memory contributes to increasing people's vitality following the description of one of their intrinsic memories, but not following one of their extrinsic memories (as shown above, there was no increase of vitality following the description of an extrinsic memory and need satisfaction in extrinsic memories was unrelated to change in vitality, $\beta = -.03, ns$). Overall, our results suggest that memories related to intrinsic values are particularly important in contributing to general and situational well-being. In addition, this effect seems to occur through the level of need satisfaction characterizing these memories.

5. Discussion

The present study found that autobiographical memories with themes related to intrinsic values (close relationships, self-growth, helping others, making a contribution to society) are associated with people's well-being and adjustment. We further found that the relationship between intrinsic memories and well-being is influenced by the degree to which memories satisfy basic psychological needs. Importantly, we discovered these results using two different methodologies: coding spontaneously generated autobiographical memories and randomly assigning individuals to write about an intrinsic or an extrinsic memory.

Using self-determination theory's distinction between intrinsic and extrinsic values and following the work of [Bauer, McAdams, and Sakaeda \(2005\)](#), we examined the content of people's memories. We invited participants to describe one memory that was positive, negative, or neutral whereas [Bauer et al. \(2005\)](#) asked participants to describe three memories (about a high point, low point, and a turning point in life). Our results provide additional information on the degree to which individuals spontaneously describe an intrinsic autobiographical memory. When asked to describe a significant personal memory, 42% of our participants (Study 1) described an event with intrinsic themes. For example, participants described memories of helping others through work or volunteer experiences, and of key moments in relationships such as becoming closer to someone, expressing feelings for the first time, or ending a relationship and the growth that ensued from these moments.

Using a different method for asking about autobiographical memories, we arrived at a similar conclusion to that of [Bauer, McAdams, and Sakaeda \(2005\)](#). People's well-being is associated with the degree to which they remember events related to close relationships, community, helping others, and self-growth rather than events that are not related to intrinsic values. We found that participants who described an intrinsic memory experienced greater life satisfaction and psychological adjustment than participants who described a non-intrinsic memory. Our findings are congruent with a large body of research that has demonstrated that the more that people prioritize intrinsic values for self-growth, close relationships, and helping others compared to extrinsic values for wealth, status, and image, the greater their well-being ([Kasser, 2002; Lekes et al., 2012](#)). They are also congruent with

the finding that for female participants, memories of close relationships were associated with self-esteem and related to increases in self-esteem over time whereas memories related to getting approval from friends was associated with chronically low and decreasing self-esteem (Thorne & Michaelieu, 1996).

Self-determination theorists have proposed that the vital difference between intrinsic and extrinsic values that accounts for their differential relationship to well-being is the degree to which they are linked to the satisfaction of needs for competence, autonomy, and relatedness. Researchers have found some support for this proposition. When parents support their children's needs for autonomy, relatedness, and competence, children are more likely to internalize and prioritize intrinsic values (Kasser, Ryan, Zax, & Sameroff, 1995; Lokes et al., 2010, 2011; Williams, Cox, Hedberg, & Deci, 2000). Providing more direct evidence, Niemiec et al. (2009) found that over the course of a year, change in the attainment of post-college students' intrinsic values related to change in well-being and the relationship was mediated by psychological need satisfaction.

The present study is the first to show that the relationship between intrinsic memory content and well-being is influenced by need satisfaction and importantly does so using both correlational and experimental designs. In Study 1, need satisfaction partially mediated the relationship between intrinsic concerns in an autobiographical memory and life satisfaction and fully mediated the relationship between intrinsic concerns and psychological adjustment. In Study 2, the degree to which intrinsic memories satisfied the three needs predicted participants' life satisfaction, whereas need satisfaction in extrinsic memories was unrelated to life satisfaction. We further found that need satisfaction in an intrinsic memory contributes to increases in vitality following its description/recall. These results support self-determination theory's proposition that extrinsic values depend on the contingent reaction of others and are often pursued as a means to an end whereas intrinsic values are thought to be inherently satisfying and congruent with psychological needs (Kasser, 2002). It follows that need satisfaction accounts for the relationship between intrinsic memories and well-being. In contrast, whether or not individuals found their extrinsic memories to be need-satisfying was unrelated to their well-being.

Importantly we extended previous research by testing the relationship between intrinsic memories and well-being experimentally. When participants were randomly assigned to describe either an intrinsic or an extrinsic memory, we discovered that those who described a personal memory related to self-development, close relationships, and/or community contribution experienced an immediate increase in vitality. In this manner, Study 2 adds to recent experimental research in which a focus on intrinsic goals and values leads to increases in people's well-being. When young people were randomly assigned to pursue either three extrinsic goals (e.g. enhance your name recognition or popularity, find a way to earn some extra money) or three intrinsic goals (e.g. get to know someone beyond a superficial level, join a volunteer organization), researchers found that intrinsic, but not extrinsic, goal attainment was related to changes in well-being (Sheldon et al., 2010). Even more recently, researchers found that when participants were randomly assigned to reflect on their intrinsic values rather than a control activity, they experienced greater well-being (Lokes et al., 2012). Thus, whether pursuing short-term intrinsic goals, reflecting on intrinsic values, or remembering events with intrinsic themes, people experience benefits to their well-being.

Interestingly, our results held regardless of whether individuals' values were oriented toward intrinsic or extrinsic concerns. Moreover, we found that the more that individuals endorsed extrinsic values, the more likely they were to experience increased vitality following their description of an intrinsic memory. This adds to the evidence provided by Sheldon, Gunz, Nichols, and Ferguson

(2010) in which even for individuals with an extrinsic value orientation, attaining intrinsic, but not extrinsic goals, increased their well-being.

Finally, Study 2 adds to the understanding of the directive function of memory (Pillemer, 2003). Describing an intrinsic memory had an immediate effect on people's situational well-being and this directive force was a function of the level of need satisfaction characterizing the intrinsic memory. This finding extends previous work on the directive force of recalling or reactivating a memory (e.g., Kuwabara & Pillemer, 2010; Philippe et al., 2012), while specifying that a directive effect on well-being is more likely to occur with intrinsic memories, and does not occur with extrinsic memories.

The present study is limited in several ways. We examined well-being and memories at one time point only. Study 2 provides evidence that describing intrinsic memories transiently increases situational well-being yet it is still unknown whether this effect could help build an increased sense of well-being over time. Longitudinal study of memories would allow researchers to examine the impact of remembering events related to intrinsic values over time. Likewise it is important to test our results in community samples given that our results are limited to college students. For example, intrinsic memories could have a greater effect on well-being at certain life stages such as during the college years and early adulthood when people's identity is developing. Samples of participants in different age groups would be useful for examining this question. Furthermore, it is important to test our results from Study 2 with a larger sample of male participants.

Our results raise questions for further study. Given that close to 60% of the participants in Study 1 did not spontaneously describe a memory with intrinsic themes, can individuals be encouraged to remember and reflect on their intrinsic memories? It may benefit individuals to activate their intrinsic memories regularly. All of our participants in Study 2 were able to describe an intrinsic memory. In line with the findings of Lokes et al. (2012), such reflecting may help increase people's well-being over short periods of time. A further question is whether individuals can focus on intrinsically-themed memories over longer periods of time in order to influence their long-term well-being. This has implications for intentional self-development (Brandtsadter, Wentura, & Rothermund, 1999) and therapy interventions in which helping professionals encourage reflection on memories related to growth- personal, relational, and societal. Given that negative memories are associated with lower well-being (Philippe, Lecours, & Beaulieu-Pelletier, 2009), and that Bauer, McAdams, and Sakaeda (2005) found a lower rate of intrinsic memories for low points in life than high points, can individuals frame negative memories in terms of intrinsic growth to the benefit of their well-being? Researchers recently found that individuals' interpretation of past events as causing various forms of self-growth predicts their well-being (Lilgendahl & McAdams, 2011), suggesting that this is an important area for future research.

The main message from these two studies is that remembering events with intrinsic themes compared to non-intrinsic or extrinsic themes is related to well-being through the degree to which these events satisfy our basic psychological needs. These findings are in line with self-determination theory's proposition that satisfaction of our psychological needs for autonomy, competence, and relatedness are at the heart of optimal well-being and psychological adjustment. They further have implications for fostering well-being through the type of memories that people focus on and how they frame their memories.

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