# Charting the internal landscape: Affect associated with thoughts about major life domains explains life satisfaction

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**Abstract**

Studies of happiness have examined the impact of demographics, personality and emotions accompanying daily activities on life satisfaction. We suggest that how people feel while contemplating aspects of their lives, including their weight, children and future prospects, is a promising yet uncharted territory within the internal landscape of life satisfaction. In a sample of 811 American women, we assessed women's feelings when thinking about major life domains and frequency of thoughts about each domain. Regression and dominance analyses showed that emotional valence of thoughts about major life domains was an important predictor of current and prior life satisfaction, surpassing, in descending order, demographics, participants' feelings during recent activities, and their neuroticism and extraversion scores. Domains thought about more frequently were often associated with greater emotional valence. These results suggest that life satisfaction may be improved by modifying emotional valence and frequency of thoughts about life domains. Moreover, these thoughts appear to be an important and relatively stable component of well-being worthy of further study.

Keywords: life satisfaction, life domains, rumination, savoring, activities, time use.

## 1 Introduction

Thoughts represent the way people consciously perceive their circumstances, and capture people's preoccupations, dreams, and hopes. This study identifies thoughts related to major life domains as a promising new feature of the well-being landscape, particularly in terms of their emotional valence and frequency. Using a systematic approach for capturing thoughts, we demonstrate that people's feelings while contemplating various aspects of their lives contribute more to the prediction of their life satisfaction than some commonly studied variables.

Past investigations have indicated that life circumstances, personality, and time use are reliable determinants of life satisfaction (Lyubomirsky et al., 2005; for a review see Dolan et al., 2008). Some circumstances (e.g., divorce, layoff, disability) can have substantial lasting effects on life satisfaction (Diener et al., 2006; Lucas, 2005). Yet life circumstances are less closely associated with well-being than is usually assumed (e.g., Brickman & Campbell, 1971; Wilson & Gilbert, 2005). Personality is another factor shown to have at least a moderate effect on well-being (Diener & Lucas, 1999). Of the traits included in the Big Five, neuroticism and extraversion are generally the most closely related to life satisfaction (e.g., Schimmack et al., 2004). Another major determinant of life satisfaction is time use: how people spend their time and how they feel while engaged in activities. Indeed testing a model developed by Lyubomirsky and colleagues (2005), Sheldon and Lyubomirsky (2006a) showed that active rather than circumstantial activity change results in sustainable improvement in life satisfaction. In a series of studies, Kahneman and colleagues found that the average affect associated with routine daily activities (i.e., episodes) was correlated with life satisfaction (Kahneman et al., 2004; Kahneman et al., 2006), and a recent examination on parenting and its contribution to life satisfaction found that parents derive more positive feelings from caring for their children than from other daily activities (Nelson, Kushlev, English, Dunn, & Lyubomirsky, 2013).

Drawing from prior work in time-budget measurement and cognitive science (Belli, 1998; Juster & Stafford, 1985; Michelson, 2005; Robinson, 1977; Robinson &

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Clore, 2002), the Day Reconstruction Method (DRM; Kahneman et al., 2004) is designed to collect data describing the experiences a person has on a given day via systematic reconstruction conducted on the following day. The DRM requires respondents to reconstruct the waking hours of the previous day by producing a short, confidential diary consisting of a sequence of episodes. The episodic format of the diary is based upon cognitive research with Event History Calendars (Belli, 1998) and is designed to reduce biases commonly found with retrospective reports (Robinson & Clore, 2002; Schwarz & Oyserman, 2001; Schwarz & Sudman, 1994). Next, respondents are encouraged to use their diary notes to answer questions about key features of each episode, including: when the episode began and ended, what they were doing, where they were, who they were interacting with, and how they felt during that episode, assessed on multiple affect dimensions. To avoid selection biases, respondents are unaware of the content of the questions when they record their diary notes. Validation studies have shown that DRM captures changes in affect over the course of the day that closely correspond to changes captured by experience sampling (Kahneman et al., 2004; Stone et al., 2006).

The DRM is designed to capture activities and experiences of the preceding day and is thus advantageous in providing time use information and limiting reports to very recent episodes recalled in the context of other episodes of the day (or the product use, see Kujala & Miron-Shatz, 2013). However, the focus on a single day makes it difficult to assess infrequent activities, which a significant number of respondents may not have engaged in, but which may nonetheless be important to well-being. The Event Reconstruction Method (ERM; Kahneman et al., 2006; Miron-Shatz, 2009; Schwarz et al., 2008; Grube et al., 2008), used in the present study to assess affect associated with routine daily activities, employs a procedure identical to DRM, but circumvents this limitation by asking respondents to report on the most recent episode of each of a set of activities (e.g., working, taking care of your children, having dinner). ERM is more efficient than DRM (Grube et al., 2008) and shows good correspondence with DRM, provided the last episode of an activity is relatively recent (Schwarz et al., 2008). Like DRM, ERM has been validated relative to experience sampling methods (Grube et al., 2008).

In this study, we shift the focus from activities to thoughts and investigate the hypothesis that affect during thoughts about life domains, irrespective of their duration, plays a key role in life satisfaction. We suggest that people's feelings while thinking about the significant elements of their lives constitute a critical but relatively uncharted part of the internal landscape of life satisfaction. We operationalize this idea as affect associated with

thoughts about major life domains (as distinct from the more general notion of life views, as in, e.g., Wu et al., 2009) and attempt to demonstrate that this factor explains a large proportion of the variance in life satisfaction.

Most judgments of complex issues rely on a set of cognitive heuristics that reduce processing time (e.g., Gilovich et al., 2002; Kahneman et al., 1982; Tversky & Kahneman, 1974). Kahneman and Frederick (2002; 2005) propose that many of these heuristics are elaborate forms of *attribute substitution*, a process whereby an easier question is substituted for a difficult, unfamiliar question. We further suggest that when a question is broad and complex, a person may substitute an aggregate of different attributes. For example, the Satisfaction with Life Scale (Diener et al., 1985) requests an evaluation of the statement, a "My life is close to ideal these days." To address this complex question, a participant may instead ask herself a set of more straightforward questions about attributes such as her career, her children, and her future. Next, the individual evaluates her immediate affective reactions to the chosen domains and combines these evaluations. Finally, life satisfaction is judged via the attribute substitution process (Kahneman & Frederick, 2002; 2005), through which the composite evaluation of the relevant domains substitutes for abstract and subjective questions like, "Overall, how satisfied are you with your life these days?" Such a scheme is consistent with the hybrid model of well-being (Kahneman & Riis, 2005), according to which local evaluations are critical to global judgments of life satisfaction. As implied by the name, the "hybrid model" suggests that domain evaluations may constitute one important mediator of the way people gauge their overall satisfaction with life. Indeed the present study examines whether emotions associated with thinking about such major life domains represents a better cognitive heuristic for life satisfaction judgments than emotions associated with activities or than demographic characteristics.

Among investigations of well-being, naturally-occurring thoughts about life domains are seldom explored. One notable exception is Schimmack and colleagues (2002), who evaluated the impact of thoughts about important life domains on life satisfaction judgments cross-sectionally and longitudinally using open-ended and closed-format retrospective reporting. They showed that the thoughts are stable over time and that certain domains (e.g., family relations, academic performance) are thought about more frequently than others (e.g., financial satisfaction). Another example is the work of White and Dolan (2009), who adapted the Day Reconstruction Method (DRM; Kahneman et al., 2004) to include thoughts as well as feelings, showing that the contribution of thoughts adds a reward component to the pleasure component of life satisfaction

judgments. Indeed Dolan and Metcalfe (2012) included ratings of thoughts about life in recommendations to national governments for informing and appraising public policy. Other studies focus on specific, unpleasant issues, such as death and suicidal ideation, usually in clinical populations (e.g., Michael & Snyder, 2005). One study found that in contrast to general affect, those who think about their health frequently and negatively are more willing to sacrifice life years in order to alleviate their health problems (Dolan et al., 2011). Recent work has highlighted the importance of evaluating satisfaction with income and wealth (as distinct from level of income or wealth). Indeed Miron-Shatz (2009) showed that feelings accompanying thoughts about financial security are as predictive of life satisfaction as income. Similarly, Norris and Larsen (2011) investigated the have-want discrepancy, as mediated by materialism, another predictor of life satisfaction that transcends objective level of income and net worth and relates to affect associated with thoughts. Finally, Lyubomirsky (2013) has shown that long-term life satisfaction can be achieved by reshaping and reconsidering present-day thoughts and feelings, including those relating to circumstances that seem unequivocally negative. These studies demonstrate the great potential of exploring emotional valence of thoughts to chart the internal well-being landscape.

Two extremes of the thought-related emotional spectrum that have been studied extensively are ruminating and savoring. Rumination involves conscious, spontaneous, and recurrent thoughts about negative events and has been characterized as an experientially avoidant emotion regulation strategy that arises in response to perceived discrepancies between desired and actual status (Smith & Alloy, 2009). Rumination has been deemed an inappropriate coping strategy (Janoff-Bulman, 1989) associated with poor health (Kirkegaard Thomsen et al., 2004), reduced satisfaction, happiness and confidence (Extremera & Fernandez-Berrocal, 2006; Ward et al., 2003), impaired thinking, problem solving, instrumental behavior, and social relationships (Nolen-Hoeksema et al., 2008), as well as negative affect, depression, anxiety, substance abuse, eating disorders, and possibly self-harm (Kuehner & Weber, 1999; Nolen-Hoeksema et al., 2008; but see, e.g., Hunt, 1998; Watkins, 2004, who link rumination with reduction in depressive symptoms and recovery from upsetting events). Savoring, or "the active process of enjoyment" (Bryant, 2003; Bryant & Veroff, 2007, p.3), involves "attending to joy" rather than merely experiencing it and may be operationalized as the self-regulation of positive feelings, most typically generating, maintaining or enhancing positive affect by attending to positive experiences from the past, present, or future (Bryant, 1989, 2003; Bryant, Ericksen, & DeHoek, 2008; Bryant & Veroff, 2007).

Unlike rumination, savoring has been studied sparingly, but one study showed that people with high self-esteem are more likely to savor positive affect than those with low self-esteem (Wood et al., 2003). Wood and colleagues (2003) suggest that low self-esteem individuals may dampen positive moods because they feel undeserving of experiencing positive moods (Parrott, 1993), and are thus motivated to diminish them to maintain predictability and stability, consistent with self-verification theory (Swann, 2012). Further, it has been hypothesized that depression involves not only increases in negative affect, but also decreases in positive affect (Clark & Watson, 1991). Indeed depression appears related to reduced attention and responsiveness to positive stimuli (Rottenberg et al., 2002; Henriques & Davidson, 2002; Sloan et al., 2002), which in turn predicts slower recovery (Rottenberg et al., 2002). This literature demonstrates how the content, frequency and emphasis of thoughts can influence mood and experienced affect, and even be associated with depression.

Although there is some prior literature, ours is the first systematic, large-scale exploration of the association between affect during naturally occurring thoughts about major life domains (Cummins, 1996) (e.g., material well-being, health, productivity, intimacy) and life satisfaction. We begin by providing an initial, descriptive account of the content and valence of people's thoughts. We then present data on the association between the emotions accompanying naturally occurring thoughts about major life domains and concurrent life satisfaction. In secondary analyses, we explore whether the association differs for life domains thought about very often, and whether the association holds for life satisfaction measured six months prior. Finally, we examine how well emotions accompanying thoughts explain the variance in life satisfaction, compared to the other predictors that have been heavily studied: demographics, personality and emotions accompanying activities. We expect affect during thoughts about life domains to be at least as explanatory as the traditionally-studied factors.

## 2 Method

### 2.1 Participants

Survey companies recruited 811 women from Columbus, Ohio using random-digit dialing. The sample was limited to women to avoid the influence of potential gender differences and given evidence that women ruminate more than men (Nolen-Hoeksema et al., 1999). Their mean age was 43.82 ($SD$ = 10.47). The women were randomly assigned to receive one of three versions of the survey, each including a different set of thought domains (see section 2.2; Version 1: $n$ = 271; Version 2: $n$ = 269; Version 3:

$n$ = 271). Analyses of variance conducted with survey version as the independent variable indicated that neither age nor household income varied significantly across versions, $F(2, 808) = 0.114$ and $F(2, 798) = 0.688$, $ps > .05$. 71.2% to 72.7% of the participants receiving each version were married or cohabiting and 67.3% to 70.1% were employed. The survey was in English and all participants spoke English at home.

## 2.2   Materials and procedure

The participants completed individual questionnaires according to the Event Reconstruction Method (ERM) protocol developed by Kahneman et al. (2006).

They first completed the Satisfaction with Life Scale (Diener et al., 1985), a 5-item scale that asks respondents to indicate the extent to which they agree with each item (e.g., "I am satisfied with my life"; "If I could live my life over, I would change almost nothing"), using a 7-point scale ranging from strongly disagree to strongly agree. The sum of the item scores was used as a measure of life satisfaction.

Participants were then prompted to think of the most recent episode in which they engaged in each of ten specific activities (e.g., exercising, shopping, resting), with participants randomly assigned to one of three overlapping sets of activities presented in one of two administration orders. For each episode, participants were asked to record when the episode occurred (today, yesterday, within the last seven days, more than seven days ago) and the time of day. They were then instructed to relive the episode in detail, including everything they were doing, the people they were with, and the location of the episode. Then they recorded where they were (home, work, car or bus, elsewhere), whether they were alone, and whether they were talking with anyone (no, one person, more than one person), whom they were talking with (e.g., spouse, children), what else they were doing during the episode (e.g., preparing food). If they recalled doing multiple things, they were instructed to circle the activity that seemed most important at the time. Then, for each of the ten activity episodes, participants were asked to judged emotional valence by rating the extent to which they were happy, calm/relaxed, affectionate/friendly, tense/stressed, irritated/angry, or depressed/blue during the episode on a scale from 0 (*not at all*) to 6 (*very much*).

The participants next completed an abbreviated version of the Big Five personality inventory (Mini IPIP, Donnellan et al., 2006). For the Mini IPIP, participants rated how accurately they are described by each of 20 statements describing behaviors (1=very inaccurate, 2=moderately inaccurate, 3= neither inaccurate nor accurate, 4=moderately accurate, 5=very accurate). The neuroticism and extraversion variables used in some of our analyses were computed as the sum of the 4 neuroticism items and the 4 extraversion items, respectively.

The participants then responded to questions regarding their thoughts about six life domains. There were 18 thought domains (Miron-Shatz, 2009) divided among three versions. Version 1: 'love and relationships,' 'the respect you get from others,' 'your house and home,' 'getting older,' 'current events, news and politics,' and 'the spiritual aspects of your life'; Version 2: 'your weight,' 'your children (if you have any),' 'your hobbies,' 'your future,' 'your work,' and 'medical insurance'; Version 3: 'your family,' 'financial security,' 'your looks,' 'your health,' 'your faith and religion,' and 'your marriage (if you are married)'. Thought domains were distributed among the versions to minimize overlap of similar domains within the same version (e.g., 'love and relationships' and 'your marriage' were in different versions). Each participant completed one version (determined randomly) and indicated the frequency with which she experienced the thought: 0 (*never*), 1 (*sometimes*), 2 (*once every day*), or 3 (*many times each day*). She then rated emotional valence while thinking about each domain in a manner comparable to the valence judgments during episodes of activities in the ERM protocol (see above), using the same emotions and scale as for the ERM. The questions on thoughts were placed at the end of the survey to reduce potential influence of questions on life satisfaction presented earlier in the survey.

### 2.2.1   Measures

*Difmax* was calculated for each thought domain and activity episode as the rating of 'happy' minus the highest value among 'tense/stressed', 'irritated/angry', or 'depressed/blue' (Krueger & Schkade, 2008; Miron-Shatz, 2009); range: -6 [negative valence] to +6 [positive valence]). Results for this variable were very similar to those for 'net affect', obtained by subtracting the average of these negative emotions from the average of 'happy', 'affectionate/friendly' and 'calm/relaxed' ratings (Krueger & Schkade, 2008). Difmax was used over 'net affect' because it is consistent with the intuition that a thought domain or an activity episode can be judged aversive if even one of the negative emotions is intense (Krueger & Schkade, 2008). This is also consistent with the broader notion of negativity bias, whereby negative stimuli and information are weighted more heavily than positive ones (Baumeister, Bratslavsky, Finkenauer & Vohs, 2001; Rozin & Royzman, 2001).

*Average thought Difmax* was calculated as the mean of the Difmax for all six thoughts the participant rated.

*Average ERM Difmax* was calculated by averaging the Difmax ratings of the activity episodes the participants provided.

*Good Fortune Index* was derived in a previous study (Kahneman et al., 2010) by conducting a multiple regression for life satisfaction using the following predictors: age, household income, years of education, body mass index, and a set of variables that were dummy coded '0' or '1' depending upon whether the condition applied: has a biological child, lives with a biological child, is married or cohabiting, not unemployed (this condition also applies to homemakers, students and retired persons who are not seeking employment), is white, lives with a child that is under 6 years old, and is not receiving medical treatment. This set of variables was empirically selected, solely on the basis of statistical significance in the Kahneman et al. (2010) regression model. The good fortune 'index' was computed using the beta weights for each variable from the Kahneman et al. (2010) derivation.

## 2.3 Additional materials and procedure

Six months earlier, a sub-sample of the participants ($n = 551$, mean age = 43.82, $SD = 10.47$) had followed the DRM protocol (Kahneman et al., 2004), identical to the ERM except that rather than reconstructing the previous episode of each of a set of activities, participants were instructed to reconstruct the previous day of their lives in terms of discrete episodes, from when they woke up in the morning until bedtime. The DRM episodes (Kahneman et al., 2004) were reported in chronological order. Specifically, participants were asked to construct a short diary of the previous day by thinking of their day as a continuous series of scenes or episodes in a film. They were instructed to give each episode a brief name that would help them remember it (for example, 'commuting to work' or 'at lunch with B'). They were further instructed to record the approximate times at which each episode began and ended, with the caveat that an episode should last at least 20 minutes but not more than 2 hours. Participants were told that indications of the end of an episode might be going to a different location, ending one activity and starting another or a change in the people he/she was interacting with. Participants were not required to share their diary. Comparison of the ERM data with the DRM data collected six months earlier was intended to evaluate the extent to which key variables predicted life satisfaction, as measured both concurrently and six months previous. Emotional valence of thought domains was not rated as part of the DRM.

## 2.4 Statistical analyses

To describe affect during each of the 18 thought domains, mean Difmax and associated *SD* was computed for each domain. Then, to quantify the association between affect and life satisfaction for each domain, a bivariate correlation between Difmax and life satisfaction from the Satisfaction with Life Scale (Diener et al., 1985) was computed. To describe frequency of thoughts of each of the 18 thought domains, mean frequency and associated *SD* was computed for each domain. Then, to quantify the association between frequency and life satisfaction for each domain, a bivariate correlation between frequency and life satisfaction was computed. Proportion of participants thinking about each domain 'many times a day' was computed as well as mean Difmax for only these participants. In an exploratory analysis, a between-groups t-test (or Mann-Whitney U test if Levene's test p < .05) was used to compare mean Difmax for participants thinking about a domain 'many times a day' with mean Difmax for all other participants (who reported thinking about a domain less often). To compare affect during thoughts of major life domains with other predictors of life satisfaction, a multiple regression analysis was run with these predictors: good fortune index, neuroticism, extraversion, average ERM Difmax, and average thought Difmax. In a confirmatory analysis, a similar multiple regression was run on the sub-sample ($n = 530$) who completed the DRM six months prior.

## 3 Results

### 3.1 Exploratory analysis of affect associated with thought domains and its association with life satisfaction

The average bivariate correlation for Difmax among pairs of thought domains was only $r = .34$ (corresponding to a common variance of 12%), indicating that the ratings were largely domain-specific. In Table 1, the 18 thought domains are ordered by average rated emotional valence. The domains that were associated with the greatest positive affect were 'hobbies', 'faith and religion', and 'the spiritual aspects of your life'. Thoughts of three life domains were associated with negative emotional scores: 'financial security', 'your weight', and 'current news and politics'. Interestingly, although 'current news and politics' was associated with an average Difmax rating as low as $-1.85$ ($SD = 2.51$), the correlation between the Difmax of thinking about 'current news and politics' and life satisfaction was one of the lowest ($r = .30$, $p < .001$) among all thoughts. This suggests that, while people experience negative affect when contemplating the news, this has little effect upon their evaluations of their lives. Notably, thoughts of 'your marriage' were most highly correlated with life satisfaction ($r = .67$), followed by thoughts of 'your future' ($r = .53$) and 'love/relationships' ($r = .52$, $p < .001$ for all). This finding points to the centrality of relationships and intimacy in assessing one's life. As

Table 1: Valence (Difmax) and frequency of thoughts about major life domains: descriptive statistics and correlations with life satisfaction.

| | Mean Difmax | Correlation Difmax & LifeSat | Mean frequency | Correlation frequency & LifeSat |
|---|---|---|---|---|
| Your hobbies | 3.32 (2.30) | .38*** | 2.53 (0.89) | .15[b] |
| Your faith/religion | 3.25 (2.50) | .32*** | 2.83 (1.01) | .04 |
| Spiritual aspects of your life | 3.00 (2.60) | .33*** | 3.00 (0.90) | .14[c] |
| Your children | 2.88 (2.34) | .21*** | 3.77 (0.52) | .01 |
| Your marriage | 2.11 (3.57) | .67*** | 3.28 (0.72) | −.04 |
| Respect from others | 2.06 (2.85) | .36*** | 2.57 (0.74) | −.06 |
| Your house/home | 2.05 (3.11) | .47*** | 3.12 (0.79) | −.09 |
| Love/relationships | 1.89 (3.05) | .52*** | 3.26 (0.69) | −.03 |
| Your family | 1.46 (2.84) | .32*** | 3.48 (0.56) | .04 |
| Your looks | 1.34 (2.83) | .40*** | 3.08 (0.77) | −.08 |
| Your work | 0.91 (2.91) | .41*** | 3.25 (1.02) | .07 |
| Your future | 0.71 (3.03) | .53*** | 3.04 (0.75) | −.24*** |
| Your health | 0.57 (2.87) | .44*** | 2.96 (0.75) | −.10 |
| Getting older | 0.39 (2.88) | .37*** | 2.51 (0.75) | −.13[d] |
| Medical insurance | 0.15 (3.47) | .21*** | 2.05 (0.75) | −.09 |
| Financial security | −0.68 (2.86) | .46*** | 3.14 (0.75) | −.33*** |
| Your weight | −1.25 (3.28) | .32*** | 3.25 (0.73) | −.18[a] |
| Current news/politics | −1.85 (2.51) | .30*** | 2.86 (0.82) | .03 |

Note: *SD*s are in parentheses; only women who have children/were ever married included in relevant analyses. The table is sorted in descending order of mean Difmax. The frequency variable has a range of 1–4, and Difmax ranges from –6.00 (negative valence) to +6.00 (positive valence).

*** $p < .001$; [a] $p < .01$; [b] $p = .01$; [c] $p = .02$; [d] $p = .03$; all others $p > .05$.

expected, nearly all of our married participants (98.8%) thought about their marriage, and 99.2% of the parents thought about their children. Strikingly, while thoughts of 'your children' were most prevalent and had a relatively positive emotional valence, their correlation with life satisfaction was as low as that of medical insurance, which was pondered least ($r = .21$ for both, $ps < .001$). Thus although people ascribe a high value to having children when rating life satisfaction, they find that caring for children is not necessarily pleasant (Kahneman et al., 2004; but see Nelson et al., 2013).

## 3.2 Exploratory analysis of frequency of thoughts by domain and its association with life satisfaction

Average frequency of thoughts was a significant predictor of life satisfaction ($\beta = 1.15$, $p < .05$). The frequency with which people had specific thoughts was correlated with life satisfaction in only six out of 18 domains and then only weakly (Table 1). For example, life satisfaction shared a weak correlation with the frequency of thinking about weight ($r = −.18$, $p < .01$) and spirituality ($r = .14$, $p < .05$), but not with the frequency of thoughts on faith and religion ($r = .04$, ns).

## 3.3 Affect associated with thoughts about major life domains thought about very often

Of the six thought domains in a given version, participants reported thinking about an average of 1.83 domains 'many times each day,' with 'your children' (for 81% of the participants with children) and 'your work' (56%) most prevalent (Table 2). The mean Difmax associated with each thought for participants who reported thinking

Table 2: The prevalence and valence of thinking of a domain many times each day.

| Thought | % think many times a day | Mean Difmax for many times a day | Mean Difmax for other frequencies |
|---|---|---|---|
| Your hobbies | 13.06 | 3.66 | 3.26 |
| Your faith/religion | 30.83 | 4.41*** | 2.60 |
| Spiritual aspects of your life | 33.58 | 4.28*** | 2.30 |
| Your children | 80.56 | 2.89 | 2.82 |
| Your marriage | 41.92 | 2.06 | 2.53 |
| Respect from others | 9.59 | 1.24 | 2.15 |
| Your house/home | 33.95 | $1.32^b$ | 2.44 |
| Love/relationships | 38.66 | 1.41 | 2.15 |
| Your family | 51.67 | 1.76 | 1.12 |
| Your looks | 31.11 | $0.63c$ | 1.67 |
| Your work | 55.64 | $0.52a$ | 1.59 |
| Your future | 27.34 | $-0.22^a$ | 1.08 |
| Your health | 22.96 | -0.94*** | 1.04 |
| Getting older | 8.86 | $-0.91^d$ | 0.51 |
| Medical insurance | 5.26 | $-2.07^c$ | 0.31 |
| Financial security | 34.81 | -2.26*** | 0.16 |
| Your weight | 39.93 | -2.88*** | -0.14 |
| Current news/politics | 21.40 | -2.41 | -1.69 |

Significance indicated for between-groups *t*-test (or Mann-Whitney *U* test if Levene's test $p < .05$) comparing Mean Difmax for participants who thought about a domain many times a day with Mean Difmax for all other participants (who reported thinking about the domain less frequently).

\*\*\* $p < .001$; $^a p < .01$; $^b p = .01$; $^c p = .02$; $^d p = .03$; all others $p > .05$.

about a domain 'many times a day' (Table 2, middle column) may be compared with mean Difmax for the entire sample (Table 1, left column) and for those who reported thinking about the domain less frequently (Table 2, right column). Generally, experiencing a thought many times each day accentuated the emotions associated with it, whether positive or negative. Thus, thinking about 'faith and religion' evoked a Difmax of 3.25 on average (Table 1), with a mean Difmax of 4.41 for those who thought about the domain 'many times a day' and a mean Difmax of 2.60 for those who thought about the domain less frequently (Table 2). A similar pattern emerged for 'the spiritual aspects of your life'. Four domains associated with positive Difmax when examined for the entire sample were associated with negative Difmax ratings among those who pondered them often: 'Your health,' 'your future,' 'getting older,' and 'medical insurance.'[1] 'Financial security' also showed this pattern when compared with

those who thought about the domain less frequently (Table 2). The results for 'medical insurance' were particularly interesting: though only 5% of the sample considered it very often, they did so with relatively negative emotionality (a Difmax rating of -2.07, compared with 0.15 for the entire sample and 0.31 for those who thought about the domain less frequently). Taken together, these results suggest that, while frequency of thoughts is not very predictive of life satisfaction, it affects the emotional valence of thoughts.

## 3.4 Affect during thoughts compared with other predictors of life satisfaction

A multiple regression analysis supported our main hypothesis that people's thoughts about various life domains capture a component of their well-being that is separable from other predictors. The relative sizes of the standardized $\beta$ values in predicting life satisfaction indicated that average thought Difmax ($\beta = .357, p < .001$) was associated more closely with life satisfaction than the good for-

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[1]Note: These data were collected in 2007, prior to the 2010 U.S. healthcare reforms designed to expand coverage to 32 million Americans who were previously uninsured.

tune index, ($\beta$ = .288, $p$ < .001), neuroticism ($\beta$ = $-$.118, $p$ < .001), the Difmax of experienced ERM activities ($\beta$ = .098, $p$ = .01), or extraversion ($\beta$ = .070, $p$ = .01).

A dominance analysis (Budescu, 1993; Braun & Oswald, 2011) yielded similar results. Dominance analysis allows for statistical decomposition of the total predicted variance in the regression model to give the relative portion of variance accounted for by each variable. Table 3 summarizes the dominance analysis results. The first two columns list the predictor(s) and $R^2$ included in each sub-model. The next five columns (one for each predictor) show the increase in $R^2$ associated with incorporating each predictor. The five sections in the table represent the following: the direct effect of each variable, i.e., its predictive ability when entered by itself (first section); its partial effect when entered along with one other variable (second section), with two other variables (third section), with three other variables (fourth section), and with four other variables (fifth section). The direct and average partial effect (second, third, fourth, and fifth sections) of each variable were averaged to produce a utility index, which allows for comparison of the predictive ability across the variables (Geiser & Studley, 2002; Azen & Budescu, 2003). The utility index effectively gives the relative importance of each predictor based upon all possible sub-models, averaging the contribution of each predictor across them all. According to this utility index (shown at the bottom of Table 3), the most important variable in predicting life satisfaction was average Difmax for the thought domains (.179), followed by the good fortune index (.123), Difmax of experienced ERM activities (.085), neuroticism (.078), and extraversion (.014).

The emotions associated with thoughts of life domains also predicted life satisfaction rated six months earlier by a sub-sample ($n$ = 536). While the good fortune index best predicted life satisfaction at the earlier time point ($\beta$ = .339, $p$ < .001), average thought Difmax came second ($\beta$ = .244, $p$ < .001), surpassing the contribution by emotions experienced during activities ($\beta$ = .186, $p$ < .001). These findings reflect the stability of participants' life satisfaction judgments and suggest that the emotions evoked when pondering major life domains are consistently related to such judgments.

## 4 Discussion

This study evaluates the role of thoughts about life domains in predicting life satisfaction, thereby exploring uncharted territory within the internal well-being landscape. The study systematically measures the frequency with which people pondered various life domains and the feelings associated with such thoughts, extending prior work by evaluating naturally occurring thoughts (Cummins, 1996) rather than thoughts arising from judging life satisfaction. The emotions associated with thoughts can reveal internal sources of joy as well as distress (see also Ross et al., 1986). Indeed even when demographics, experienced happiness, and personality are taken into account, emotional valence associated with thoughts of major life domains predicts life satisfaction. Furthermore, the thought component appears to be consistently related to concurrent life satisfaction judgments and those made six months prior, suggesting that it reflects authentic-durable rather than fluctuating happiness (Dambrun & Ricard, 2011; Dambrun et al., 2012). This indicates that the thoughts were not fleeting ones, but rather represent a core component of consciousness (Pavot & Diener, 1993; Schimmack et al., 2002). Notably, the emotional impact of many thoughts (e.g., faith, spirituality, your weight) was augmented by enhanced frequency.

Our findings have meaningful implications not only for the measurement of well-being, but also for its enhancement. While demographics and a genetically-determined predisposition for happiness are relatively constant in a person's life, Lyubomirsky and colleagues (2005; Sheldon & Lyubomirsky, 2006a) suggested that activities may be modified for increased and sustained happiness (but see Nawijn, 2010). Similarly, thoughts about major life domains may be malleable and conducive to the enhancement of life satisfaction.

Indeed, interventions within the paradigm of positive psychology have increased positive emotions and sense of engagement and meaning, while reducing depressive symptoms for up to six months (Boehm & Lyubomirsky, 2009; Layous et al., 2011; Lyubomirsky et al., 2005; Seligman et al., 2006; Seligman et al., 2005; Mongrain & Anselmo-Matthews, 2012). Common positive exercises that have been validated in randomized controlled longitudinal studies (Boehm & Lyubomirsky, 2009) include writing letters of gratitude (Boehm et al., 2011; Lyubomirsky et al., 2011; Seligman et al., 2005; Mongrain & Anselmo-Matthews, 2012), counting one's blessings (Emmons & McCullough, 2003; Froh et al., 2008; Lyubomirsky et al., 2005), practicing optimism (Boehm et al., 2011; Lyubomirsky et al., 2011; Sheldon & Lyubomirsky, 2006b; King, 2001), performing acts of kindness (Dunn et al., 2008; Sheldon et al., 2013), meditating on positive feelings toward others (Cohn & Fredrickson, 2010; Fredrickson et al., 2008), and using one's signature strengths (Seligman et al., 2005; Mongrain & Anselmo-Matthews, 2012). All of these brief, self-administered exercises promote positive feelings, thoughts, and/or behaviors rather than directly aiming to alter negative or pathological feelings, thoughts, and behaviors (Layous et al., 2011) and may have long-lasting effects (Cohn & Fredrickson, 2010; Seligman et al., 2005; Mongrain & Anselmo-Matthews, 2012).

Table 3: Dominance analysis: Contributions of Average Thought Difmax (ATD), Experienced ERM Difmax (EED), Extraversion (EXT), Neuroticism (NEU), and Good Fortune Index (GFI) in predicting life satisfaction[a].

| | $R^2$ | Additional contribution | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | | ATD | EED | EXT | NEU | GFI |
| – | 0 | .317 | .186 | .030 | .176 | .175 |
| ATD | .317 | – | .005 | .007 | .017 | .087 |
| EED | .186 | .136 | – | .013 | .058 | .143 |
| EXT | .030 | .295 | .170 | – | .163 | .164 |
| NEU | .176 | .158 | .068 | .017 | – | .119 |
| GFI | .175 | .229 | .154 | .019 | .121 | – |
| Average with 1 other variable | | .204 | .099 | .014 | .090 | .128 |
| ATD/EED | .322 | – | – | .007 | .015 | .091 |
| ATD/EXT | .324 | – | .004 | – | .017 | .084 |
| ATD/NEU | .334 | – | .002 | .007 | – | .081 |
| ATD/GFI | .404 | – | .009 | .005 | .012 | – |
| EED/EXT | .199 | .129 | – | – | .056 | .137 |
| EED/NEU | .244 | .092 | – | .011 | – | .118 |
| EED/GFI | .329 | .084 | – | .007 | .033 | – |
| EXT/NEU | .193 | .148 | .062 | – | – | .114 |
| EXT/GFI | .193 | .215 | .143 | – | .113 | – |
| NEU/GFI | .295 | .120 | .067 | .011 | – | – |
| Average with 2 other variables | | .131 | .048 | .008 | .041 | .104 |
| ATD/EED/EXT | .329 | – | – | – | .014 | .088 |
| ATD/EED/NEU | .336 | – | – | .007 | – | .085 |
| ATD/EED/GFI | .409 | – | – | .008 | .012 | – |
| ATD/EXT/NEU | .341 | – | .002 | – | – | .079 |
| ATD/EXT/GFI | .409 | – | .008 | – | .012 | – |
| ATD/NEU/GFI | .416 | – | .006 | .005 | – | – |
| EED/EXT/NEU | .255 | .088 | – | – | – | .113 |
| EED/EXT/GFI | .336 | .081 | – | – | .032 | – |
| EED/NEU/GFI | .362 | .059 | – | .006 | – | – |
| EXT/NEU/GFI | .306 | .114 | .062 | – | – | – |
| Average with 3 other variables | | .085 | .019 | .006 | .017 | .091 |
| ATD/EED/EXT/NEU | .343 | – | – | – | – | .116 |
| ATD/EED/EXT/GFI | .417 | – | – | – | .066 | – |
| ATD/EED/NEU/GFI | .421 | – | – | .012 | – | – |
| ATD/EXT/NEU/GFI | .420 | – | .072 | – | – | – |
| EED/EXT/NEU/GFI | .368 | .159 | – | – | – | – |
| Average with 4 other variables | | .159 | .072 | .012 | .066 | .116 |
| Utility index | | .179 | .085 | .014 | .078 | .123 |

[a]See section 2.2 for detailed information on how these predictors were computed.

Frisch's (1998; 2006) Quality of Life (QOL) therapy is a positive psychology intervention that, like the present study, emphasizes the importance of affect related to major life domains in life satisfaction. Indeed Frisch's QOL approach assumes that overall quality of life is the sum of satisfaction with important life domains (Frisch, 1998; 2006). Among the domains included in Frisch's model are health, friendships, work, neighborhood, and community. In the QOL approach, individuals are taught a theory, tenets, and skills aimed at helping them identify,

pursue, and fulfill their most cherished needs, goals and wishes in valued areas of life (Frisch, 2006). The CASIO theory of life satisfaction is a cornerstone of the QOL approach. According to CASIO, the perceived gap between what one has and what one wants in a particular area is comprised of five components: objective Circumstances of an area, Attitudes toward an area, the application of Standards of fulfillment or achievement in an area, the Importance placed on an area for overall well-being, and Overall satisfaction in other areas that are not of immediate concern (CASIO). As a simple example of QOL therapy, a mother who generally broods over her rebellious children may be trained to compare them instead to more poorly behaved adolescents, thereby generating more positive emotions and enhancing her happiness. As thoughts on major life domains are pivotal to well-being, such interventions may have long-lasting benefits (Lyubomirsky, 2013). Those who have received QOL therapy have reported improved quality of life in a variety of setting and in randomized controlled trials (Frisch et al., 2005; Rodrigue et al., 2005).

The present study was limited in several important ways that should be addressed in future work. One was use of a pre-determined set of life domains (see section 2.2). Further, ours was not a comprehensive inquiry on the effect of each life domain on life satisfaction, or even a means of developing a typology of such domains. These should be the subject of future investigations. In addition, our ability to generalize these findings to other populations is limited, given that all participants were American women from the same city. Cross-cultural research suggests that the association between affect and life satisfaction is typical of individualistic, but not collectivist, cultures (Suh et al., 1998) and that women ruminate more than men (Nolen-Hoeksema et al., 1999). Future work should expand the scope of this investigation to males and non-Western cultures. Future work should also examine the impact of specific (e.g., textbooks) as compared with global (e.g., education) thoughts, given that specific thoughts may be less influenced by societal norms for displaying positivity (Diener et al., 2000). Finally, our conclusions are necessarily limited by the accuracy with which participants recall their thoughts and activities and their accompanying emotions, a caveat inevitable when using pen and paper self-reports to assess naturally occurring thoughts. Future work may employ objective techniques for measuring brain activity in an attempt to define and track activity reflecting affect associated with thoughts of major life domains; indeed a prototype for such a device is currently being developed for Google Glass virtual reality (Goldman, 2012; see http://www.walnutwearables.com/). Further, smartphone apps may be developed to help modify emotional valence and frequency of thoughts about particular life domains (see

Nedelcu, 2013).

Limitations notwithstanding, this investigation demonstrates the relevance of specific life domain evaluations to the study of life satisfaction. Our findings help differentiate between affect associated with the experiential (activities) and the evaluative (thoughts) components of well-being, and suggest that assessing people's feelings when thinking about life domains holds great promise for future efforts aimed at charting the internal landscape of life satisfaction.

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