

# The Role of Need Satisfaction as a Distinct and Basic Psychological Component of Autobiographical Memories: A Look at Well-Being

Frederick L. Philippe,<sup>1</sup> Richard Koestner,<sup>1</sup> Genevieve Beaulieu-Pelletier,<sup>2</sup> and Serge Lecours<sup>2</sup>

<sup>1</sup>McGill University

<sup>2</sup>University of Montreal

**ABSTRACT** The purpose of the present research was to show that satisfaction of the psychological needs of autonomy, competence, and relatedness constitutes a basic component characterizing autobiographical memories. In Study 1, a coding scheme and a self-rating method for measuring need satisfaction in memories were developed and shown to be highly related to each other. Across 3 studies using graduate and undergraduate students (Study 1:  $N = 244$ ; Study 2:  $N = 309$ ; Study 3:  $N = 159$ ), need satisfaction was found to be moderately associated with well-being measures, over and above several other memory components usually assessed in research on autobiographical memories. In addition, this association between need satisfaction in autobiographical memories and well-being held, even after controlling for person-level measures, such as personality traits, self-determined orientation, or experience of need satisfaction in general in one's life, thus suggesting that autobiographical memory and semantic self-knowledge are distinct databases.

The functional role of autobiographical memories has attracted increasing interest in recent decades. Whereas autobiographical research in the 1970s was more focused on the *remembering*, recent research

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Correspondence concerning this article should be addressed to Frederick L. Philippe, Psychology Department, University of Quebec at Montreal, P.O. Box 8888 Station Centre-Ville, Montreal, Quebec, Canada, H3C 3P8. Email: philippe.frederick@ugam.ca

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modeling autobiographical memories is more concerned about the *rememberer* (Robinson, 1996). This interest has generated several studies investigating the characteristics of autobiographical memories that are associated with general positive functioning. Despite considerable evidence of linkages between autobiographical memory and well-being, we propose that previous research may have overlooked some core psychological components of autobiographical memories. Specifically, we seek to illustrate that the psychological needs of autonomy, competence, and relatedness in autobiographical memories play a critical role in people's well-being.

### On Autobiographical Memories

It is well recognized that specific life experiences have an effect on people's functioning and well-being. For example, negative experiences such as childhood trauma not only impact people's mental health as a child, but also exert a continuing pervasive effect into adulthood (Thomas, 2003). Positive experiences of attachment, success, and self-expression usually fulfill people's self-confidence and promote their self-growth (Deci & Ryan, 2000). One way these life experiences, positive or negative, can affect people's well-being immediately and over time is that people use the memories of these experiences to guide their choices, attitudes, and actions in life, which has an important consequential impact on their well-being (Pillemer, 2003). Important life experiences are encoded in the memory system as autobiographical memories and remain associated with the cognitive-affective component experienced during the initial event (Conway, 2008; Conway & Pleydell-Pearce, 2000). In this article, we propose that the concept of need satisfaction is one important cognitive-affective component that characterizes many autobiographical memories and that it can help explain the adaptive significance of autobiographical memories for well-being.

### On Need Satisfaction

Psychological need satisfaction is based on self-determination theory (Deci & Ryan, 2000) and grounded in a phenomenological and humanistic perspective rather than in a strict personality one. Self-determination theory does not focus on individual differences in the strength of motives (e.g., whether achievement strivings are more important for a person than another) but is rather interested in people's level of satisfaction of innate and universal needs. According to

self-determination theory (Deci & Ryan, 2000), humans have an overarching goal of psychological growth, which is expressed through the pursuit of fulfillment of three psychological needs: autonomy, competence, and relatedness. *Autonomy* refers to the need to feel volitional and authentic in one's actions. *Competence* is defined as the need to feel effective and efficacious. *Relatedness* refers to the need to feel connected and cared for by others and to care for others in turn. Satisfaction of these three needs provides people with the necessary nutrients for psychological growth and the healthy development of their well-being (Deci & Ryan, 2000). A great deal of research has highlighted the fundamental nature of these three needs across diverse domains and cultures (e.g., Deci et al., 2001; Sheldon, Elliot, Kim, & Kasser, 2001) and has shown that their satisfaction in everyday life is positively associated with measures of well-being, such as psychological growth, purpose and meaning in life, general life satisfaction, and psychological adjustment (e.g., Meyer, Enstrom, Harstveit, Bowles, & Beevers, 2007; Reis, Sheldon, Gable, Roscoe, & Ryan, 2000; Sheldon, Ryan, & Reis, 1996).

### Need Satisfaction and Autobiographical Memories

Because of the fundamental nature and prominence of these three psychological needs across situations, their need satisfaction representations should remain attached to a majority of significant autobiographical memories. In addition, because people frequently use their autobiographical memories to guide their choices, attitudes, and actions in life (Pillemer, 2003), the need satisfaction representations attached to these memories should affect people's well-being accordingly. More specifically, memories characterized by need satisfaction should signal possibilities for psychological growth and the opportunity to build and expand the self (Deci & Ryan, 2000; Hodgins & Knee, 2002), which should lead to well-being. Conversely, memories characterized by need thwarting should signal a potential threat to the self and to the innate psychological growth goal and should lead to self-closure and strategies that seek to protect the self (Deci & Ryan, 2000; Hodgins & Knee, 2002), which should detract from well-being.

One type of frequently used and thought about memories are self-defining memories. Self-defining memories are defined as autobiographical memories that are emotional, vivid, repeatedly retrieved, linked to other similar memories, and that are believed to play an im-

portant role in defining one's identity and perception of oneself (Singer & Salovey, 1993). It is posited that these types of memory represent people's enduring concerns and that people are likely to refer to these memories in their life to guide their actions (Singer & Salovey, 1993). Consequently, the level of need satisfaction characterizing these memories should have an important impact in people's well-being.

### Other Autobiographical Memory Approaches

The study of autobiographical memories in the field of personality and social psychology is characterized by three major approaches. A first approach is that of narrative life stories (McAdams, 2001) and focuses on identifying a number of themes and sequences (e.g., personal growth) present in people's autobiographical narratives that are related to well-being (e.g., Adler, Kissel, & McAdams, 2006; Bauer, McAdams, & Sakaeda, 2005; King, Scollon, Ramsey, & Williams, 2000). The central idea is that the themes people include in their narrative and the ways they tell their story (the structure) reflect emergent aspects of their personality, tapping into the intentions and meanings people use to make sense of events in their lives (Bauer et al., 2005).

A related approach assumes that people may be unaware of certain aspects of their personality that would be expressed in the content and structure of their autobiographical memory narratives (Woike, 2008). This research has mostly focused on implicit motives, such as the motives for power, achievement, and intimacy. These motives have been coded from autobiographical memories and have been shown to relate to well-being, especially when only intrinsic, positive, related themes are taken into account (e.g., Bauer & McAdams, 2004; King & Noelle, 2005). Both of these approaches described use judges to code the different themes from participants' narrative materials.

A third approach to understanding the adaptive role of autobiographical memories has focused on their qualitative and functional aspects. This third approach departs from the first two in that data are not obtained by coding autobiographical memories, but rather by directly asking the participants about certain qualities or functions of a memory (but see Pasupathi, Lucas, & Coombs, 2002). Within the qualitative aspects, research has examined, for instance, the vividness of a memory or its reliving sensation, the perspective of a memory (first or third person), its coherence, its significance, or the age of the memory. Within the functional perspective, research has

focused on how much a memory was rehearsed (Alea & Bluck, 2007), shared with others (Pasupathi, 2003), or whether it has served as a lesson (Pratt, Arnold, Norris, & Filyer, 1999). This approach is related to the first one in the sense that reflecting on past events or talking about them with others is seen as an important way in which people develop a life story or a narrative identity/personality (e.g., Habermas & Bluck, 2000; McLean & Breen, 2009). These memory aspects have also been shown to be related to well-being (e.g., McLean & Breen, 2009; Pals, 2006).

The need satisfaction perspective is different from these three other approaches. First, the narrative approach of autobiographical memories focuses on individual differences in autobiographical narratives, representing the intentions and meanings that people use to make sense of the events in their lives (Bauer et al., 2005). Need satisfaction in a memory focuses on how a past event has actually been experienced (and is recalled to have been experienced). The implicit motives approach focuses on individual differences in the strength of some motives (e.g., achievement, communion). As mentioned earlier, the need satisfaction perspective does not focus on the importance of some motives (or needs) in people's lives but on whether the three fundamental needs are satisfied or thwarted (the term *need* is indeed used to refer to the innate, universal, and essential nature of these needs, in contrast to the term  *motive*, which represents a personal inclination or personality difference). Finally, the qualitative perspective highlights different structural qualities of a memory, whereas the functional perspective specifies what people do with their memories. Thus, the need satisfaction approach is relatively independent of all these other approaches. In addition, another important aspect of the need satisfaction perspective is that it relies on a phenomenological perspective. This implies that people can be consciously aware of whether their needs have been satisfied or thwarted in a specific past event when asked about it. This is in contrast with the two first perspectives presented earlier, which rely on coding participants' narrative materials to extract the personality components that researchers are interested in.

### **Autobiographical Memories and Semantic Self-Knowledge**

Autobiographical memories and semantic self-knowledge are two independent databases informing the self. Cognitive and neuropsy-

chological research on this topic has suggested that episodic memories and semantic self-knowledge structures are stored in different areas of the brain (Conway, 2008; Craik et al., 1999) and play different functional roles (Klein & Loftus, 1993; Tulving, 1987).

Whereas semantic self-knowledge is generally applied at the person level, autobiographical memories are used to inform one about how to behave in specific instances (Klein, Cosmides, Tooby, & Chance, 2002). Therefore, autobiographical memories should have an additional predictive utility for understanding meaningful life outcomes above and beyond person-level measures referring to semantic self-knowledge, such as traditional questionnaire measures of personality (Lodi-Smith, Geise, Roberts, & Robins, 2009). Research from all the approaches presented earlier found supporting evidence for this claim. For instance, the presence of growth themes (intrinsic and integrated memories) or of some types of sequence in important memories postulated to constitute people's life stories—such as turning points, self-defining memories, lower points, or narratives of personality change—were found to be associated with well-being, over and above some of the common five personality traits, perceived personality change, or attributional style (Adler et al., 2006; Bauer et al., 2005; Lodi-Smith et al., 2009). Research on implicit motives has shown that themes of achievement and intimacy coded from autobiographical memories were mostly uncorrelated with self-reports measuring trait-related achievement and communion and predicted different outcomes (see Woike, 2008). In line with this theoretical and empirical evidence, we expected that need satisfaction in memories would also be independent of semantic self-knowledge measures in its association with well-being.

### The Present Research

The purpose of the present research was to show that need satisfaction for autonomy, competence, and relatedness are core psychological components of autobiographical memories because they are the basis of the cognitive-affective component of autobiographical memories. Across three studies, participants described a self-defining memory, that is, a memory representing the person's enduring concerns and that is frequently thought about. Our general hypothesis was that need satisfaction in self-defining memories would be positively associated with well-being. In Study 1, we planned to test this hypothesis while

assessing memory need satisfaction both by self-ratings and coded ratings. In addition, in all three studies, it was expected that level of need satisfaction in autobiographical memories would be associated with well-being over and above several other memory components identified in past research through the narrative, implicit motives, or memory quality/functional approaches. Finally, we also hypothesized that need satisfaction in autobiographical memories would be associated with well-being over and above semantic self-knowledge measures.

### STUDY 1

In Study 1, we first developed a method to accurately code satisfaction of the need for autonomy, competence, and relatedness in autobiographical memories. We also developed a self-rating scale for participants to rate their own need satisfaction in an autobiographical experience.

On the basis of self-determination theory (Deci & Ryan, 2000), which supposes that people can have a good and accurate subjective sense of their need satisfaction levels within a situation, we expected that the correlation between need satisfaction, as coded by judges and as rated by the participants, would be large. In line with self-determination theory, it was also expected that satisfaction of these three needs (either coded or rated) would be moderately correlated to each other and would converge on a single dimension in a factorial analysis. Finally, we expected that need satisfaction, either coded by judges or self-rated by the participants, would be correlated with well-being measures to the same extent.

A second purpose of Study 1 was to show that need satisfaction constitutes an important memory component that has an incremental predictive value with respect to a number of narrative and implicit motives measures coded from autobiographical memories. We expected that need satisfaction would have an incremental predictive value with respect to well-being measures, over and above several coded memory components used in past research—that is, integrative and intrinsic memories (e.g., Bauer et al., 2005), redemption and contamination sequences (McAdams, Reynolds, Lewis, Patten, & Bowman, 2001), degree of closure (King et al., 2000), and achievement and intimacy motives (Bauer & McAdams, 2004), which were also all hypothesized to correlate with well-being based on the past research cited earlier.

Finally, a third purpose was to illustrate the distinction between autobiographical memories and semantic self-knowledge. Autobiographical memory need satisfaction (coded and self-rated) was expected to saturate a dimension, whereas person-level measures of need satisfaction in one's life were expected to correspond to a second and different dimension. As past research has shown for other memory components (e.g., Bauer et al., 2005), we expected that need satisfaction in autobiographical memories, whether coded by judges or rated by the participants themselves, would reflect information about the person's well-being that is not fully accessible through the person's semantic self-knowledge. Therefore, it was also hypothesized that autobiographical memory need satisfaction (coded and rated) would remain significantly associated with well-being, even once person-level semantic self-knowledge measures were controlled for, such as personality traits and need satisfaction experienced in general in one's life.

## Method

### *Participants*

A total of 244 undergraduate and graduate students (147 women, 97 men) from a Canadian university took part in this study. The mean age was 29.68 years ( $SD = 9.29$  years).

### *Measures*

#### *Autobiographical memory*

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.

Thus, participants were free to recall any type of memory and were not guided in selecting one memory of a particular valence.

*Need satisfaction.* Participants were also asked to rate the level of psychological need satisfaction they experienced during the self-defining



event 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 were both need satisfaction and need thwarting in the event or that need satisfaction was not present in the event. They were thus provided with two items assessing each of the three basic psychological needs postulated by self-determination theory (i.e., autonomy, competence, and relatedness). A sample item for autonomy is “I felt free to do things and to think how I wanted”; for competence: “I felt capable or skillful”; and for relatedness: “I felt connected to one or more people.” These items were derived from past research (e.g., Reis et al., 2000; Ryan, Rigby, & Przybylski, 2006; Sheldon et al., 2001) and adapted to assess experience during a past event. A confirmatory factor analysis revealed an excellent fit for a three-factor model,  $\chi^2 = (df = 6, n = 244) = 7.82, p = .25, NNFI = .99, NFI = .99, CFI = 1.00, RMSEA = .035 [.00; .09], SRMR = .024, GFI = .99$ , with factor loading ranging from .52 to .98. These results suggest that the selected items adequately discriminate the three needs. Correlations among the three latent factors were high, ranging from .55 to .85, and the examination of a second-order factor (super factor) yielded virtually the same fit indices, thus indicating that the needs of autonomy, competence, and relatedness can be subsumed under the broader and single concept of need satisfaction. Therefore, all three needs were averaged to yield a need satisfaction index, as is commonly done by self-determination theory researchers (e.g., Deci et al., 2001; Gagné, 2003).<sup>1</sup> Cronbach’s alpha for this index was .82.

#### *Coding of memories by judges*

*Need satisfaction.* Two judges coded participants’ memory for autonomy, competence, and relatedness using the same Likert scale used by the

1. Some researchers have also looked at the distinct association between each need and well-being. However, these researchers have usually used special types of design or method, such as experience samplings or meta-analyses, to make this investigation. This is because all three needs are at least moderately correlated (as shown in Studies 1–3, they all converge on a single dimension), and this may lead to multicollinearity issues. Following Patrick, Knee, Canevello, and Lonsbary’s meta-analysis (2007), we combined the present three studies’ data and regressed our index measure of well-being (hedonic and eudaimonic well-being and psychological adjustment) on all three needs, allowing them to covary with each other’s in the same block ( $n = 712$ ). Results revealed that each need was significantly associated with well-being, with beta coefficients ranging from .10 to .31 (all  $ps < .05$ ). This finding replicates past research showing that all three needs are important.

participants ( $-3$  to  $+3$ ). The judges were blind to the participants' other data and rated the need satisfaction experienced within the event composing the autobiographical memory. More specifically, autonomy was coded as satisfied when the episode description included aspects related to feelings of choice, self-determination or self-concordance, self-initiative, self-expressiveness, feelings of self-control, or feelings of freedom. Autonomy was rated as thwarted when descriptions included aspects related to felt pressure and stress, feelings of being controlled by others or by something, evaluative contexts, inability to decide between alternatives, and feelings of guilt or shame. Competence satisfaction was coded when aspects such as feelings of intrinsic achievement, competency, taking on challenges, belief in one's capacity, or feelings of working hard on something were present in the episode description. Thwarted competence was coded when aspects such as feelings of incompetence, failure, incapacity, and envy of others' success were included in the episode description. Relatedness satisfaction was rated when aspects such as connectedness and affiliation, feelings of being appreciated by others, sharing, or taking care of someone were present. Relatedness was rated as thwarted when aspects such as the loss of a significant other, interpersonal conflict, rejection, or loneliness were present. Adequate inter-judge reliability was obtained for the memory ratings on the first half of the sample ( $n = 122$ ; one-way random intraclass correlations between .80 and .86). One of the two judges coded the remaining memories (total  $N = 244$ ), and this procedure was used for all other coding procedures in Study 1. Below are two samples of narrative of high and low need satisfaction.

High Need Satisfaction: "What I have to say summarizes six years of my thinking and conversations with myself in my thesis. I notice W's eyes are full of pride and those of X are amazed. . . . I thank them, I hear the applause stronger than expected. . . . I ask for one other little moment. . . . I thank my spouse for being there all this time. Turn after turn, I respond to my jury's questions. I do not have to defend my thesis. It is amazing. I receive praise, compliments. . . . The jury goes out to deliberate and comes back. Z declares that the jury unanimously agrees to award me the highest Ph.D. grade."

Low Need Satisfaction: "My grand-mother was at the hospital, and she was taking strong medications. One day I was left alone with her at the hospital. She had taken a lot of medications and she started behaving in a very strange way. She tried to escape from the hospital, and I was alone with her. I tried to stop her but I absolutely couldn't and it was very hard for me to see the person that took care of me acting in such a bizarre way, as though she had lost her mind, so I burst into tears, I wasn't capable of handling the situation and the nurse had to intervene and tie her up."

*Integrative and intrinsic memories.* Integrative memories emphasized the importance of learning, integrating, or otherwise coming to a new or deeper understanding about the self or others. Intrinsic memories emphasized the importance of personal growth, meaningful relationships, and contributing to society (see Bauer et al., 2005, for further coding details). Two judges coded these two themes (+1: theme present; 0: theme not present) and obtained adequate inter-judge reliability for the first half of the material (one-way random intraclass correlations of .72 and .74).

*Redemption and contamination sequences.* Two judges rated the memories for contamination and redemption sequences in line with McAdams and colleagues' (2001) rating procedure. A redemption sequence is a memory description that transforms from a bad, affectively negative life scene to a subsequent good, affectively positive life scene. Conversely, a contamination sequence is a memory description that transforms from a good, affectively positive life scene to a subsequent bad, affectively negative life scene. A score of +1 was attributed to memories showing a redemption sequence and a score of -1 was attributed to memories that showed a contamination sequence. Finally, self-defining memories that did not show either of these two sequences were scored 0 (see McAdams et al., 2001, for further rating details). Adequate inter-judge reliability was obtained on the first half of the sample (one-way random intraclass correlation was .85).

*Closure.* Following the work of King and colleagues (2000) and Pals (2006), closure in participants' autobiographical memory was coded according to the degree to which the memory exhibited evidence of a coherent resolution. Closure was rated on a 5-point scale (1 = *not resolved at all*, 5 = *very resolved*) reflecting the extent to which the participant exhibited a sense of closure with respect to the event/experience described, in terms of the consequences of the experience and a lack of unresolved issues and emotions. Adequate inter-judge reliability was obtained on the first half of the sample (one-way random intraclass correlation was .76).

*Achievement and intimacy motives.* In line with McAdams, Hoffman, Day, and Mansfield (1996), each memory was coded for achievement and intimacy motives. Achievement refers to themes of self-mastery, status/victory, achievement/responsibility, and empowerment. Themes of intimacy include love/friendship, positive dialogue, caring/help, and a sense of community unity. Adequate inter-judge reliability was obtained on the first half of the sample (one-way random intraclass correlation was .80 and .82).

*Well-being*

Three types of well-being were assessed: hedonic well-being, eudaimonic well-being, and psychological adjustment. Hedonic well-being refers to one's general happiness with one's life (Ryan & Deci, 2001), whereas eudaimonic well-being is concerned with self-realization and personal growth (Bauer et al., 2005; Ryan & Deci, 2001; Ryff & Keyes, 1995). Psychological adjustment is more concerned with the absence of psychological symptoms such as depression and anxiety and with high levels of self-esteem.

*Hedonic well-being.* The Satisfaction With Life Scale (Diener, Emmons, Larsen, & Griffin, 1985) was used as a measure of hedonic well-being ( $\alpha = .85$ ).

*Eudaimonic well-being.* A short version of the Psychological Well-Being scale (PWB; Ryff & Keyes, 1995) was used in this study to assess eudaimonic well-being. This short scale assesses six dimensions of well-being, each with three items. However, in the present study, only three of these dimensions—that is, self-acceptance, purpose in life, and personal growth—were used because the PWB's other dimensions (i.e., autonomy, mastery, and relatedness) are related to the three basic psychological needs ( $\alpha = .85$ ). Participants were asked to rate all items presented above on a 7-point Likert scale ranging from 1 (*do not agree at all*) to 7 (*totally agree*).

*Psychological adjustment.* Psychological adjustment was measured with three items ( $\alpha = .61$ ) from the Beck Depression Inventory (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) and with six items ( $\alpha = .83$ ) drawn from the Beck Anxiety Inventory measuring the subjective state of anxiety (see Osman, Kopper, Barrios, Osman, & Wade, 1997). One item assessing self-esteem was also used (Robins, Hendin, & Trzesniewski, 2001). All these items were transformed in  $z$  scores (depression and anxiety measures reverse-scored) and averaged to create a psychological adjustment index. Alpha for this index was .85.

*Self-knowledge measures*

*Personality traits.* The Ten-Item Personality Inventory (TIPI; Gosling, Rentfrow, & Swann, 2003) was used to assess the five factors of personality (i.e., Neuroticism, Extraversion, Openness, Conscientiousness, and Agreeableness). This brief scale uses two pairs of adjectives to assess each of the five personality factors. This scale has yielded correlations between .65 and .87 with the complete Big Five Inventory (John & Srivastava,

1999). Participants were asked to rate, on a 7-point Likert scale (1 = *disagree strongly*, 7 = *agree strongly*), their degree of agreement with each pair of adjectives (e.g., “I see myself as . . . extraverted, enthusiastic”). Adequate evidence of validity and reliability has been found for this instrument (Ehrhart et al., 2009; Gosling et al., 2003). In this study, the interitem correlation for each trait ranged from .11 to .46.

*General need satisfaction.* A short version of the Basic Need Satisfaction in General (Gagné, 2003; Ilardi, Leone, Kasser, & Ryan, 1993) was used to assess participants’ general need satisfaction. Nine items assessed autonomy, competence, and relatedness with three items each. In the present study, Cronbach’s alpha for this complete short scale was .60.

### *Procedure*

Participants were all from a Canadian university and were contacted through their institutional email. An email explained that we were conducting a study about personality and memory. The incentive was that their participation allowed them to be entered into a drawing of four prizes of \$125. The incentive was the same for all studies reported in the present article. Participants were told that participating in this study involved completing an online questionnaire on a secure Web site. Participants were also assured that all their responses would remain confidential and anonymous. Finally, it is important to note that all participants completed the personality traits, general need satisfaction, and well-being measures before describing their autobiographical memory, such that their memory description did not affect their well-being ratings.

## **Results and Discussion**

### *Need Satisfaction (Coded and Rated) and Well-Being*

Correlations between the judge’s scores and participants’ ratings of need satisfaction in the autobiographical memory were relatively large for each need (*r*s between .52 and .59). In addition, this judge’s average score of the three needs correlated at .70 with the participants’ average rating score of the three needs. These results suggest that participants were able to accurately rate their level of autonomy, competence, and relatedness satisfaction in line with what is theoretically expected by self-determination theory’s conception of need satisfaction.

A principal components analysis (PCA) was conducted to examine whether the three needs as coded by the judges and as rated by

the participants would all load on a same single factor. Results of this analysis revealed only one factor with an eigenvalue higher than one (3.63), accounting for 60.50% of the variance. All six factor loadings were high for each need, either coded or self-rated, ranging from .68 to .85. These results suggest that (a) all three needs converge on a single factor and should thus be averaged together, and (b) need satisfaction in an autobiographical memory coded by judges converges with the participants' own ratings. Finally, as expected, need satisfaction either coded or rated was positively associated with well-being to about the same extent (see Table 1).

### *Incremental Validity of Need Satisfaction*

Hierarchical regression analyses were conducted to examine the incremental value of need satisfaction with respect to the other coded memory components. Each well-being measure was hierarchically regressed on each memory component divided in five steps—(1) intrinsic and integrative memories, (2) redemption/contamination sequences, (3) closure, and (4) intimacy and achievement motives—with an additional fifth step including need satisfaction as coded by the judges. Results are shown in Table 2. Replicating past research, intrinsic memories, but not integrative memories, were associated with hedonic well-being (Bauer et al., 2005), as well as redemption and contamination sequences (McAdams et al., 2001) and intimacy and achievement motives (Bauer & McAdams, 2004). As predicted, need satisfaction made a strong additional contribution to the prediction of hedonic well-being. Eudaimonic well-being was significantly predicted by integrative memories (but not by intrinsic memories; Bauer et al., 2005), redemption and contamination sequences, and achievement motives. Again, need satisfaction showed an incremental predictive value with respect to eudaimonic well-being. Finally, in line with past research, redemption and contamination sequences were associated with psychological adjustment (Adler et al., 2006). Closure was only marginally associated with psychological adjustment, whereas achievement was significantly positively associated with it. Need satisfaction was also significantly and positively associated with psychological adjustment, over and above all these memory components.

Overall, need satisfaction accounted for 2.3% to 5.2% of the variance of the well-being measures and for 21% to 40%

**Table 1**  
**Study 1: Correlations Among Need Satisfaction (Coded and Rated), Other Coded Memory Variables,**  
**and Well-Being Measures**

	1	2	3	4	5	6	7	8	9	10
Need satisfaction coded (1)	—									
Need satisfaction self-rated (2)	.70**	—								
Intrinsic memories (3)	.56**	.44**	—							
Integrative memories (4)	.16*	.11	.10	—						
Redemption/contamination (5)	.55**	.31**	.23**	.23**	—					
Closure (6)	.54**	.28**	.39**	.05	.38**	—				
Achievement motive (7)	.32**	.20**	-.09	.00	.32**	.15*	—			
Intimacy motive (8)	.43**	.39**	.62**	.04	.17**	.28**	-.14*	—		
Hedonic well-being (9)	.38**	.34**	.19**	.05	.20**	.23**	.16*	.23**	—	
Eudaimonic well-being (10)	.28**	.31**	.10	.15*	.22**	.12	.18**	.12	.46**	—
Psychological adjustment (11)	.34**	.34**	.10	.09	.20**	.19**	.21**	.10	.67**	.52**

*Note.* \* $p < .05$ . \*\* $p < .01$ .

**Table 2**  
 Study 1: Hierarchical Regression Analyses of Narrative Memory Sequences, Motives, and Need Satisfaction on Hedonic and Eudaimonic Well-Being and Psychological Adjustment

	Hedonic Well-Being	Eudaimonic Well-Being	Psychological Adjustment
Step 1: Intrinsic memories	.19**	.07	.08
Integrative memories	.03	.15*	.09
Step 2: Redemption/contamination	.17*	.19*	.17**
Step 3: Closure	.14*	.04	.13 $p = .08$
Step 4: Achievement	.14*	.14*	.16*
Intimacy	.18*	.11	.08
Step 5: Need satisfaction coded	.33** (.24**)	.24* (.27**)	.36** (.31**)
Total $R^2$	.155	.108	.129
$R^2_{\text{change}}$ due to need satisfaction	.044 (.041)	.023 (.049)	.052 (.068)

*Note.*  $N = 244$ . The numbers in parentheses are the results for need satisfaction as rated by the participants.

\* $p < .05$ . \*\* $p < .01$ .

of the variance predicted by all identified memory components. Furthermore, results were virtually the same when the need satisfaction index, as rated by the participants, was used (see Table 2). In addition, once self-rated need satisfaction was entered in the regression, coded need satisfaction did not significantly predict additional variance in any of the three well-being measures. This latter result suggests that self-ratings of need satisfaction are equivalent to the coding of need satisfaction in the prediction of well-being.

### *Autobiographical Memories and Semantic Self-Knowledge*

It was hypothesized that measures related to autobiographical memories would be relatively independent of those related to semantic self-knowledge. It was expected that need satisfaction either coded by judges or rated by the participants would constitute a dimension, while need satisfaction experienced in general in one's life would saturate a second, different dimension. As expected, the correlation between need satisfaction in memory and need satisfaction in general was small to medium in size ( $r = .25, p < .05$ ). To further examine this issue, a PCA with a Varimax rotation was conducted including the



need for autonomy, competence, and relatedness from the autobiographical memory as coded by judges and rated by the participants, and as experienced in life in general and reported by the participants. Results of this analysis revealed two factors with an eigenvalue higher than one (3.88 and 1.34), accounting for 58% of the variance. The first factor was saturated by the three needs in autobiographical memory, as coded by judges and rated by the participants (the six factor loadings ranging from .65 to .86). The second factor was saturated by the three needs in general (the three factor loadings ranging from .68 to .78). In addition, there were no cross-loadings higher than .19. The fact that autobiographical need satisfaction (either coded or self-rated) and general need satisfaction ratings loaded on two separate factors suggests that episodic memories and person-level self-knowledge are distinct sources of information.

A second line of evidence for the above assertion would be to show that need satisfaction in autobiographical memories is associated with well-being over and above person-level semantic self-knowledge measures, such as traits and general need satisfaction experience. Correlational results revealed that need satisfaction in memory and all five traits were correlated in the expected directions and were all small to medium in size ( $r$ s ranging from  $-.17$  to  $.21$ ). Hierarchical regression analyses were then conducted, with the five traits and general need satisfaction entered at Step 1 and need satisfaction in the autobiographical memory as coded by judges at Step 2. A regression was conducted for each of the three well-being measures separately. Age and gender were also controlled for in the analysis at Step 1. Results revealed that need satisfaction in the autobiographical memory was associated with all three measures of well-being, over and above age, gender, traits, and general need satisfaction (see Table 3). Results were virtually the same when using need satisfaction in memories as rated by the participants in the regression. These results further suggest that autobiographical memories capture and reflect an important process with respect to people's well-being that is distinct from person-level semantic self-knowledge.

## STUDY 2

In Study 2, we sought to replicate the main results of Study 1 while controlling for a number of *self-rated* memory components that have been examined in past research. These memory components included

**Table 3**

Study 1: Hierarchical Regression Analyses of Age, Gender, Traits, General Need Satisfaction, and Need Satisfaction in Memories on Hedonic and Eudaimonic Well-Being and Psychological Adjustment

	Hedonic Well-Being	Eudaimonic Well-Being	Psychological Adjustment
Step 1: Age	-.01	-.04	.09
Gender	-.01	.03	.05
Extraversion	.04	.15*	.07
Agreeableness	-.09	-.03	-.10*
Neuroticism	-.25**	-.07	-.39**
Openness	-.03	.07	-.01
Conscientiousness	.11*	.20**	.08
General need satisfaction	.52**	.37**	.43**
Step 2: Need satisfaction coded	.22** (.16**)	.12* (.16**)	.16** (.16**)
Total $R^2$	.47	.31	.50
$R^2_{\text{change}}$ due to need satisfaction	.042 (.021)	.012 (.021)	.021 (.021)

Note.  $N = 244$ . The numbers in parentheses are the results for need satisfaction as rated by the participants.

\* $p < .05$ . \*\* $p < .01$ .

how much a memory has been shared with others (e.g., Bluck, Alea, Habermas, & Rubin, 2005), its level of thought rehearsal (Alea & Bluck, 2007), its vividness (Pillemer, 2003), and personal significance (Alea & Bluck, 2007). Valence of the autobiographical memory was also measured. Other research has also looked at the types of explicit motive (in contrast to implicit motives) included in a memory, such as achievement, intimacy, and power (i.e., the extent to which people consciously sought this specific type of goal during a past event; see Sutin & Robins, 2008). As in Study 1, it was hypothesized that need satisfaction in autobiographical memories would be associated with well-being. It was also expected that need satisfaction would show an incremental predictive value with respect to well-being, above and beyond the other self-rated memory components presented earlier. Finally, it was also predicted that need satisfaction in autobiographical memories would again be associated with well-being over and above traits and general need satisfaction. However, in Study 2, we used the full versions of the Big Five traits and the general need satisfaction measures in order to ensure that all the variance was accounted for by these measures.

## Method

### *Participants and Procedures*

A total of 309 undergraduate and graduate students (235 women, 74 men) from a Canadian university took part in this study. Mean age was 25.91 years ( $SD = 6.24$  years; range = 18–56 years). Procedures in Study 2 were identical to those presented in Study 1.

### *Measures*

*Personality traits.* The Big Five Inventory (John & Srivastava, 1999) was used to assess the five common traits of personality. This well-validated measure requires participants to rate on a 5-point scale the extent to which each of 44 items describes their own personality. In this study, Cronbach's alpha coefficients were .77 and above for each of the five traits.

*General need satisfaction.* The Basic Psychological Needs Scale (Gagné, 2003; Ilardi et al., 1993) was used to assess participants' general need satisfaction. A total of 21 items (1 = *not true at all*, 7 = *definitely true*) assess autonomy, competence, and relatedness ( $\alpha = .76$ ).

*Well-being.* The same well-being measures used in Study 1 were again used in Study 2. However, because results in Study 1 were the same for each well-being measure taken separately, we averaged all three well-being measures in an index. The Cronbach's alpha coefficient for this index was .81.

*Autobiographical memory.* As in Study 1, participants were asked to describe a self-defining memory. Participants also rated a number of single items related to various memory components, such as vividness ("The memory I have for this event is vivid (or clear in my mind) and detailed"), significance ("This memory is significant/important for me"), rehearsal ("I frequently think about this memory"), and sharing with others ("I frequently talk about or share this memory with others"). These items were drawn from the Memory Quality Questionnaire (Alea & Bluck, 2007) and were slightly adapted to fit our Likert scale. Participants also rated the extent to which they had motives of achievement ("to do something well or to excel at something"), power ("to exert power or control over others"), or intimacy ("to feel close or intimate with others") during the experience or event described in their memory. These items were taken from Sutin and Robins (2008). Participants also rated the valence of their memory ( $-3 = \textit{very negative}$ ,  $+3 = \textit{very positive}$ ). As in Study 1, participants also rated their psychological need satisfaction. However, in order to be able to make fair comparisons among need satisfaction and all other

single-item memory components, each need was assessed with only one item (one item assessing autonomy, one item for competence, and one item for relatedness). Specifically, the item of each need with the highest factor loading in the CFA presented in Study 1 was retained. The participants thus rated all these items on a  $-3$  to  $+3$  Likert scale.

## Results and Discussion

### *Need Satisfaction and Well-Being*

As in Study 1, all three needs were highly correlated with each other ( $r$ s = .55 to .74), and a PCA extracted only one factor, accounting for 76% of the variance and factor loadings between .82 and .91. All three needs were thus averaged together. Table 4 shows that need satisfaction was moderately positively correlated with well-being. Need satisfaction was also only weakly correlated with all other memory components, except for significance and valence. While the correlation with significance was small to moderate ( $r = .25$ ), the one with valence was much higher ( $r = .75$ ). This correlation was expected since the emotional response to an event is tightly related to the need satisfaction experience (see Sheldon et al., 2001). This is also particularly the case with positive memories (but see Study 3). Finally, the other memory components showed small to moderate correlations with well-being.

### *Incremental Validity of Need Satisfaction*

A hierarchical regression was conducted to examine the incremental predictive value of need satisfaction with respect to well-being, over and above all other memory components. The three motives were entered at Step 1; followed by memory significance, vividness, rehearsal, and sharing at Step 2; valence at Step 3; and need satisfaction at Step 4. At Step 1, achievement was significantly related to well-being ( $\beta = .19, p < .01$ ), as well as power ( $\beta = -.15, p < .05$ ). At Step 2, significance ( $\beta = .16, p < .05$ ), rehearsal ( $\beta = -.17, p < .05$ ), and sharing ( $\beta = .12, p < .05$ ) were significant. Valence at Step 3 ( $\beta = .31, p < .01$ ) and need satisfaction at Step 4 ( $\beta = .32, p < .01$ ) were also significantly associated with well-being. Thus, need satisfaction significantly contributed to the prediction of well-being, over and above all other memory components entered in Steps 1–3,  $F_{\text{change}}(1, 300) = 16.70, R_{\text{change}}^2 = .043, p < .01$ .

**Table 4**  
**Study 2: Means, Standard Deviations, and Correlations**

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Need satisfaction (1)	1.20	1.84	—														
Achievement (2)	1.25	1.86	.16	—													
Power (3)	-1.39	1.79	-.14	.09	—												
Intimacy (4)	0.43	1.98	.14	.14	.12	—											
Vividness (5)	2.41	1.06	.13	-.04	-.07	.09	—										
Significance (6)	2.54	0.97	.26	.07	-.07	.17	.42	—									
Rehearsal (7)	2.39	1.06	-.03	.03	.01	.14	.50	.44	—								
Sharing (8)	1.25	1.95	.12	.02	.00	.14	.26	.26	.38	—							
Valence (9)	1.13	2.37	.75	.19	-.15	.15	.04	.23	-.07	.06	—						
Extraversion (10)	3.37	0.83	.15	.04	.03	.05	.15	.12	-.01	.15	.16	—					
Agreeableness (11)	3.87	0.63	.19	.06	-.19	.03	.10	.12	.04	.11	.13	.11	—				
Conscientiousness (12)	3.78	0.64	.19	.04	-.11	-.03	.12	.22	.07	.13	.18	.15	.29	—			
Neuroticism (13)	2.94	0.86	-.29	-.10	.05	.06	.03	-.02	.13	-.03	-.25	-.12	-.33	-.27	—		
Openness (14)	3.86	0.58	.18	.05	.09	.16	.07	.20	.07	.03	.12	.17	.18	.03	-.03	—	
General need satisfaction (15)	5.15	0.65	.33	.09	-.10	.11	.12	.24	.06	.14	.31	.45	.43	.40	-.42	.25	—
Well-being	0.00	0.73	.44	.19	-.12	.09	.08	.17	-.01	.12	.38	.37	.39	.44	-.57	.19	.75

*Note.*  $N = 309$ .  $r_s > .11$ ,  $p < .05$ .

*Autobiographical Memories and Semantic Self-Knowledge*

The contribution of need satisfaction to well-being over and above person-level self-knowledge measures such as traits and general need satisfaction was examined within a hierarchical regression. All five traits were entered at Step 1 along with general need satisfaction, age, and gender. At Step 2, need satisfaction in the memory was entered. Results revealed that even when traits, general need satisfaction, age, and gender were taken into account, need satisfaction in the memory was still significantly associated with well-being ( $\beta = .15$ ,  $p < .001$ ), along with Conscientiousness ( $\beta = .14$ ,  $p < .001$ ), Neuroticism ( $\beta = -.27$ ,  $p < .001$ ), age ( $\beta = -.07$ ,  $p < .05$ ), and general need satisfaction ( $\beta = .49$ ,  $p < .001$ ). Need satisfaction in the memory accounted for a significant portion of the variance,  $F_{\text{change}}(1, 300) = 19.38$ ,  $R_{\text{change}}^2 = .02$ ,  $p < .01$ , over and above traits, general need satisfaction, age, and gender. These results replicate those of Study 1, this time using the full assessment versions of personality traits and general need satisfaction.

**STUDY 3**

Study 2 showed that need satisfaction and valence were strongly correlated ( $r = .75$ ). Even if need satisfaction predicted well-being over and above valence in Study 2, their high correlation raises some concerns about the differentiation between need satisfaction and valence. One issue with Study 2 is that when asked to report a self-defining memory, people usually report a positive one, thus confounding need satisfaction with the positive valence of the majority of the reported memories. To address this issue, in Study 3, we asked participants to report a negative self-defining memory. Although we expected that there would be a lower level of need satisfaction in negative memories compared to positive memories, need satisfaction in negative events should still correlate with well-being. For example, even in an interpersonal conflict, people may feel autonomy in the sense that they could have freely expressed who they truly are and set their limits. People may also feel relatedness through being supported by another person after having failed at an important task. Finally, certain negative events may be more need thwarting than others; a negative event thwarting only one of the three needs should be less detrimental for the person's well-being than an event thwart-

ing all three needs. Thus, we expected that need satisfaction, even in memories for negative events, would be variable and positively associated with well-being. Showing that need satisfaction in negative memories is predictive of well-being would be further evidence that need satisfaction can be distinguished from the valence of an autobiographical memory.

In Study 3, we examined again the incremental predictive value of need satisfaction over two memory components yet unexamined in the present research: the age of the memory and the perspective of the memory. However, we also wanted to explore whether these memory components would interact with need satisfaction. First, there is a common belief that older memories may have a more profound effect with respect to people's well-being and life than more recent memories. However, it is unclear whether this effect would affect need satisfaction. Thus, we wanted to examine the relationship between need satisfaction and age of the memory and whether it would alter the relationship between need satisfaction in memory and well-being. Second, some research has shown that the visual perspective that people take to retell a memory matters with respect to their self, whether they adopt a first- or a third-person perspective (Libby & Eibach, 2002). In a first-person memory, people "see" the event from the same visual perspective that they originally did. In their memory, they are looking out at the surroundings through their own eyes. A third-person perspective occurs when people "see" the event of their memory from an observer's visual perspective, such that in their memory, they can actually see themselves as well as the surroundings. Research has shown that people report seeing a memory from a third-person perspective when there is a mismatch between their memory and their actual self-concept (Libby & Eibach, 2002). Therefore, it is plausible that memories from a first- or a third-person perspective may influence differently the relationship between need satisfaction and well-being. Additionally, we examined the role of valence in a negative autobiographical memory.

Finally, we also intended to show this association between need satisfaction in negative memories and well-being while controlling for self-determined personality orientation. In Studies 1 and 2, we controlled for the Big Five traits as semantic self-knowledge structures. However, these traits have not been frequently implicated in motivation *per se*. Self-determination theory suggests that need satisfaction fuels self-determined motivation in general, which can be

measured by assessing people's general self-determined orientation (Deci & Ryan, 1985; Pelletier & Dion, 2007). Therefore, we expected to show that need satisfaction in memories would be associated with well-being, over and above a self-determined personality orientation, since this measure corresponds to a person-level self-knowledge.

## Method

### *Participants and Procedures*

A total of 159 undergraduate students (81 women, 78 men) from a Canadian university took part in this study. Mean age was 19.67 years ( $SD = 2.89$  years). Procedures were the same as those presented in Studies 1 and 2.

### *Measures*

*Self-determined orientation.* Participants' self-determined orientation was measured using the Global Motivation Scale (GMS; Pelletier & Dion, 2007). This scale is composed of 18 items measuring six types of internalization process (types of regulation)—that is, intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation, and absence of regulation or amotivation—with three items each (e.g., "In general, I do things . . . for the pleasure of learning something new"). A continuum-index of self-determination was computed by attributing a different weight to each subscale (see Pelletier & Dion, 2007).

*Well-being.* The same well-being measures used in Studies 1 and 2 were again used in Study 3. As in Study 2, all well-being measures were averaged in an index. The Cronbach's alpha coefficient for this index was .81.

*Autobiographical memory.* The same instructions used in Studies 1 and 2 were again used in Study 3, with the exception that participants were specifically asked to describe a *negative* self-defining memory. Participants also rated the valence of their memory, the perspective they had with respect to their memory as being either a first- or third-person perspective (instructions were taken from Libby & Eibach, 2002), their need satisfaction levels, and indicated in years how old their memory was.

## Results and Discussion

### *Need Satisfaction and Well-Being*

Again, all three needs were correlated with each other ( $r$ s ranging from .36 to .53,  $ps < .001$ ), and all converged on a single factor



within a PCA, accounting for 64.19% of the variance and with factor loadings ranging from .76 to .86. Table 5 reports means, standard deviations, data range, and correlations among all study variables. Correlational results revealed that need satisfaction was positively associated with well-being, but unrelated to self-determined orientation. Also, need satisfaction was correlated with valence to a much lower extent compared to Study 2, thus indicating that valence and need satisfaction mostly correlate when the memory is positive in valence. Interestingly, valence was unrelated to well-being. Finally, need satisfaction was negatively associated with the age of the memory and unrelated to the perspective taken (first or third person) with respect to the memory.

### *Incremental Validity of Need Satisfaction*

A hierarchical regression analysis was conducted with, entered at Step 1, the valence and the age of the memory and the person's perspective with respect to the memory (0 = first person; 1 = third person). At Step 2, participants' age, gender (0 = female; 1 = male), and self-determined orientation were entered, whereas at Step 3, need satisfaction was entered. Results revealed that at Step 3, the only significant predictors of well-being were the self-determined orientation ( $\beta = .51, p < .01$ ), gender ( $\beta = .21, p < .01$ ), and need satisfaction ( $\beta = .33, p < .01$ ), with need satisfaction predicting 8.9% of the variance of well-being, over and above the other memory components and self-determined orientation,  $F_{change}(1, 152) = 23.42, p < .01$ . Interaction terms were also computed between need satisfaction and the age of the memory or the perspective of the memory. All interactions were nonsignificant. Taken together, these results suggest that need satisfaction in negative autobiographical memories is also associated with well-being. Results also showed that controlling for the age of the memory, its valence, the perspective taken with respect to this memory, and people's self-determined orientation did not affect this association. This latter finding is noteworthy because self-determined orientation was strongly associated with well-being but need satisfaction in memories was unrelated to self-determined orientation. This result further underscores the difference between autobiographical memories and person-level self-knowledge structures.

**Table 5**  
**Study 3: Means, Standard Deviations, Data Range, and Correlations**

	Mean	<i>SD</i>	Data Range	1	2	3	4	5
Memory need satisfaction (1)	-0.66	1.33	-3 to +3	—				
Memory valence (2)	-2.38	0.78	-3 to 0	.32**	—			
Memory perspective <sup>a</sup> (3)	0.57	0.50	0 and 1	-.11	-.08	—		
Age of the memory (4)	4.98	4.66	1 to 20	-.17*	.06	.11	—	
Self-determined orientation (5)	5.63	3.96	-8.67 to 15.17	.02	-.01	.07	.05	—
Well-being (6)	0.00	0.79	-2.68 to 1.41	.32**	.11	.08	.09	.50**

*Note.*  $N = 159$ .

<sup>a</sup>Overall, 91 participants reported seeing their memory from a first-person perspective, whereas 68 reported seeing it from a third-person perspective.

\* $p < .05$ . \*\* $p < .01$ .

## GENERAL DISCUSSION

The present research showed that need satisfaction characterizing positive and negative autobiographical memories constitutes a distinct and core memory component that is correlated with well-being. The present research provided empirical evidence that need satisfaction is distinct from a number of other memory components and possesses a moderately strong association with various well-being measures. In addition, need satisfaction was shown to relate to well-being above and beyond person-level measures, such as traits, general need satisfaction, and self-determined orientation. A number of central findings and contributions to the literature that can be derived from the present research are underscored below.

### Coded and Self-Rated Need Satisfaction in Autobiographical Memories and Well-Being

The present research sought to develop a coding scheme to measure need satisfaction in memories in line with self-determination theory's definitions of the needs for autonomy, competence, and relatedness. In addition, on the basis of past research (Reis et al., 2000; Ryan et al., 2006; Sheldon et al., 2001), a self-rating method was developed to assess these needs in memories. As expected by self-determination theory, satisfaction of these three needs was correlated with each other and loaded on the same factor in a factor analysis. Specifically, they were found to be distinct from each other in a first-order confirmatory factor analysis but to converge within a second-order factor. Another important finding was that need satisfaction as coded by judges and as rated by the participants themselves were highly correlated. In addition, need satisfaction coded by the judges and rated by the participants was found to be associated with the various well-being measures at virtually the same strength. Furthermore, all three needs, both coded and self-rated by participants, loaded on the same factor in a factor analysis and coded need satisfaction did not predict well-being measures above self-rated need satisfaction in Study 1. These results highlight that people are capable of accurately reporting the level of need satisfaction they experienced in past events. This finding is methodologically important, since memory coding consumes a lot of time and resources. That objective coding and self-rating methods lead to the same results provides evidence that memory coding may be replaced with appropriate self-ratings

when need satisfaction is measured. Finally, the present research shows that it is possible to collect valid autobiographical narratives using online studies.

### **Why Does Need Satisfaction in Memories Predict Well-Being?**

People frequently use their memories of past events to guide their choices, attitudes, and actions in life (Pillemer, 2003). Autobiographical memories thus become an important source of information for the self, dictating whether certain situations should be approached or avoided and how. Self-defining memories are certainly one type of autobiographical memories that are frequently used to this effect and that consequently can have an important effect in people's life. It was thus expected that the cognitive-affective component of these self-defining memories in terms of need satisfaction or need thwarting would have an important effect on people's well-being. Indeed, self-defining memories characterized by need satisfaction and used to guide one's actions in life should frequently signal possibilities for psychological growth and the opportunity to build and expand the self (Deci & Ryan, 2000; Hodgins & Knee, 2002), which over time should promote well-being. Conversely, self-defining memories characterized by need thwarting should frequently signal a potential threat to the self and to the innate psychological growth goal and should lead to self-closure and strategies that seek to protect the self (Deci & Ryan, 2000; Hodgins & Knee, 2002), which over time should negatively affect people's well-being. Although the correlational designs of the present research do not allow us to specifically address the mechanism through which need satisfaction in memories affects people's well-being, we believe that the above process merits investigation in future research.

### **Incremental Validity of Need Satisfaction**

Our results generally replicated past research on memory components and well-being. In Study 1, intrinsic memories were found to be associated with hedonic well-being and not with eudaimonic well-being, whereas the reverse finding was found for integrative memories, thus replicating Bauer and colleagues (2005). Redemption and contamination sequences (McAdams et al., 2001), closure (King et al., 2000), and achievement and intimacy motives (e.g., Bauer & McAdams, 2004) were also found to correlate with well-being

measures in line with what past research has found. In Study 2, explicit motives of achievement and power in memories (Sutin & Robins, 2008) were found to be associated with well-being, as well as significance, rehearsal (Alea & Bluck, 2007), sharing (Pasupathi, 2003), and valence (Philippe, Lecours, & Beaulieu-Pelletier, 2009; Sutin & Robins, 2005).

One of the most important findings of the present research showed that need satisfaction was associated with well-being, over and above all these other memory components. In addition, this association was shown for both positive and negative memories. Although need satisfaction and these other memory components were differentiated on theoretical bases in the introduction, the present research provides empirical support for their difference. Overall, it would appear that need satisfaction corresponds to the cognitive-affective component associated with an autobiographical memory and that it is different from other narrative, qualitative, and functional measures of autobiographical memories.

#### **Autobiographical Memories and Self-Knowledge Structures**

Recently, there has been evidence that autobiographical memories and self-knowledge structures were not part of the same system and that both may function relatively independently of each other. Research has also shown that some memory components or themes, such as integrative memories, were associated with well-being, even after controlling for common personality traits (e.g., Bauer et al., 2005). Similar evidence was found with respect to need satisfaction in the present research. It was shown that need satisfaction in memories remained associated with well-being, even after controlling for personality traits (Studies 1 and 2) and self-determined orientation (Study 3). More strikingly, the present research results also showed that need satisfaction in memories (self-rated or coded by judges) and judgments of need satisfaction experienced in life in general constituted two different factors, overlapping only minimally. Results also showed that need satisfaction in memories was still significantly associated with well-being, once need satisfaction in general was taken into account. Taken together, these findings illustrate that need satisfaction in a specific memory and need satisfaction judged from one's general life experience constitute two different levels and that both are distinctively associated with well-being. It

would thus appear that the information contained in autobiographical memories is not the same as the information contained in semantic self-knowledge structures and obtained through traditional person-level questionnaire measures. Future research is needed to further examine this issue, using outcomes other than well-being.

### Limitations

The present research was characterized by some limitations that need to be mentioned. First, only memories from North American students were collected. Although research on need satisfaction within the field of self-determination theory has provided some evidence that all three needs are important across contexts and cultures (e.g., Sheldon et al., 2001), future research will be needed to make this demonstration with respect to need satisfaction in memories. Second, it is necessary to extend the present research and show that need satisfaction in memories can be associated with outcomes other than well-being. We encourage researchers to pursue this research avenue to further develop studies on the role of autobiographical memories in people's specific life spheres. A third limitation is that we only examined self-defining memories. However, one of the advantages of the need satisfaction perspective appears to be its broad applicability such that all types of memories from all contexts can be assessed. For example, past research has focused on key memories such as turning points or life transition-related memories to code critical themes in people's narratives, such as markers of personal growth. Although need satisfaction can be assessed from these types of special memories, it can also be assessed from more mundane memories, and there is a need to study the role of everyday episodic memories. Future research will be needed to provide evidence of a broader applicability.

In sum, the present research offers some evidence that need satisfaction is a core psychological component of autobiographical memories and a distinct one from several other memory components identified in past research. The present research contributes to the literature by providing both a coding scheme and a self-rating method for need satisfaction in memories. Both measures appeared to be associated with well-being, and this result held after controlling for a number of other memory components and self-knowledge

measures. The study of need satisfaction in episodic and autobiographical memories thus appears as a fruitful research avenue.

## REFERENCES

- Adler, J. M., Kissel, E. C., & McAdams, D. P. (2006). Emerging from the cave: Attributional style and the narrative study of identity in midlife adults. *Cognitive Therapy and Research*, *30*, 39–51.
- Alea, N., & Bluck, S. (2007). I'll keep you in mind: The intimacy function of autobiographical memory. *Applied Cognitive Psychology*, *21*, 1091–1111.
- Bauer, J., & McAdams, D. P. (2004). Personal growth in adults' stories of life transitions. *Journal of Personality*, *72*, 573–602.
- Bauer, J. J., McAdams, D. P., & Sakaeda, A. R. (2005). Interpreting the good life: Growth memories in the lives of mature, happy people. *Journal of Personality and Social Psychology*, *88*, 203–217.
- Beck, A. T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry*, *12*, 57–62.
- Bluck, S., Alea, N., Habermas, T., & Rubin, D. C. (2005). A tale of three functions: The self-reported uses of autobiographical memory. *Social Cognition*, *23*, 91–117.
- Conway, M. A. (2008). Exploring episodic memory. In E. Dere, A. Easton, L. Nadel, & J. P. Huston (Eds.), *Handbook of episodic memory* (Vol. 18, pp. 19–29). Oxford, UK: Elsevier.
- Conway, M. A., & Pleydell-Pearce, C. W. (2000). The construction of autobiographical memories in the self-memory system. *Psychological Review*, *107*, 261–288.
- Craik, F. I. M., Moroz, T. M., Moscovitch, M., Stuss, D. T., Winocur, G., Tulving, E., et al. (1999). In search of the self: A positron emission tomography study. *Psychological Science*, *10*, 26–34.
- Deci, E. L., & Ryan, R. M. (1985). The General Causality Orientations Scale: Self-determination in personality. *Journal of Research in Personality*, *19*, 109–134.
- Deci, E. L., & Ryan, R. M. (2000). “The “what” and the “why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*, 227–268.
- Deci, E. L., Ryan, R. M., Gagné, M., Leone, D. R., Usunov, J., & Kornazheva, B. P. (2001). Need satisfaction, motivation, and well-being in the work organizations of a former eastern bloc country. *Personality and Social Psychology Bulletin*, *27*, 930–942.
- Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction With Life Scale. *Journal of Personality Assessment*, *49*, 71–76.
- Ehrhart, M. G., Ehrhart, K. H., Roesch, S. C., Chung-Herrera, B. G., Nadler, K., & Bradshaw, K. (2009). Testing the latent factor structure and construct validity of the ten-item personality inventory. *Personality and Individual Differences*, *47*, 900–905.

- Gagné, M. (2003). The role of autonomy support and autonomy orientation in prosocial behavior engagement. *Motivation and Emotion, 27*, 199–223.
- Gosling, S. D., Rentfrow, P. J., & Swann, W. B., Jr. (2003). A very brief measure of the Big Five personality domains. *Journal of Research in Personality, 37*, 504–528.
- Habermas, T., & Bluck, S. (2000). Getting a life: The emergence of the life story in adolescence. *Psychological Bulletin, 126*, 748–769.
- Hodgins, H. S., & Kneer, R. (2002). The integrating self and conscious experience. In E. L. Deci & R. M. Ryan (Eds.), *Handbook on self-determination research* (pp. 87–100). Rochester, NY: University of Rochester Press.
- Illardi, B. C., Leone, D., Kasser, R., & Ryan, R. M. (1993). Employee and supervisor ratings of motivation: Main effects and discrepancies associated with job satisfaction and adjustment in a factory setting. *Journal of Applied Social Psychology, 23*, 1789–1805.
- John, O. P., & Srivastava, S. (1999). The Big Five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 102–138). New York: Guilford.
- King, L. A., & Noelle, S. (2005). Happy, mature, and gay: Intimacy, power, and difficult times in coming out stories. *Journal of Research in Personality, 39*, 278–298.
- King, L. A., Scollon, C. K., Ramsey, C., & Williams, T. (2000). Stories of life transition: Subjective well-being and ego development in parents of children with Down syndrome. *Journal of Research in Personality, 34*, 509–536.
- Klein, S. B., Cosmides, L., Tooby, J., & Chance, S. (2002). Decisions and the evolution of memory: Multiple systems, multiple functions. *Psychological Review, 109*, 306–329.
- Klein, S. B., & Loftus, J. (1993). The mental representation of trait and autobiographical knowledge about the self. In T. K. Srull & R. S. Wyer (Eds.), *Advances in social cognition* (pp. 1–49). Hillsdale, NJ: Erlbaum.
- Libby, L. K., & Eibach, R. P. (2002). Looking back in time: Self-concept change affects visual perspective in autobiographical memory. *Journal of Personality and Social Psychology, 82*, 167–179.
- Lodi-Smith, J., Geise, A. C., Roberts, B. W., & Robins, R. W. (2009). Narrating personality change. *Journal of Personality and Social Psychology, 96*, 679–689.
- McAdams, D. P. (2001). The psychology of life stories. *Review of General Psychology, 5*, 100–122.
- McAdams, D. P., Hoffman, B. J., Day, R., & Mansfield, E. D. (1996). Themes of agency and communion in significant autobiographical scenes. *Journal of Personality, 64*, 339–377.
- McAdams, D. P., Reynolds, J., Lewis, M., Patten, A. H., & Bowman, P. J. (2001). When bad things turn good and good things turn bad: Sequences of redemption and contamination in life narrative and their relation to psychosocial adaptation in midlife adults and in students. *Personality and Social Psychology Bulletin, 27*, 474–485.



- McLean, K. C., & Breen, A. V. (2009). Processes and content of narrative identity development in adolescence: Gender and well-being. *Developmental Psychology, 45*, 702–710.
- Meyer, B., Enstrom, M. K., Harstveit, M., Bowles, D. P., & Beevers, C. G. (2007). Happiness and despair on the catwalk: Need satisfaction, well-being, and personality adjustment among fashion models. *Journal of Positive Psychology, 2*, 2–17.
- Osman, A., Kopper, B. A., Barrios, F. X., Osman, J. R., & Wade, T. (1997). The Beck Anxiety Inventory: Reexamination of factor structure and psychometric properties. *Journal of Clinical Psychology, 53*, 7–14.
- Pals, J. L. (2006). Narrative identity processing of difficult life experiences: Pathways of personality development and positive self-transformation in adulthood. *Journal of Personality, 74*, 1079–1109.
- Pasupathi, M. (2003). Emotion regulation during social remembering: Differences between emotions elicited during an event and emotions elicited when talking about it. *Memory, 11*, 151–163.
- Pasupathi, M., Lucas, S., & Coombs, A. (2002). Conversational functions of autobiographical remembering: Long-married couples talk about conflicts and pleasant topics. *Discourse Processes, 34*, 163–192.
- Patrick, H., Knee, C. R., Canevello, A., & Lonsbary, C. (2007). The role of need fulfillment in relationship functioning and well-being: A self-determination theory perspective. *Journal of Personality and Social Psychology, 92*, 434–457.
- Pelletier, L. G., & Dion, S. C. (2007). An examination of general and specific motivational mechanisms for the relations between body dissatisfaction and eating behaviors. *Journal of Social and Clinical Psychology, 26*, 303–333.
- Philippe, F. L., Lecours, S., & Beaulieu-Pelletier, G. (2009). Resilience and positive emotions: Examining the role of emotional memories. *Journal of Personality, 77*, 139–175.
- Pillemer, D. B. (2003). Directive functions of autobiographical memory: The guiding power of the specific episode. *Memory, 11*, 193–202.
- Pratt, M. W., Arnold, M. L., Norris, J. E., & Filyer, R. (1999). Generativity and moral development as predictors of value socialization narratives for young persons across the adult lifespan: From lessons learned to stories shared. *Psychology and Aging, 14*, 414–426.
- Reis, H. T., Sheldon, K. M., Gable, S. L., Roscoe, J., & Ryan, R. M. (2000). Daily well-being: The role of autonomy, competence, and relatedness. *Personality and Social Psychology Bulletin, 26*, 419–435.
- Robins, R. W., Hendin, H. M., & Trzesniewski, K. H. (2001). Measuring global self-esteem: Construct validation of a single-item measure and the Rosenberg Self-Esteem Scale. *Personality and Social Psychology Bulletin, 27*, 151–161.
- Robinson, J. A. (1996). Perspective, meaning, and remembering. In D. C. Rubin (Ed.), *Remembering our past: Studies in autobiographical memory* (pp. 218–243). Cambridge, UK: Cambridge University Press.

- Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. In S. Fiske (Ed.), *Annual review of psychology* (pp. 141–166). Palo Alto, CA: Annual Reviews.
- Ryan, R. M., Rigby, C. S., & Przybylski, A. (2006). Motivation pull of video games: A self-determination theory approach. *Motivation and Emotion*, **30**, 347–365.
- Ryff, C. D., & Keyes, C. L. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology*, **69**, 719–727.
- Sheldon, K. M., Elliot, A. J., Kim, Y., & Kasser, T. (2001). What is satisfying about satisfying events? Testing 10 candidate psychological needs. *Journal of Personality and Social Psychology*, **80**, 325–339.
- Sheldon, K. M., Ryan, R. M., & Reis, H. T. (1996). What makes for a good day? Competence and autonomy in the day and in the person. *Personality and Social Psychology Bulletin*, **22**, 1270–1279.
- Singer, J. A., & Salovey, P. (1993). *The remembered self: Emotion and memory in personality*. New York: Free Press.
- Sutin, A. R., & Robins, R. W. (2005). Continuity and correlates of emotions and motives in self-defining memories. *Journal of Personality*, **73**, 793–824.
- Sutin, A. R., & Robins, R. W. (2008). Going forward by drawing from the past: Personal strivings, personally meaningful memories, and personality traits. *Journal of Personality*, **76**, 631–664.
- Thomas, P. M. (2003). Protection, dissociation, and internal roles: Modeling and treating the effects of child abuse. *Review of General Psychology*, **7**, 364–380.
- Tulving, E. (1987). Multiple memory systems and consciousness. *Human Neurobiology*, **6**, 67–80.
- Woike, B. A. (2008). A functional framework for the influence of implicit and explicit motives on autobiographical memory. *Personality and Social Psychology Review*, **12**, 99–117.