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Psychological need satisfaction across levels of experience: Their organization and contribution to general well-being

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ABSTRACT

The present research examines the interrelation between psychological need satisfaction at the general, domain-specific, and episodic levels of experience, and the extent to which need satisfaction at each level predicts general well-being independently of the other levels. Results show evidence for both top-down and bottom-up effects of need satisfaction across three levels of experience and provide support for a heterarchical model of need satisfaction. Psychological need satisfaction at three distinct levels of experience independently contributes to general well-being both measured concurrently and prospectively. Overall, the present research provides a theoretical and empirical model of the organization of need satisfaction across multiple levels of experience. This supports the importance of assessing need satisfaction at multiple levels of experience.

1. Introduction

As people go through their everyday lives, a variety of experiences become encoded in long-term memory as representations. People are then able to think back to these experiences at different levels of abstraction, from the episodic ('I enjoyed my last work meeting'), to the contextual ('I really like my job'), to the general ('my life is pretty good'). Although a great deal of research has looked at how self-aspects and self-attributes may be organized in the self (e.g., Marsh & Yeung, 1998; McAdams, 1995; McConnell, 2011; Schell, Klein, & Babey, 1996; Shavelson, Hubner, & Stanton, 1976; Wood & Roberts, 2006), very little research has examined how experiences are organized across different levels of the self and how these experiences combine to influence broad life outcomes, such as well-being. In the present paper, we examine this question through the lens of self-determination theory, focusing on the role of psychological need satisfaction across levels of experience. Specifically, we propose that the satisfaction of basic psychological needs at different levels of experience can affect outcomes across levels, focusing on well-being as our outcome of interest.

Self-determination posits the existence of three basic psychological needs (Deci & Ryan, 2000). These are autonomy, or feeling like your actions are in line with your interests and values; competence, feelings of mastery over one's environment; and relatedness, feeling close and connected to others. The satisfaction of these needs has been consistently linked with positive outcomes, including greater general well-being and psychological adjustment (Deci & Ryan, 2000). Furthermore, need satisfaction experienced in a multitude of specific domains, such as school, work, relationships, and leisure, has also been linked both to domain-specific and to general well-being (Deci & Ryan, 2008; Milyavskaya & Koestner, 2011; Patrick, Knee, Canevello, & Lonsbary, 2007). Finally, at the episodic level, it has been shown that need satisfaction experienced in specific life episodes also contributes to well-being (Philippe, Koestner, Beaulieu-Pelletier, & Lecours, 2011; Philippe, Koestner, Beaulieu-Pelletier, Lecours, & Lekes, 2012). Although all these studies provide evidence for the role of need satisfaction across multiple levels of experience in well-being, none have specifically investigated the structure of these levels. Indeed, SDT researchers have typically drawn conclusions about the effects of need satisfaction without considering whether need satisfaction was measured at the global, contextual, or episodic level. In the present research, we investigate the relationship among these levels of need satisfaction and their effects on well-being by contrasting *hierarchical* and *heterarchical* models, which have both been used in the literature to explain how people use their cognitions at various levels to express who they are or what they experience.

1.1. Hierarchical and heterarchical models

Hierarchical models imply that mental representations are organized from the most basic and concrete units at the lower end

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of the hierarchy to the most abstract representations at the top of the hierarchy (Cohen, 2000). In addition, lower-level representations are fully subsumed under mid-level representations, which are further subsumed under high-level representations (see Fig. 1a). Shavelson et al. (1976) proposed one of the first such models of the organization of the self. They posited a hierarchical model of self-concept where both academic and non-academic self-concept combine into a higher-order 'general self-concept' factor, and where academic self-concept can be further subdivided based on specific self-concepts in particular areas (reading, math, etc.). Similarly, in their Personality and Role Identity Structure Model, Wood and Roberts (2006) showed that personality is structured in such a way that general personality traits or dispositions subsume distinct role identities, which in turn, are based on specific experiences in those roles. Other comparable hierarchical models have been proposed with supporting evidence in the realms of attachment systems (Pierce & Lydon, 2001), self-concept (McConnell, 2011), life satisfaction (Heller, Watson, & Ilies, 2004), and motivation (Vallerand, 1997).

In such models, the lower-level units often serve to build up the higher-level into more abstract representations (Markus, 1977; Schimmack, 2008; Vallerand, 1997). For example, a woman's specific episode of success at work could serve to build up her feelings of competence at work, which could further enhance her general feelings of competency. This process within a hierarchical model has been termed the bottom-up effect, which means that the representations at the lower end of the hierarchy lead to changes in the more abstract and general representations at the top of the hierarchy. Inversely, top-down effects imply that representations at the top of the hierarchy influence representations at the bottom of the hierarchy. For example, one's global motivational orientation (autonomous or controlled) could influence one's motivation in a

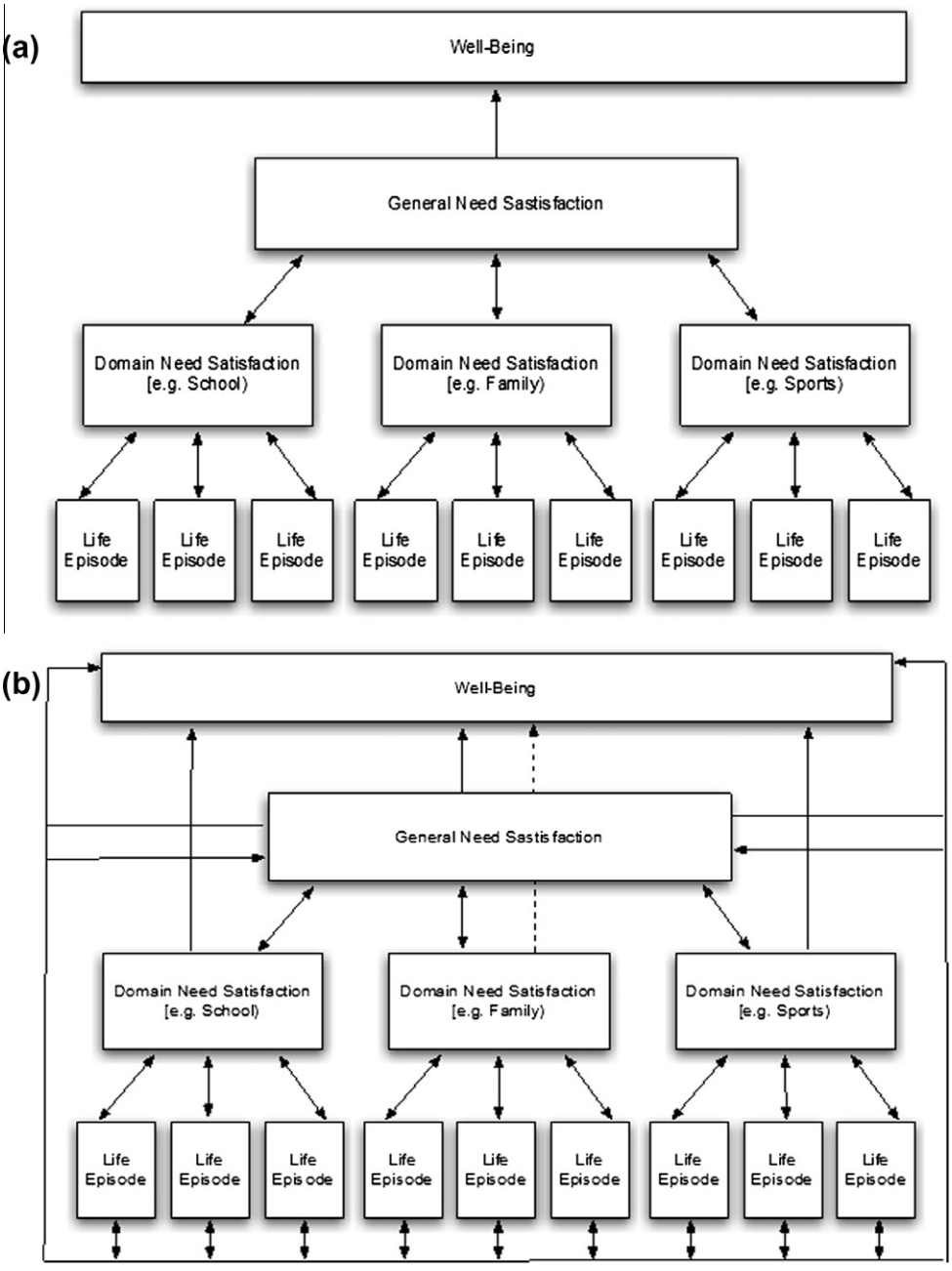

Fig. 1. Hierarchical (1a) and heterarchical (1b) organization of interactions among three levels of experience and well-being.

specific domain (school), which could further influence one's motivation toward a specific task (writing a school report) (Vallerand, 1997).

Similar to hierarchical models, heterarchical models (e.g., Berntson & Cacioppo, 2008) also imply that lower levels are associated with higher levels and also expect top-down and bottom-up effects. However, hierarchical models imply that each lower level is perfectly subsumed in the other higher levels (e.g., Vallerand, 1997; Wood & Roberts, 2006). In contrast, in heterarchical models, each level remains partly independent from one another and each is only partially subsumed under each other (see Fig. 1b). As such, each level can uniquely contribute to build upper levels, guide a person's actions, or influence a particular outcome such as well-being or adjustment. This is because the information contained in each level is not fully redundant, even if part of the information in the lower levels has been used to build up the upper levels. For example, a woman's feelings of competence at work may only be partly represented in her general feelings of competence in her life or even not at all. Similarly, a specific episode of success at work for this woman may positively affect her general well-being, even if her general perceptions of competence are chronically low and negatively impact her well-being.

Heterarchical models are more popular in other disciplines, such as biology and neurology, and very few models have been proposed in personality and social psychology, with a few exceptions (e.g., Peck, 2007). Nevertheless, indirect empirical findings for such types of models can be found in the psychology literature, showing how various levels of the self can combine to predict important outcomes, instead of being redundant with each other (e.g. Davis, Morris, & Kraus, 1998). Indeed, many models proposed to be hierarchical actually exhibit evidence of heterarchical structure. For example, Pierce and Lydon (2001) showed that global attachment experiences shared only a modest amount of variance with relationship-specific attachment experiences (e.g., experiences with one's father or friend) and that both uniquely predict the quality of daily social interactions with the relationship-specific partner (see Heller et al. (2004) and Marsh, Trautwein, Ludtke, Koller, and Baumert (2006) for further examples). In the present research, we sought to compare hierarchical and heterarchical models of levels of experience of need satisfaction and investigate if each level may combine to predict upper levels and well-being.

1.2. Present research

In the present research, we looked at three levels of experience of need satisfaction—general, contextual, and episodic. Need satisfaction at the general level represents a person's general impression of whether his or her needs have been satisfied or thwarted. This may include a summary representation of lower levels of experience (contexts and episodes) and corresponds to the most abstract and general representations of one's need satisfaction experiences.

At the next level, we find domains in which people repeatedly engage, such as school, work and friends, and which represent "distinct spheres of human activity" (Emmons, 1995). Psychological need satisfaction in a domain encompasses a person's range of experiences in that domain, and is typically thought to be based on the extent to which the contextual or structural elements of the domain provide adequate support (for a review, see Deci & Ryan, 2008).

Finally, need satisfaction at the episodic level concerns the amount of need satisfaction experienced in a specific life episode. This level is to be differentiated from what is sometimes called the situational level, which refers to how people feel at the present moment (Csikszentmihalyi, 1990) or after having engaged in a specific task (e.g., Guay, Vallerand, & Blanchard, 2000). Such situational experiences are not the focus of the present study, because the models we seek to test examine various levels of experiences of need satisfaction as encoded and integrated in the self or in memory. Obviously, how one feels right now does not necessarily imply that this immediate experience will be encoded in memory or in the self, as most daily experiences are quickly forgotten (Conway & Pleydell-Pearce, 2000). In contrast, those episodes that do get encoded in memory are typically meaningful episodes and are often recalled as part of one's autobiographical memory; need satisfaction in such episodes has previously been shown to influence well-being and other positive outcomes (e.g., Philippe et al., 2012).

The present research contributes to the literature in multiple ways. First, although evidence exists for the importance of need satisfaction at the general, contextual, and episodic level, no theoretical model exists to account for how these levels of experience of need satisfaction are organized in the self. In the present research, we sought to examine two such competing models, which will allow us to derive insights into how levels of experience are organized. Second, evidence has consistently shown that need satisfaction at each of these levels is associated with well-being, but again, no research has investigated whether these levels combine with each other to affect well-being or if they are simply redundant with each other. The present research will allow us to provide a clear answer to this issue. Finally, many phenomena reported in the SDT literature seems to conform to top-down effects, since broad representations of general need satisfaction (or deprivation) seems to affect expectations and experiences of need satisfaction in contextual and episodic levels (Deci & Ryan, 2000). Conversely, very few bottom-up effects have been examined and reported. The present research thus also seeks to extend the literature on bottom-up effects of need satisfaction and to help classify and understand what seem to be top-down effects of need satisfaction.

Overall, this research tests the following three hypotheses; the first two are consistent with both types of models, while the third one pits the two models against each other:

1. Need satisfaction experience in each life context/domain or in each life episode should uniquely predict general experience of need satisfaction, conforming to bottom-up effects which would be predicted by both models.
2. The organization of need satisfaction across the three levels will exhibit top-down effects. One strategy to evaluate top-down effect is that need satisfaction experienced in each domain should be correlated. However, this correlation should drop considerably after controlling for general need satisfaction, which implies that the common variance in the experience of need satisfaction across contexts is attributable to the top-down effect of general need satisfaction (for a similar statistical strategy to assess top-down effects, see Wood & Roberts, 2006).
3. (a) Hierarchical models posit that each lower-level is perfectly subsumed under higher-levels. Therefore, the relationship between need satisfaction assessed at the episodic level and at the general level should be mediated by need satisfaction at the contextual level. Similarly, the relationship between need satisfaction assessed at the episodic level or at the contextual level and well-being should be fully mediated by general need satisfaction. (b) Conversely, heterarchical models posit that each level remains partly independent of each other. Therefore, need satisfaction assessed at the episodic level should predict need satisfaction at the general level even after controlling for need satisfaction at the contextual level. Similarly, need satisfaction assessed at the episodic level and at the contextual level should uniquely and additively predict well-being, even after controlling for general need satisfaction, which should also additively predict well-being.

Given the wide range of measures and indicators that have been used in past research to highlight the relationship between need satisfaction and well-being or adjustment criteria (e.g., affect, life satisfaction, stress, self-esteem, vitality, physical symptoms, psychological well-being), we did not limit our investigation to one type of measure, but rather used a diverse number of well-being and adjustment measures across the present studies. In addition, we also used various existing measures of need satisfaction, either using the same items adapted to each level (stronger correlations among levels, but more stringent test to predict outcomes over and above these levels) or different items (lower correlations among levels).

2. Study 1

In this study, participants indicated two important domains in which they were involved and reported on their experiences of autonomy, competence, and relatedness in each domain. They also completed a general measure of psychological need satisfaction and several measures of well-being. In line with both tested models, we expected that need satisfaction in each domain would uniquely predict ratings of general need satisfaction (bottom-up effect). In addition, we expected that the correlation between need satisfaction in each domain would drop after controlling for general need satisfaction (top-down effect). We did not make any hypothesis about the size of the zero-order correlation between need satisfaction in each domain, given that past research has found either strong (Wood & Roberts, 2006) or weak (Marsh & Yeung, 1998) correlations for mid-level units (e.g., self-aspects, roles identity). Finally, hierarchical models would imply that the relationship between need satisfaction in the domains and well-being should be fully mediated by general need satisfaction. In contrast, heterarchical models would expect that need satisfaction in each domain should be uniquely associated with well-being, even after controlling for general need satisfaction, which should also be associated with well-being.

2.1. Method

2.1.1. Participants and procedure

Participants were recruited through online classified ads and through a Facebook event, and offered a 10$ gift card to amazon.ca for completing an online survey about important life domains. Two hundred and eighteen adults from the general population (approximately half were students) responded to the survey. As the survey was expected to take approximately 30–45 min, we removed all respondents who completed the survey in less than 20 min (n = 10). We also removed five participants who either rated the same domains twice or left some of the measures entirely blank. The final sample was composed of 203 adults (62.6% female; two participants did not indicate gender) ages 18–71 (M = 24.55, SD = 7.03).[1]

Participants completed some general personality questionnaires and then were asked to name domains in which they were involved and completed measures for each of these domains. We used the first two domains indicated by each participant as those that are most central and in which they were most involved. After completing measures of need satisfaction in each domain, participants completed a measure of general need satisfaction followed by the well-being measures.

[1] These data come from a larger study of psychological need satisfaction; results linking domain need satisfaction with domain well-being have previously been reported in Milyavskaya and Koestner (2011). However, in that paper, general need satisfaction and general well-being were not considered.

2.1.2. Measures

2.1.2.1. General and domain need satisfaction. A 24-item scale was adapted from previous scales of need satisfaction (Gagné, 2003; LaGuardia, Ryan, Couchman, & Deci, 2000) to assess competence (e.g., "In this domain, I feel like a competent person"), relatedness (e.g., "I feel that the other people in this domain sincerely care about me"), and autonomy (e.g., "I am free to express my ideas and opinions in this domain") in each domain. Responses were made on a 7-point scale, ranging from 1 (*not at all true*) to 7 (*completely true*). We combined all the items to form a measure of overall need satisfaction in each domain. The same 24 item measure was also used to assess general need satisfaction, with instructions to answer the questions "about your life in general". Using the exact same items, with a different reference point ensures that the general and domain need satisfaction measures are equivalent to each other. This scale had a high reliability, α = .90 for Domain 1, α = .89 for Domain 2, and α = .94 for general need satisfaction.

2.1.2.2. General well-being. Six different aspects of well-being were assessed in this study. Participants completed a 9-item scale of affect (Emmons, 1992) asking them the extent to which they generally felt that way, which included four positive (e.g., joyful) and five negative (e.g., frustrated) items rated on a scale from 1 (*not at all*) to 7 (*extremely*). A 7-item psychological vitality scale (Ryan & Frederick, 1997) assessed the degree to which participants felt physically and mentally vigorous and alert (e.g., "I feel energized"). Satisfaction with life was assessed using the five-item Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985). Both vitality and life satisfaction were assessed on a 7-poiunt scale ranging from 1 (*not at all true*) to 7 (*very true*) Participants also completed a measure assessing the extent to which they experienced nine physical symptoms (headaches, stomachache/pain, chest/heart pain, runny or congested nose, coughing/sore throat, faintness/dizziness, shortness of breath, acne/pimples, stiff/sore muscles) over the past 2 weeks, ranging from never to very often (Emmons, 1992). Finally, participants completed the 4-item Subjective Happiness Scale (SHS; Lyubomirsky & Lepper, 1999) consisting of items assessing absolute ratings of happiness and ratings relative to peers, as well as the extent to which a characterization of a happy and unhappy individual describes the respondent. All the scales were reliable, α = .89 for positive affect; α = .88 for negative affect; α = .92 for vitality; α = .90 for SWLS; α = .74 for symptoms; and α = .90 for the SHS. An Exploratory Factor Analysis with Principal Axis Factoring as the method of estimation was conducted on all measured aspects of well-being. Only one factor was extracted (second highest Eigen Value = .91), accounting for 61% of the variance. All well-being aspects loaded on this component, with factor loadings ranging from .35 to .89. Therefore, all well-being scales were averaged to form an index measure of well-being.

2.2. Results

Table 1 presents the means, standard deviations and correlations among all study variables. In this study, need satisfaction in

Table 1
Means, standard deviations, and correlations among need satisfaction and well-being in domains and in general: Study 1.

	Means	*SD*	1	2	3
1. Need satisfaction Domain 1	4.34	0.96	–		
2. Need satisfaction Domain 2	4.87	0.89	.39**	–	
3. General need satisfaction	5.12	0.96	.50**	.49**	–
4. General well-being[a]	0.00	0.79	.49**	.50**	.82**

Note: n = 197.
** p < .01.
[a] Standardized scores.

the two domains were positively correlated, $r = .39$, $p < .01$ and were positively associated with general need satisfaction and well-being. General need satisfaction was also strongly associated with well-being.

A confirmatory factor analysis using Maximum Likelihood as the method of estimation was conducted in Mplus 6.12 (Muthén & Muthén, 1998–2011) in order to examine whether need satisfaction in each domain and with respect to general need satisfaction could be differentiated into distinct factors, or whether they would be better described by one single factor. We correlated the residual terms of the same need across the two domains and with general need satisfaction (e.g. the residual variance of autonomy for Domain 1 was correlated with the residual variance of autonomy for Domain 2 and autonomy assessed in general), given that the same items were used with slight adaptations to measure both domains and general need satisfaction. Consequently, a measurement error found for one need (e.g., a limited understanding of an item) should also be found for this need at the other level. Results for a three-factor model revealed excellent fit indices, $\chi^2(15) = 19.95$, *ns*, CFI = .99, TLI = .98, RMSEA = .04 [.00; .08]. SRMR = .03, AIC = 4939.46. See Table 2 for the covariance matrix. A two-factor model, where need satisfaction in both domains converge under a single factor and a one-factor model, combining all need satisfaction measures under the same latent variable, were then tested. Results revealed poorer fit indices for the two-factor model, $\chi^2(17) = 57.96$, $p < .01$, $\Delta\chi^2(2) = 38.01$, p < .001, CFI = .93, TLI = .85, RMSEA = .11 [.08; .14], SRMR = .05, AIC = 4973.47 and an even poorer fit for the single-factor model, $\chi^2(18) = 108.28$, $p < .01$, $\Delta\chi^2(3) = 88.33$, $p < .001$, CFI = .84, TLI = .68, RMSEA = .16 [.13; .19], SRMR = .084, AIC = 5021.79. The model with the lowest AIC value—the original model—should be preferred. Thus, there is evidence that need satisfaction assessed in different domains are distinct from each other and are further distinct from general need satisfaction.

A first hierarchical multiple regression was conducted to examine the presence of a top-down effect. Need satisfaction in Domain 2 served as the dependent variable and at Step 1, need satisfaction in Domain 1 was entered, followed by general need satisfaction at Step 2. Results showed that need satisfaction in Domain 1 was positively associated with need satisfaction in Domain 2 ($\beta = .39$, $p < .01$) and this association was significantly reduced by the inclusion of general need satisfaction at Step 2 ($\beta = .19$, $p < .01$). Although general need satisfaction is not a mediator between need satisfaction in the two domains, but rather what has been termed a confounder (MacKinnon, 2008), the same statistical procedure used for mediations can be used to assess whether the relationship between the two domains is explained by general need satisfaction (in other words, whether the association between the two domains is significantly decreased by the inclusion of general need satisfaction). A bootstrap procedure using 1000 resamples revealed that the relationship between the two domains was significantly explained by general need satisfaction, as zero was not included in the obtained 95% confidence intervals, [.11; .27].

A second multiple regression analysis was conducted to investigate the degree to which the need satisfaction experienced in each life domain contributes to build up one's general perceptions of need satisfaction in life (bottom-up effect). If only top-down effects exist, then need satisfaction in each domain should be redundant and should cancel each other out in predicting general need satisfaction. If bottom-up effects also exist, need satisfaction in each domain should independently predict general need satisfaction.

Results showed that need satisfaction in both domains were positively and uniquely associated with general need satisfaction, $\beta = .36$, $p < .01$ for Domain 1 and $\beta = .35$, $p < .01$, for Domain 2 (see Table 3 for regression results). Together, both domains explained 35% of the variance in general need satisfaction; Domain 1 explained 12% of the variance, and Domain 2 explained 11%, while the other 13% was due to the shared variance of the two domains. This result suggests that when need satisfaction is experienced in different important life domains, each uniquely contributes to build up one's perceptions of general need satisfaction.

Another multiple regression analysis was conducted to examine the bottom-up effect of need satisfaction in each domain on well-being. Results showed that the two domains significantly and positively predicted well-being, $F(2, 194) = 52.77$, $p < .01$, $R^2 = .35$. In addition, need satisfaction characterizing each domain uniquely predicted well-being, with Domains 1 and 2 each accounting for 11% of the variance in well-being and the shared variance of the two domains accounting for 13% of the variance in well-being. All coefficients are presented in Table 3.

Finally, the critical analysis to distinguish a hierarchical from a heterarchical model was that in the former model, general need satisfaction should predict all the variance in well-being and need satisfaction in each domain should not be predictive of well-being, once general need satisfaction is taken into account. In the latter model, however, need satisfaction in each domain should uniquely predict well-being, even after controlling for general need satisfaction. Using a multiple regression analysis again, at Step 1, when general need satisfaction was entered, results showed that this variable was strongly and positively associated with well-being, $\beta = .81$, $p < .01$, accounting for 67% of its variance, $F(1, 195) = 389.40$, $p < .01$. At Step 2, when need satisfaction characterizing each of the two domains were entered, results revealed that each of them were positively and uniquely associated with well-being, Domain 1: $\beta = .10$, $p < .05$; Domain 2: $\beta = .11$, $p < .05$, accounting for 1.8% of the variance of well-being, over and above general need satisfaction, $\Delta F(2, 193) = 5.62$, $p < .01$. This latter regression analysis also allowed us to determine that general need satisfaction and domain need satisfaction together explained 69% of the variance of well-being, 33% of which was shared between general and domain need satisfaction. Table 3. presents all the regression analyses.

These results present initial evidence for the existence of both top-down and bottom-up effects of psychological need satisfaction. The correlation between need satisfaction in the two life

Table 2
Covariance matrix used in the CFA examining the distinction between general and domain need satisfaction.

G-Autonomy	0.963								
G-Competence	0.765	1.26							
G-Relatedness	0.658	0.809	1.366						
D1-Autonomy	0.355	0.369	0.342	1.519					
D1-Competence	0.434	0.708	0.475	0.599	1.339				
D1-Relatedness	0.31	0.545	0.643	0.667	0.601	1.721			
D2-Autonomy	0.377	0.297	0.295	0.478	0.292	0.345	1.34		
D2-Competence	0.324	0.539	0.294	0.235	0.359	0.262	0.425	0.984	
D2-Relatedness	0.372	0.336	0.609	0.266	0.174	0.459	0.544	0.383	1.615

Note: G = General; D1 = Domain 1; D2 = Domain 2.

Table 3
Regression analyses from study 1.

	General need satisfaction		Well-being		Well-being	
	β	t	β	t	β	t
					Step 1 R^2 = .67	
General NS					.81	19.73**
	Step 1		Step 1		Step 2 ΔR^2 = .02	
General NS					.72	14.26**
Domain 1 NS	.36	5.78**	.36	5.68**	.10	2.04*
Domain 2 NS	.35	5.62**	.36	5.72**	.11	2.24*
	R^2 = .35		R^2 = .35		R^2 = .69	
	$F(2,194) = 52.80$**		$F(2,194) = 52.77$**		$F(3,193) = 139.70$**	

Note: NS = need satisfaction.
* $p < .05$.
** $p < .001$.

domains dropped significantly once we controlled for general need satisfaction, pointing to the influence of general need satisfaction on domain need satisfaction in both domains (top-down effect). Additionally, need satisfaction in each life domain uniquely contributed to one's perceptions of general need satisfaction in life and to well-being, demonstrating a bottom-up effect. Importantly, need satisfaction assessed with respect to life domains does not appear to be a mere proxy for measures of need satisfaction generally experienced in one's life, even if the items were the same and that only the reference point differed. This finding suggests a heterarchical rather than a hierarchical model. Although domain need satisfaction and general need satisfaction share a great deal of variance (as would be expected if domain need satisfaction builds up general need satisfaction), domains need satisfaction preserves a degree of discriminant validity from general need satisfaction in predicting well-being. The factor analysis conducted in this study also confirmed that experiences of need satisfaction in the two domains and in general are distinct from each other.

3. Study 2

In the previous study, we showed that need satisfaction in two important life domains each contributes independently both to general perceptions of need satisfaction and to well-being, supporting a heterarchical model of need satisfaction across levels of experience. In this study, we wanted to replicate these findings with another sample and with three rather than two domains. We thus wanted to again test our hypotheses of both top-down and bottom-up effects, and also wanted to confirm the heterarchical organization by showing that need satisfaction in each of three domains would uniquely predict well-being even after controlling for general need satisfaction. Additionally, we wanted to test whether the bottom-up effects of domain need satisfaction on general need satisfaction were influenced by other domain characteristics, particularly the subjective importance of the domain and the time spent in the domain.

3.1. Method

3.1.1. Participants and procedure

Undergraduate students were recruited for an online survey. One hundred and seventy-nine participants (61.5% female) aged 17–62 (M = 20.29, SD = 5.35) completed the survey. The study took approximately 30 min to complete, and all participants were entered into a draw for one of three prizes of $125. Participants were first asked to report on their general need satisfaction and were then asked to list three domains in which they were involved and provided ratings of need satisfaction for each domain, as well as a rating of the importance of the domain and the time they spend in that domain. After completing a questionnaire unrelated to the present study, they completed the well-being measures.

3.1.2. Measures

3.1.2.1. Domain need satisfaction. The 18-item measure of need satisfaction used by Sheldon and Gunz (2009) was adapted for measuring need satisfaction in specific life domains. Items assessed autonomy (e.g., 'In this domain I am free to do things my own way'), competence (e.g., 'In this domain I often struggle doing something I should be good at'; reversed), and relatedness (e.g., 'In this domain I feel close and connected with other people'). Nine of the 18 items were negatively worded. Responses were made on a 7-point scale, ranging from 1 (*not at all true*) to 7 (*completely true*). All the items were combined to form a measure of overall need satisfaction in each domain. This scale had a good reliability, α = .86 for Domains 1 and 2, and α = .84 for Domain 3.

3.1.2.2. Domain time and importance. For each domain, participants rated how important that domain was to them using one item ('How important is this domain to you?') ranging from 1 (*not at all important*) to 7 (*very important*). They also rated how much time they spent in that domain from 1 (*less than* 5 h) to 7 (*more than* 30 h), with each number in between representing a 5-h increment.

3.1.2.3. General need satisfaction. The extent to which participants experienced satisfaction of their basic needs in their life in general was assessed using a combination of the short 9-item Basic Psychological Needs Scale (Gagné, 2003; Ilardi, Leone, Kasser, & Ryan, 1993) and seven items created by Philippe et al. (2011). Five items measured autonomy (e.g., 'I generally feel free to express my ideas and opinions.'), five items measured competence (e.g., 'Most days I feel a sense of accomplishment from what I do.'), and six items measured relatedness (e.g., 'I generally feel connected to people.'). Responses were made on a 7-point scale, ranging from 1 (*do not agree at all*) to 7 (*completely agree*). To obtain a score of overall need satisfaction, we combined the mean scores of each subscale. The scale was reliable, α = .84.

3.1.2.4. Well-being. Several measures of psychological well-being were completed by the participants. Perceived stress was measured using the Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983), a 10-item scale that assesses how often participants felt stressed over the past month (e.g. 'In the last month, how often have you been upset because of something that happened unexpectedly?'). Responses were made on a 5-point scale, ranging from 0 (*never*) to 4 (*very often*). Global life satisfaction was assessed using the 5-item Satisfaction with Life Scale (SWLS; Diener et al., 1985). The 10-item Rosenberg Self-Esteem scale (RSE; Rosenberg, 1965) was used to measure participants'

self-esteem (e.g. 'I feel that I have a number of good qualities'). Finally, eudaimonic well-being was measured using three of the subscales from the short Psychological Well-Being scale (PWB; Ryff & Keyes, 1995). Although the full measure consists of six subscales with three items each, three of the subscales (autonomy, environmental mastery, positive relations) overlap with the three psychological needs of autonomy, competence, and relatedness. We therefore used questions from the three remaining subscales: personal growth (e.g. 'For me, life has been a continuous process of learning, changing, and growth'), purpose in life (e.g. 'I sometimes feel as if I have done all there is to do in life'; reversed), and self-acceptance (e.g. 'I like most aspects of my personality'). Responses to the SWLS, the RSE, and the PWB were all made on a 7-point scale, ranging from 1 (*do not agree at all*) to 7 (*completely agree*). All four well-being scales were reliable, $\alpha = .86$ for the PSS; $\alpha = .85$ for the SWLS; $\alpha = .90$ for the RSE; and $\alpha = .72$ for the PWB. An Exploratory Factor Analysis with Principal Axis Factoring as the method of estimation was conducted on all scales of well-being. Only one factor was extracted (second highest Eigen Value = .57), accounting for 57% of the variance. All well-being scales loaded strongly on this component, with factor loadings ranging from .66 to .85. Therefore, all well-being scales were averaged to form an index measure of well-being.

3.2. Results

Table 4 presents the means, standard deviations and correlations among all study variables. In this study, need satisfaction in the third domain was correlated with both of the other domains, but Domains 1 and 2 were uncorrelated. Need satisfaction in each domain was positively associated with general need satisfaction and well-being. General need satisfaction was again strongly associated with well-being.

Multiple regressions were conducted to examine the presence of top-down effects of general need satisfaction on domain need satisfaction. Each pair of domain need satisfaction was examined while controlling for general need satisfaction. In each case, the association between each domain need satisfaction was significantly reduced by the inclusion of general need satisfaction in the equation (Domain 1 and Domain 3; $\beta = .20$, $p < .01$ to $\beta = .01$, *ns*; Domain 2 and Domain 3, $\beta = .25$, $p < .01$ to $\beta = .11$, *ns*; Domain 1 and Domain 2: β −.01, *ns* to −.24, $p < .01$). Although the initial association between Domain 1 and Domain 2 need satisfaction was not significant, the inclusion of general need satisfaction turned it into a significant negative relationship, thus evidencing a top-down effect of general need satisfaction. Bootstrapping analyses revealed that all indirect effects were significant, with 95% confidence intervals excluding zero [.13; .31], [.08; .28], [.19; .40], respectively. These results again suggest that general need satisfaction exerted top-down effects on ratings of need satisfaction in all three domains.

Another multiple regression analysis was conducted to investigate the degree to which the need satisfaction experienced in each life domain contributes to build up one's general perceptions of need satisfaction in life (bottom-up effects). Results showed that need satisfaction in each of the three domains were uniquely and positively associated with general need satisfaction, $\beta = .45$ ($t = 7.95$) for Domain 1, $\beta = .36$ ($t = 6.30$) for Domain 2, and $\beta = .24$ ($t = 4.21$) for Domain 3, all *ps* < .01, $F(3,175) = 52.11$, $p < .001$, explaining 47% of the variance in general need satisfaction. This result suggests that when need satisfaction is experienced in different important life domains, each uniquely contributes to build up one's perceptions of general need satisfaction. Neither time spend in each of the domains, the importance of the domain, nor their interactions with need satisfaction or with each other were significant predictors of general need satisfaction, suggesting that the bottom-up effects of domain need satisfaction on general need satisfaction are not necessarily based on the time spent in that domain and the importance of that domain.

Finally, we tested the heterarchical structure of our data by conducting a multiple regression analysis to examine the specific contribution of need satisfaction in each domain to well-being, after controlling for general need satisfaction. At Step 1, when general need satisfaction was entered, results showed that this variable was strongly and positively associated with well-being, ($\beta = .67$, $t = 12.01$, $p < .01$), accounting for 44% of its variance, $F(1,177) = 144.21$, $p < .01$. At Step 2, when need satisfaction characterizing each of the three domains were entered, results revealed that each of them were positively and uniquely associated with well-being (Domain 1: $\beta = .20$, $t = 3.16$, $p < .01$; Domain 2: $\beta = .11$, $t = 1.78$, $p = .08$; Domain 3: $\beta = .16$, $t = 2.71$, $p < .05$), together accounting for 5.4% of the variance of well-being, over and above general need satisfaction, $\Delta F(3,174) = 6.35$, $p < .01$.

In this study, we replicated the results from Study 1 with three domains, showing again that both top-down and bottom-up effects occur across the general and contextual levels of need satisfaction. Additionally, we again showed that domain need satisfaction accounts for additional variance in well-being over and above what is explained by general need satisfaction, which provides support for a heterarchical structure of need-satisfaction across the levels. Finally, we used different measures of well-being than in the first study and obtained similar results, suggesting that the effects we found are not limited to one specific conceptualization of well-being.

Table 4
Means, standard deviations, and correlations among need satisfaction and well-being in domains and in general: Study 2.

	Means	*SD*	1	2	3	4
1. Need sat Dom 1	4.60	0.99	–			
2. Need sat Dom 2	4.75	1.03	−.02	–		
3. Need sat Dom 3	5.01	0.92	.19*	.23*	–	
4. General need sat	5.01	0.96	.49**	.40**	.40**	–
5. General WB	0.00	0.82	.46**	.34**	.44**	.70**

Note: $n = 177$.
** $p < .01$.

4. Study 3

Study 3 examined the structure of need satisfaction at all three levels of experience and their relation to well-being in a prospective study. More specifically, at Time 1 participants completed measures of well-being followed by general need satisfaction, and then, after completing other questionnaires related to goals they were pursuing (and unrelated to the present study), they described two important domains in their life and rated their level of need satisfaction for each domain. In addition, in order to assess the role of specific experiences hierarchically subsumed under a domain, we asked the participants to describe a specific past event related to each of their important domains (e.g., a life episode). At Time 2, 4 weeks later, participants were asked to complete the well-being scales again. We again hypothesized the existence of top-down effects and expected that the association between need satisfaction in each life episode and the association between need satisfaction in each domain would be significantly reduced after controlling for general need satisfaction. In addition, we also expected bottom-up effects, such that need satisfaction in each domain should predict general need satisfaction. Furthermore, need satisfaction in each life episode should be associated with need satisfaction in the domain to which it pertains, but not with need satisfaction in the domain unrelated to the life episode.

Crucially, the prospective design and the three-level structure of need satisfaction of the present study allowed us to perform more rigorous tests of the heterarchical model of need satisfaction hypothesis. As in Studies 1 and 2, need satisfaction in each domain should be associated with well-being, even after controlling for general need satisfaction. In light of the support for a heterarchical organization of need satisfaction experience obtained in the previous studies, we also hypothesized that need satisfaction in the life episodes would uniquely predict general need satisfaction, even if need satisfaction in each domain is controlled for. In addition, need satisfaction in the life episodes should be associated with well-being, even after controlling for domain need satisfaction and general need satisfaction. Finally, we also expected that these same hypotheses would also apply when predicting changes in well-being over time, such that need satisfaction in the life episodes, in the domains, and in general should all uniquely predict increases in well-being over time.

4.1. Method

4.1.1. Participants and procedure

Participants were undergraduate students who were taking part in a larger longitudinal study on goal pursuit. Participants were sent the questionnaire electronically, and completed it at home. Well-being was assessed first, followed by general need satisfaction, other items unrelated to the present study (related to people's goals and goal pursuit), and then finally need satisfaction in domains and memories. Four weeks later, participants completed the follow-up questionnaire online. One hundred and thirty-five participants ages 18–32 ($M = 20.18$, $SD = 2.26$) completed the initial questionnaire. The participants were mostly female (78.1% female), and three participants did not indicate their gender. Participants received $20 compensation for completing all study follow-ups. Only five participants did not complete the follow-up.

4.1.2. Measures

4.1.2.1. Domain need satisfaction. Participants were asked to name two domains in which they were involved using the same description as in Study 2. Participants then rated each domain on a six-item measure of need satisfaction initially developed for use with memories (Philippe et al., 2011) and adapted here to assess domains. Sample items include "In this domain I feel free to do things and think how I want" (autonomy), "In this domain I feel competent or capable" (competence), and "In this domain I feel connected to people" (relatedness). One item assessing autonomy was negatively worded ("In this domain I feel obliged to do things or think in certain ways") and reverse-coded. A mean score of overall need satisfaction was obtained for each domain ($\alpha = .76$ for the first domain; $\alpha = .78$ for the second domain). All responses were made on a 7-point scale of −3 (*Strongly disagree*) to 3 (*Strongly agree*).

4.1.2.2. Episodic need satisfaction. For each domain, we asked participants to describe a personal memory related to that domain of a specific moment or event that was significant for them (Philippe et al., 2012). The instructions for choosing and describing the memory were highly similar to those used by Philippe and his colleagues, with the exception that participants were asked to describe a memory that was at least 3 months old. Need satisfaction in each recalled episode was then assessed using the same items as for domain need satisfaction. The scale was reliable, $\alpha = .88$ for the first memory and $\alpha = .89$ for the second memory.

4.1.2.3. General need satisfaction. Participants' feelings of autonomy (e.g. 'My choices expressed my "true self."'), competence (e.g. 'I did well even at the hard things') and relatedness ('I was lonelier than I'd like to be'; reversed) were measured with 18 items used by Sheldon and Gunz (2009). We computed a score of overall need satisfaction by taking the mean of all the items, with the 9 negatively worded items reversed. All responses were made on a 7-point scale of 1 (*Strongly disagree*) to 7 (*Strongly agree*).The scale was reliable, $\alpha = .82$.

4.1.2.4. Well-being measures. Participants' general well-being was assessed using the same measures of positive and negative affect and vitality as in Study 1. The same measures were used at the initial survey and at the follow-up. We used more affect-based measures of well-being in this study in order to be able to notice changes over a short period of time. The scale reliabilities were as follows: at Time 1, $\alpha = .93$ for PA, $\alpha = .86$ for NA, and $\alpha = .93$ for vitality; at Time 2, $\alpha = .90$ for PA, $\alpha = .81$ for NA, and $\alpha = .91$ for vitality. An Exploratory Factor Analysis with Principal Axis Factoring as the method of estimation was conducted on all measured aspects of well-being, that is positive and negative emotions and vitality. Only one factor was extracted (second highest Eigen Value = .50), accounting for 61% of the variance. All well-being aspects loaded strongly on this component, with factor loadings ranging from .66 to .87. The same was true at Time 2. Therefore, as in the two previous studies, all well-being scales were averaged to form an index measure of well-being.

4.2. Results

Need satisfaction in the domain-related memories were both negatively skewed and departed from normality, as indicated by the Kolmogoroz–Smirnov test of normality, $Zs > 1.45$, $ps < .05$. To correct for this non-normality, both life episode variables were squared and achieved normality after this transformation. Table 5 presents the means, standard deviations, and correlations among all study variables. Need satisfaction in the two domains were again uncorrelated ($r = .09$, *ns*), but need satisfaction in the two episodes were significantly positively correlated, $r = .24$, $p < .01$. Again, need satisfaction in each domain and in each life episode was positively associated with general need satisfaction and with well-being (all $ps < .10$).

Multiple regressions were conducted to examine the presence of top-down effects of general need satisfaction on domain or life episode need satisfaction. The relationship between Domain 1 and Domain 2 need satisfaction was examined while controlling for general need satisfaction. Results showed that the inclusion of general need satisfaction reduced the coefficient of Domain 2 in predicting Domain 1 need satisfaction ($\beta = .09$, *ns* to $\beta = .04$, *ns*). Bootstrap results revealed that the 90% confidence intervals did not include zero [.002; .112], thus implying a significant top-down effect at $p < .10$. The relationship between the two life episodes was also examined using the same analytic strategy. Results revealed that this relationship was significantly reduced following the inclusion of general need satisfaction in the equation ($\beta = .24$, $p < .01$ to $\beta = .16$, $p < .10$). Bootstrap results confirmed the significance of this indirect effect, with 95% confidence intervals that did not include zero [.01; .19]. These results again suggest that general need satisfaction exerted top-down effects on ratings of need satisfaction in both domain and life episode need satisfaction.

To examine bottom-up effects, we conducted two regressions, using general need satisfaction as the dependent variable. In separate regressions, need satisfaction in each domain (Domain 1: $\beta = .14$, $p = .08$ and Domain 2: $\beta = .34$, $p < .01$, $F(2,131) = 11.01$, $p < .01$, $R^2 = .14$) and need satisfaction in each life episode (Life episode 1: $\beta = .18$, $p < .05$ and Life episode 2: $\beta = .36$, $p < .01$, $F(2,131) = 15.92$, $p < .01$, $R^2 = .20$), were found to be positively and uniquely associated with general need satisfaction. We also examined whether need satisfaction in each life episode would be associated with need satisfaction in its related domain. Results

Table 5
Means, standard deviations, and correlations among general, domain, and situational need satisfaction and Well-being: Study 3.

	Means	*SD*	1	2	3	4	5	6
1. Memory 1 need satisfaction[b]	5.18	1.37	–					
2. Memory 2 need satisfaction[b]	5.47	1.33	.24**	–				
3. Domain 1 need satisfaction	5.17	1.06	.58**	.22**	–			
4. Domain 2 need satisfaction	5.54	1.05	.13	.57**	.09	–		
5. General need satisfaction	4.51	0.81	.26**	.36**	.16*	.31**	–	
6. Well-being Time 1[a]	0.00	0.85	.40**	.41**	.29**	.37**	.71**	–
7. Well-being Time 2[a]	0.00	0.88	.39**	.49**	.29**	.38**	.63**	.75**

Note: $n_1 = 135$, $n_2 = 130$.
* $p < .10$.
** $p < .01$.
[a] Standardized scores.
[b] Untransformed means and standard deviations.

showed that when predicting Domain 1 need satisfaction, only need satisfaction in Life episode 1 was associated with it (Life episode 1: $\beta = .53$, $p < .01$ and Life episode 2: $\beta = .10$, *ns*), whereas the opposite result was obtained when predicting Domain 2 need satisfaction (Life episode 1: $\beta = -.03$, *ns* and Life episode 2: $\beta = .57$, $p < .01$). Finally, testing the heterarchical structure of the three levels of need satisfaction, results showed that episodic need satisfaction was significantly associated with general need satisfaction, even after controlling for domain need satisfaction (Life episode 1: $\beta = .22$ and Life episode 2: $\beta = .23$, *ps* < .05). This last finding provides support for bottom-up effects from life episode directly to general need satisfaction following a heterarchical organization.

As in Studies 1 and 2, need satisfaction in each of the two domains were positively and uniquely associated with Time 1 well-being (Domain 1: $\beta = .26$; Domain 2: $\beta = .35$; $F(2,131) = 17.38$, $R^2 = .21$, all *ps* < .01). The same pattern of results was also obtained for life episodes (Life episode 1: $\beta = .31$; Life episode 2: $\beta = .34$, $F(2,131) = 23.68$, $R^2 = .27$, all *ps* < .01). To examine the specific contribution of domain need satisfaction over and above general need satisfaction in the prediction of general well-being, a multiple regression analysis was conducted. At Step 1, general need satisfaction was positively associated with general well-being, $\beta = .71$, $p < .01$, accounting for 50% of its variance. At Step 2, results showed that need satisfaction in each domain was positively associated with well-being, (Domain 1: $\beta = .18$, $p < .01$; Domain 2: $\beta = .16$, $p < .05$), accounting for 5.6% of the variance of well-being, over and above general need satisfaction, $F(2,131) = 8.35$, $p < .01$. The same pattern of results was also obtained for episodic need satisfaction. After controlling for general need satisfaction, need satisfaction in each life episode was positively associated with well-being, (Life episode 1: $\beta = .20$, $p < .01$; Life episode 2: $\beta = .15$, $p < .05$), accounting for 6.5% of the variance $F(2,131) = 9.89$, $p < .01$.

In line with a heterarchical organization that implies that each level of experience provides a unique contribution with respect to people's well-being, we examined whether domain need satisfaction and episodic need satisfaction would predict well-being independently of each other and independently of general need satisfaction. To maximize power and given that each domain and life episode was uniquely associated with well-being (as shown above), we averaged the two domains together and the two life episodes together. At Step 1, we controlled for general need satisfaction. At Step 2, results showed that domain need satisfaction was positively associated with well-being, over and above general need satisfaction, $\beta = .25$, $p < .01$, $\Delta R^2 = .06$. At Step 3, results revealed that life episode need satisfaction was positively associated with well-being, over and above general and domain need satisfaction, $\beta = .19$, $p < .05$, $\Delta R^2 = .02$. These results thus provide support again for a heterarchical organization of need satisfying experiences.

To examine the prospective relationship between need satisfaction assessed at all three levels of experience and well-being, we conducted a similar hierarchical multiple regression analysis to the one presented above, but this time predicting well-being measured at Time 2 and controlling at Step 1 for well-being measured at Time 1. At this first step, well-being measured at Time 1 was positively associated with well-being measured at Time 2, $\beta = .75$, $p < .05$, $R^2 = .57$. At Step 2, results showed that general need satisfaction predicted increases in well-being over the 4-week period, $\beta = .19$, $p < .05$, $F(1,127) = 5.38$, $\Delta R^2 = .02$. At Step 3, domain need satisfaction was positively associated with increases in well-being as well, and over and above general need satisfaction, $\beta = .14$, $p < .05$, $F(1,126) = 4.55$, $\Delta R^2 = .01$. Finally, at Step 3, life episode need satisfaction predicted increases in well-being, over and above general and domain need satisfaction, $\beta = .20$, $p < .01$, $F(1,125) = 7.00$, $\Delta R^2 = .02$.

Overall, this study provided further support for a heterarchical model of need satisfaction. Using both correlational and prospective data, this study showed that episodic, domain, and general need satisfaction each contributed to general well-being independently of need satisfaction experienced in the other levels. Importantly, the prospective results suggest that need satisfaction at each level has a directional effect on well-being, such that greater need satisfaction leads to increases of well-being over time.

5. General discussion

In a series of three studies, we explored the organization of need satisfaction across different levels of experience, providing support for a heterarchical model. Additionally, we showed that psychological need satisfaction at three distinct levels of experience independently contributes to general well-being. As expected in a heterarchical model, episodic and domain need satisfaction were partially subsumed under general need satisfaction yet were able to contribute independently to well-being. The effects of domain need satisfaction on well-being remained when we controlled for general need satisfaction, even when, in Study 1, we used the exact same items (with a different reference point) in both scales. In addition, controlling for general and domain need satisfaction did not eliminate the effect of episodic need satisfaction on well-being, even when using the exact same items to assess need satisfaction in both domains and specific life episodes (Study 3). The unique relationship of need satisfaction at each level to well-being was shown using a broad conceptualization of well-being including hedonic and eudaimonic measures, and extended to a prospective measure of well-being in Study 3, suggesting that need satisfaction at different levels of experience can affect changes in well-being. Additionally, we used different measures of need satisfaction across the studies, showing that our results are not instrument-specific.

This research provides a theoretical and statistical model of the organization of need satisfaction across multiple levels of experience. We show evidence for both top-down and bottom-up effects,

which have previously received very limited attention in SDT. In the present research, the evidence for top-down effects might appear inconsistent if only the correlations between domains are examined. Indeed, these correlations were only significant for some of the domains in Study 2 and were not significant in Study 3. However, partialling out general need satisfaction did significantly reduce the correlations in most cases, suggesting that the top-down effect was present. The size of the correlations between the domains may depend on the choice of domains selected by the participants across the samples.

Additionally, we found particularly strong evidence for the existence of bottom-up effects, which suggest that people's general perceptions of need satisfaction are derived from contextual experiences of need satisfaction, which are further derived from their episodic experiences. This is in line with previous research on self-concept (Markus, 1977; McConnell, 2011) and personality structure (Wood & Roberts, 2006); the current studies represent the first investigation of this type in relation to psychological need satisfaction.

Overall, this research suggests a mechanism for the way in which factors at multiple levels of experience (including personality at the general level and environment characteristics at the domain and episodic levels) can influence well-being and other general outcomes. Indeed, the factors present at each level would influence experiences of need satisfaction, which would in turn affect well-being. Although our research only focused on the latter relationship (between need satisfaction and well-being), other research has examined some of the factors which lead to need satisfaction at each of the levels. For example, previous research has consistently demonstrated the importance of supportive environments at the situational and contextual levels for need-satisfying experiences (see Deci & Ryan, 2008). Additionally, at the general level, research has shown how having an autonomous causality orientation (an aspect of personality; Deci & Ryan, 1985) influences perceptions of need satisfaction (e.g., Gagné, 2003). While some of this research has looked at effects across levels (e.g. predicting work engagement from general need satisfaction and general causality orientations; Gagné, 2003), our model provides a theoretical framework for understanding such cross-level effects.

Our finding that each lower-level retains a unique association with well-being independently of the general perceptions of need satisfaction also suggests that the general perceptions of need satisfaction are only summary representations of many domain and episodic experiences of need satisfaction and likely leave out many important details. However, these general perceptions probably provide the person with a stable sense of self across situations, which can in itself contribute to increases in well-being (Kernis, 2005). One explanation of how domain and episodic need satisfaction may contribute to increased well-being is through the frequent activation of their representations. People keep in memory their experiences of need satisfaction with respect to specific domains or particular events and are capable of evaluating these experiences almost irrespectively of their general perceptions of need satisfaction or of each other (as shown by the null or small correlations between the need satisfaction ratings of two domains or of two life episodes). These representations of need satisfaction attached to a domain or to a specific past event are believed to be primed by the environment when a person is engaged in the same domain or is experiencing a similar situation (Philippe et al., 2012). Such priming is expected to in turn influence the person's situational experience of well-being when engaged in the domain or in the specific situation. Over time, if this priming effect is frequently repeated in the person's life and that consequently the person frequently experiences situational well-being, it should build an enduring sense of well-being over time. This effect is similar to exercising. If a person exercises once, then he or she will feel great immediately afterwards, but this effect will quickly disappear. However, if this person is to exercise three times a week for several weeks, then this person would start to build enduring physical resources (for a similar view see Fredrickson, 2001). Thus, a heterarchichal organization of need satisfaction could explain a person's increases in well-being in two ways: A first way is through the stable perceptions of general need satisfaction. A second way is through the numerous repeated experiences of well-being derived from frequently recalled need satisfaction in specific domains and past life episodes.

Our findings on the role of need satisfaction across levels of experience contrast with a recent perspective advanced by Sheldon, Cheng, and Hilpert (2011), who posit that psychological needs (conceptualized at the global level) are the foundation of a multilevel model of personality such that all other aspects of personality (traits, goals, and sense of self) build on it. Although we do not dispute the role played by need satisfaction on traits, goals, and the self, we believe that needs can be considered separately as contributing to outcomes at each of these levels of personality or self, rather than underlying all these levels. In other words, need satisfaction experienced at one level does not necessarily correspond to need satisfaction experienced at another level. Our findings also show that even within the same level, the need satisfaction experienced in a domain, for instance, does not correspond to the need satisfaction experienced in a different domain. Thus, a person could be experiencing need satisfaction in one domain and need thwarting in another domain, and similarly may be able to recall specific instances of need satisfaction and need thwarting in each domain. It is this collection of separate levels of experience that builds up the person's general sense of self (herein the perceptions of general need satisfaction), but that may also be likely to guide people's thought and actions within particular domains or situations.

Certain limitations regarding the present set of studies need to be underscored. First, only correlational designs were used in the present studies and there is no way to confirm the causality of our results. Although Study 3's design tested the prospective effect of need satisfaction at each level on well-being, there is still the possibility that a third unknown variable explains the present findings. Another limitation of the present study is the limited focus on the episodic level. In this paper, we only assessed episodic need satisfaction in Study 3, and looked at only one episode per domain. We thus do not know whether domain need satisfaction is built up from multiple episodes in the same way as general need satisfaction is built up from multiple domains.

Overall, the present research provides consistent evidence that domain-specific and episodic need satisfaction contribute independently to well-being beyond a general sense of need satisfaction. Although there was a substantial overlap between need satisfaction across the levels, this overlap was only partial, such that each level remained relatively independent of the others and retained unique predictive power, pointing to the importance of assessing need satisfaction across multiple levels of experience. These findings contribute to our theoretical understanding of the relationship between psychological need satisfaction and well-being and particularly the organization of need satisfaction across levels of experience. Furthermore, our demonstration that need satisfaction follows a heterarchical rather than a hierarchical organization across multiple levels may have broader implications for examining personality structure and its organization more generally.

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