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Thinking About One's Subjective Well-Being: Average Trends and Individual Differences

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Abstract

In two studies, participants reported what they had been thinking about while completing measures of subjective well-being (SWB). These thought reports were analyzed with respect to life domain, valence, and how strongly they were related to actual levels of SWB. Most people focused on their life circumstances (e.g., career) rather than on dispositional predictors (e.g., personality) of SWB. The domains mentioned most frequently (career, family, romantic life) were also the ones that were most strongly related to actual SWB, indicating that most of people think about things that actually contribute to their SWB. Some domains are predominantly mentioned in positive contexts (e.g., family) whereas others are predominantly mentioned in negative contexts (e.g., money). On average, people thought more about positive than about negative things, a result that is magnified for respondents high in extraversion or emotional stability. In sum, these findings provide insight into what people think contributes to their SWB; beliefs that may guide them as they make important decisions.

Keywords

subjective well-being; happiness; source confusion; evaluative space model; personality; self-knowledge

1 Introduction

How do you feel? Many people are able to answer this question without much effort and are quick in coming up with a plausible explanation for their response (Nisbett & Wilson, 1977; Schimmack, Diener, & Oishi, 2002; Schimmack & Oishi, 2005; Wilson & Brekke, 1994). This explanation, however, can be inaccurate. For instance, a wife might be convinced that she is angry because her husband did not clear the dishwasher when in fact her sour mood is due to a negative event at work. Inaccurate attributions such as this one are often due to source confusion (Wilson & Brekke, 1994) which describes the “inability to recognize the exact contribution of all of the influences on one’s judgment” (p. 129) and, consequently, the tendency to misattribute the causes of how one is thinking, feeling, or behaving. Source

confusion is a common psychological phenomenon that occurs, for instance, when people try to explain why they are in a certain mood (Wilson, Laser, & Stone, 1982), why they like someone (Bornstein & D'Agostino, 1994), why they behave in certain ways (Bargh, Chen, & Burrows, 1996), and how they will feel in the future (Wilson & Gilbert, 2005). In the present paper, we examine whether source confusion also occurs when people think about their subjective well-being.

Subjective well-being (SWB) comprises ratings of overall life satisfaction as well as the frequency of positive and negative affect (Diener, 1984). A large proportion of the variance in SWB can be explained with partially heritable personality traits such as emotional stability and extraversion (Steel, Schmidt, & Shultz, 2008). Moreover, specific life circumstances such as being married (Diener, Gohm, Suh, & Oishi, 2000), having a reasonable income (Diener, Ng, Harter, & Arora, 2010; Howell & Howell, 2008; Luhmann, Schimmack, & Eid, 2011), having a job (Lucas, Clark, Georgellis, & Diener, 2004; Luhmann & Eid, 2009) and having meaningful social connections (Cacioppo et al., 2008) are associated with higher SWB levels. What is much less known, however, is whether and to what degree people consider these variables when they think about their own SWB.

In the present research, we study this question by asking participants to report the things or events they had been thinking about when answering questions about their SWB (cf. Schimmack et al., 2002). In previous studies, this paradigm was used to assess the so-called self-reported sources of SWB (Schimmack et al., 2002; Schimmack & Oishi, 2005). However, it is important to note that this paradigm is not a direct assessment of people's sources of SWB but it is merely a log of what people think about while answering SWB questions. These thoughts are likely closely related to what people think contributes to their SWB, but to avoid any confusion, we refer to these responses as "thoughts" or "thought reports" rather than as "self-reported sources". In the studies presented here, these thoughts are described in terms of content (life domains such as family and career) and in terms of valence as reported by the participants. To examine source confusion, we test whether and to what degree these thought reports are related to actual SWB levels. Low correlations between thoughts reports and actual SWB would indicate that people's levels of SWB are determined by other factors than the ones they report. Finally, we examine whether extraversion and emotional stability — the two personality characteristics associated most consistently with SWB (Steel et al., 2008) — explain individual differences in what people think about when they evaluate their SWB.

1.1 Content of thoughts about SWB

The content of thoughts about SWB can then be categorized on a variety of dimensions. Previous research has mainly focused on whether these thoughts refer to temporally accessible sources or chronically accessible sources (Schimmack et al., 2002; Schimmack & Oishi, 2005) and whether they refer to broad life circumstances or specific activities and experiences (Luhmann, Hawkley, Eid, & Cacioppo, 2012). Only few researchers have analyzed the content of thought reports in terms of different life domains. Probably the most comprehensive study in this context is the paper by Schimmack and colleagues (2002). Using both open-ended questions and checklists, Schimmack et al. (2002) found the things

most frequently reported by college students to be family relationships, academic performance, romantic relationships, and health. Similarly, a recent study found that when people write up their ‘recipes for long-term happiness’, the most frequently mentioned ingredients are social relationships and specific life circumstances such as employment, wealth, and health (Caunt, Franklin, Brodaty, & Brodaty, 2012). These findings are consistent with older studies where people indicated the importance of different domains in life. Bowling (1995) used a sample with a broader age range and showed that family and health are the most important domains in older age groups. In Sears’ (1977) survey of the 62-year old Terman Gifted Men, the most important sources for life satisfaction were family and occupation (health was not offered as an option). Note that although the importance of life domains is not the same as the frequency with which specific domains are mentioned in thought reports, Schimmack et al. (2002) found considerable overlap between the frequency of these domains and their perceived importance, concluding that these reports “contain systematic information that is related to the importance of domains” (Schimmack et al., 2002, p. 364).

The first goal of the present paper is to replicate these previous findings using a modified methodological approach. Specifically, we hypothesize that thoughts about social relationships with family, friends, or a romantic partner as well as career-related topics (e.g., academic achievement or work) will be most frequently reported. In contrast to most previous studies, we use open-ended questions that do not restrict the responses to a specific set of life domains predefined by the researcher. This approach therefore allows the participants to think about and report all life domains and to report the same domain multiple times. Furthermore, providing a list of life domains may prime people to report things that they have not actually thought about. Our open-ended approach should therefore yield more valid thought reports than most previous studies.

1.2 Valence of thought reports

When asked about their well-being, do people think about what is good in their lives, about what is bad, or both? To study the valence of the thought reports, two additional questions pertaining to the structure and measurement of valence need to be answered first. First, is valence a unidimensional or a bidimensional construct? As a unidimensional construct, valence can be measured on a single bipolar scale ranging from very negative to very positive. This is the model that has dominated previous research. For instance, satisfaction with different life domains is usually assessed on unidimensional scales ranging from dissatisfied/bad/negative to satisfied/good/positive (e.g., Schimmack et al., 2002). Responses on the extreme ends of these response scales are easy to interpret, but responses in the middle of these scales are not. An endorsement of the midpoint of the scale may indicate that a person feels neither good nor bad about this particular domain, or it may indicate that this person feels both good *and* bad about it. For instance, people may feel positive and negative about their marriage at the same time (Fincham & Linfield, 1997). These types of indifferent and ambivalent evaluations can only be distinguished in a model where positive and negative evaluations are treated as two independent dimensions, as it is done in the evaluative space model (Cacioppo, Gardner, & Berntson, 1997, 1999). According to the evaluative space model, positivity and negativity are two separable systems

that can be activated independently. For example, high activation of the positivity system and low activation of the negativity system indicates a clear positive evaluation. Importantly, indifference and ambivalence are distinguishable evaluative outcomes because indifference is defined as the combination of low positivity and low negativity whereas ambivalence is defined as the combination of high positivity and high negativity. With respect to thoughts about SWB, this means that a specific thing or event can be associated with purely positive experiences (*positivity*), purely negative experiences (*negativity*), but also with both positive and negative experiences at the same time (*ambivalence*), or with neither positive nor negative experiences (*indifference*).

Two features of the evaluative space model that we expected to replicate in the present paper are the positivity offset and the negativity bias. The *positivity offset* describes the phenomenon that under neutral circumstances (i.e. situations with low evaluative information), positivity ratings are higher than negativity ratings (Cacioppo et al., 1999; Ito & Cacioppo, 2005). The positivity offset has been found in several domains. For instance, people's average levels of well-being tend to be slightly positive (Diener & Diener, 1996), not hedonically neutral as was previously assumed (Brickman & Campbell, 1971). Furthermore, people tend to expect positive rather than negative outcomes for unknown future events (Hoorens & Buunk, 1993). In the present paper, we expected to find a positivity offset such that positive thoughts will be more frequently reported than negative thoughts.

The *negativity bias* describes the observation that negative experiences have stronger effects than positive experiences on a variety of psychological outcomes (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Ito & Cacioppo, 2005; Ito, Larsen, Smith, & Cacioppo, 1998; Rozin & Royzman, 2001). For example, the effects of negative life events on SWB tend to last longer than the effects of positive life events (e.g., Diener, Lucas, & Scollon, 2006). We therefore hypothesized that negative thoughts would be more strongly related to actual SWB than positive thoughts.

The second important question to answer pertains to the appropriate measurement of valence. Who decides whether a specific life domain or an event is good or bad? In previous research, this decision has sometimes been made by researchers (e.g., Headey & Wearing, 1989; pilot study 1 by Schimmack et al., 2002). However, valence ratings by independent researchers may not correspond to how the participants view the reported thoughts themselves. Consider, for instance, divorce. This is typically seen as a major negative life event (Headey & Wearing, 1989), yet on average, people experience increases in their SWB after divorce (Luhmann, Hofmann, Eid, & Lucas, 2012). Thus, life events and other things or events are never universally good or bad, and valence is subjective. In the present paper, we therefore examine the valence of the thought reports as rated by the participants themselves.

1.3 Source confusion

To examine source confusion, we test whether and to what extent the frequencies of specific thoughts are related to actual SWB levels. Assuming that thought reports reflect what people perceive to be the sources of their SWB (Schimmack et al., 2002; Schimmack & Oishi,

2005), strong associations between thought reports and SWB would indicate that what people think about is related to what actually contributes to their SWB, whereas weak associations would indicate source confusion and thus a mismatch between what people consider when evaluating their SWB and what actually influences their SWB.

SWB consists of three central components: life satisfaction, positive affect, and negative affect (Diener, 1984). These components are sometimes regarded as alternative measures of the same general construct (for a review, see Busseri & Sadava, 2011). In the last years, however, there have been several studies suggesting that these components are structurally and functionally different. First, multitrait-multimethod studies consistently find that these components are related but distinct (Lucas, Diener, & Suh, 1996; Luhmann, Hawkey, et al., 2012). Second, life satisfaction and affect are differentially related to and affected by other variables. For instance, personality characteristics such as emotional stability and extraversion have stronger associations with positive and negative affect than with life satisfaction (Schimmack, Schupp, & Wagner, 2008; Steel et al., 2008) whereas life circumstances such as income and life events have stronger associations with life satisfaction than with affect (Diener et al., 2010; Kahneman & Deaton, 2010; Luhmann, Hofmann, et al., 2012; Luhmann et al., 2011; Schimmack et al., 2008). In the present paper, we examine whether source confusion is more prevalent for one component than for the others by testing whether these three components are differentially related to what people think about such that a type of thought is strongly related to one component of SWB and weakly related to the others. Given that references to current life circumstances dominated thought reports in previous studies (see above) and that life circumstances are more strongly related to life satisfaction than to affect, we specifically hypothesize that to the extent that source confusion does occur, it should be more prevalent for affect than for life satisfaction.

1.4 Individual differences

People who are emotionally stable and extraverted tend to have higher life satisfaction and, more importantly, experience more positive and less negative affect, than people who are neurotic and introverted (Diener, Suh, Lucas, & Smith, 1999; Lucas & Diener, 2008; Steel et al., 2008). One presumed mechanism for this effect is that people low in emotional stability tend to interpret their world as more threatening and distressing than people high in emotional stability, whereas people high in extraversion tend to focus more on rewarding than on threatening aspects in their physical and social environment (e.g., Elliot & Thrash, 2002; Lucas & Diener, 2008). The same mechanism might also account for individual differences in thought reports in two ways.

First, the strength of the relationship between thought reports and actual SWB may vary between individuals due to *differential reactivity*, that is, an increased or decreased sensitivity to specific situational circumstances (Larsen & Ketelaar, 1991). People high in emotional stability and high in extraversion react less strongly to daily stressors (Bolger & Schilling, 1991), negative life events such as job loss (Luhmann & Eid, 2009), and changes in income (Soto & Luhmann, 2013). With respect to thought reports, we therefore hypothesize that the associations between positive thoughts and actual SWB are stronger for people high in emotional stability and extraversion, and that the associations between

negative thoughts and actual SWB are stronger for people low in emotional stability and extraversion.

Second, the tendency to focus on rewarding as opposed to threatening cues in emotionally stable and extraverted individuals may account for differences in the frequency of positive and negative thought reports (*differential reporting*). Specifically, we hypothesize that people low in emotional stability report more negative thoughts than people high in emotional stability, and people high in extraversion report more positive thoughts than people low in extraversion.

In addition to personality, we also examined individual differences in the thought reports in terms of gender, age, and relationship status. Furthermore, the participants reported their thoughts after completing either an affect or a life satisfaction measure. We previously found that people are more likely to think of specific activities when asked about their affect and to think of broad life circumstances when asked about their life satisfaction (Luhmann, Hawkey, et al., 2012); however, it is unknown whether these different measures also account for differential reporting in terms of content or valence of thoughts about SWB.

1.5 Overview of studies

In this paper, we present two studies. Study 1 is the main study conducted to test the hypotheses outlined above. Study 2 is a brief replication study conducted to better understand one specific finding of Study 1, namely, that the valence and content of reported thoughts depends on whether people evaluated their life satisfaction or their affect.

2 Study 1

In Study 1, we conducted a comprehensive analysis of what people think about while rating their SWB by examining the content and valence of these thought reports and how they are related to actual SWB. In addition, we tested whether the frequency of specific thoughts and their associations with SWB differed as a function of individual-difference variables such as extraversion, emotional stability, and other individual-difference variables.

2.1 Methods

2.1.1 Sample and procedure—The sample consisted of $N = 414$ participants¹ (64.0% female) with a mean age of 35.0 years ($SD = 12.5$, range from 18 to 79). It was predominantly composed of non-Hispanic Whites ($N = 318$, 76.8%). Participants were recruited through Amazon Mechanical Turk (MTurk). MTurk is an online platform designed to connect individuals offering small tasks (“requesters”) with people willing to complete these tasks for a small monetary compensation (“workers”). Any task that can be completed on a computer can be offered, including participating in surveys. The workers submit their results via the platform and are then paid by the requester if the task has been completed in a manner deemed satisfactory by the requester. The payment is directly deposited into the requester’s MTurk payment account. In the last years, MTurk has increasingly been used by

¹A total of 417 persons participated. Two participants were excluded because of random data patterns and implausible responses. One participant was excluded because he/she did not report any sources.

researchers to recruit participants for online studies. As reported by Buhrmester, Kwang, and Gosling (2011), samples recruited on MTurk tend to be more diverse compared to other samples typically used in psychological research. The main reason to participate tends to be internal motivation and interest in research rather than the monetary compensation (Buhrmester et al., 2011).

The present study was advertised as a survey on happiness and personality. Individuals interested in this task were linked to an external online survey. At the end of the survey, the participants received an automatically created personal code that they then used on MTurk to prove that they successfully completed the survey. The average time to complete the survey was 12.1 minutes and the compensation was US\$ 1.00. The survey was available over a period of two days (Saturday and Sunday).

After completing the personality measures, the participants were randomly assigned to complete either a life satisfaction measure or an affect measure (which measured both positive and negative affect). Upon completion of this measure, the participants listed the things or events they had been thinking about when answering the previous questions. Next, they completed the life satisfaction measure if they had previously answered the affect measure and vice versa. Hence, all participants completed both the life satisfaction and the affect measures; however, the thoughts were reported in reference to life satisfaction in one subsample ($n = 209$) and in reference to affect in another subsample ($n = 205$).

Note that some data from this sample have been reported elsewhere (Luhmann, Hawkey, et al., 2012). However, these data have not yet been analyzed with respect to the domains and valence of the thought reports nor with respect to the associations of the reported thoughts with actual SWB. For the original study, both SWB scales were randomly presented with one of four possible time frames (overall, last month, last week, today). This experimental manipulation was not of interest for the study reported here, and preliminary analyses showed that these time frames did not affect the results in the present study. We therefore collapsed the data across these four conditions.

2.1.2 Domain and valence of thought reports—Participants completed either a life satisfaction or an affect measure (see above). On the page immediately following this measure, they were asked to list the things or events they had been thinking about when answering the previous questions. Participants were able to provide up to five different responses in five separate text fields. There was no restriction with respect to the length of each entry. Some responses consisted of only a single word (e.g., “work”) whereas others consisted of whole sentences (e.g., “I just filed for unemployment for the first time in my life.”).

The responses provided by the participants were then transferred to the next page. Here, the participants indicated for each response whether it reflected a negative or a positive experience. The participants were able to select one option, both options, or neither of these options. These data were used to classify each response as purely positive, purely negative, ambivalent, or neutral.

The content of the thought reports was coded by two independent coders. Unlike studies using checklists, our approach permitted the participants to report multiple things or events from the same life domain, allowing us to quantify the frequency of specific responses rather than simply measuring the presence or absence of a specific thought as a binary variable. The categories were not exclusive, meaning that one response could be assigned to multiple domains. For example, the statement “my son is sick” was assigned to two domains: family and health. 16.2% of the responses could not be assigned to a specific domain, either because they referred to an abstract past or future, or because the life domain they referred to was uncommon in the sample (e.g., only 13 religion-related sources). Interrater agreement ranged from $\kappa = .63$ (leisure) to $\kappa = .94$ (career)². Per conventions, $\kappa > .60$ is regarded as acceptable and $\kappa > .80$ is regarded as good (Nussbeck, 2006). All discrepancies were reviewed and resolved through discussion. Discrepancies were mostly due to responses being assigned to one domain by one coder and to two or more domains by the other coder. In this case, multiple domains were preferred.

2.1.3 SWB and personality measures

Actual SWB: Life satisfaction was assessed with the 5-item Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985). Participants were asked to rate the extent to which they agreed with statements such as “in most ways your life is close to ideal” on a 5-point response scale ranging from 1 (*not at all*) to 5 (*very much*). The internal consistency was $\alpha = .92$. Affect was assessed with the 20-item Positive Affect Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). Each subscale consisted of 10 adjectives (e.g., “excited”, “nervous”) that were rated on a 5-point response scale ranging from 1 (*not at all*) to 5 (*very much*). Internal consistencies were $\alpha = .90$ for positive affect and $\alpha = .92$ for negative affect.

Personality: Extraversion and emotional stability were assessed with the respective two-item subscales of the Big Five Inventory-Short Version (Rammstedt & John, 2007). Extraversion was measured with the items “extraverted, enthusiastic” and “reserved, quiet”, and emotional stability was measured with the items “anxious, easily upset” and “calm, emotionally stable”. The response format ranged from 1 (*disagree strongly*) to 7 (*agree strongly*). The items were reversed if appropriate and averaged to form summary scores with higher scores reflecting greater extraversion and greater emotional stability, respectively. Internal consistencies were $\alpha = .70$ for extraversion and $\alpha = .73$ for emotional stability, respectively. Descriptive statistics for all variables are reported in Table 1.

2.2 Results

Across all participants, 1,229 thoughts were reported (see Figure 1 for a pictorial summary). Most thought reports refer to specific life domains whereas only few responses (14.8%) refer to temporary sources of SWB such as the current emotional state or weather. We restricted the analyses to the eight most frequently mentioned life domains: family, romantic

²The interrater agreement coefficients for the other domains were $\kappa = .69$ for housing, $\kappa = .72$ for health, $\kappa = .75$ for friends, $\kappa = .76$ for family, $\kappa = .87$ for romantic life, and $\kappa = .89$ for money.

life, friends, career (which comprises education and work), health, money, housing, and leisure.

2.2.1 Do the frequencies of reported thoughts differ by domain?—Consistent with our hypothesis, the most frequent domains were career, family, romantic relationships, and friends, indicating that there is consensus across individuals that these domains are most relevant for SWB (Figure 2). A multivariate analysis of variance (MANOVA) indicated that these frequencies vary as a function of age, $F_{\text{approx}}(8, 393) = 5.17, p < .001$, relationship status, $F_{\text{approx}}(8, 393) = 5.65, p < .001$, emotional stability, $F_{\text{approx}}(8, 393) = 2.69, p = .007$, extraversion, $F_{\text{approx}}(8, 393) = 2.01, p = .045$, and whether people had completed the affect scale or the life satisfaction scale, $F_{\text{approx}}(8, 393) = 3.83, p < .001$. Age was positively correlated with reporting family-related, health-related, and housing-related thoughts, and negatively with reporting friends-related and career-related thoughts (see correlations in Table 2). People in a romantic relationship were more likely to think about family and romantic life and less likely to think about friends than singles. Emotional stability was negatively correlated with reporting thoughts related to money and positively with reporting thoughts related to leisure. Extraversion was positively correlated with thoughts about family and romantic. Finally, thoughts related to family, romantic life, and housing were less likely to be reported by people who rated their affect than by people who rated their life satisfaction, suggesting that these domains are more relevant for life satisfaction than for affect. In contrast, thoughts related to leisure were more frequently reported for affect than for life satisfaction. Note that all of these correlations were rather weak, with the strongest correlation being the one between being in a relationship and thinking about one's family ($r = .26$).

2.2.2 Do the frequencies of reported thoughts differ by valence?—We detected significant differences between the average frequencies of thought reports of different valence, $F(3, 1238) = 70.38, p < .001$. Positive thoughts were more frequently reported than negative thoughts (Table 3). This finding is consistent with the positivity offset according to which positivity is more dominant than negativity in neutral conditions (Cacioppo et al., 1999). Both positive and negative thoughts were significantly more frequently reported than ambivalent or neutral thoughts. A MANOVA detected significant effects of relationship status, $F_{\text{approx}}(4, 397) = 4.03, p = .003$, extraversion, $F_{\text{approx}}(4, 397) = 4.59, p = .001$, emotional stability, $F_{\text{approx}}(4, 397) = 7.07, p < .001$, and whether people rated their life satisfaction or their affect, $F_{\text{approx}}(4, 397) = 3.42, p = .009$. Specifically, people with a romantic relationship, high in extraversion, and high in emotional stability reported more positive thoughts and less negative thoughts than singles and people low in extraversion or low in emotional stability. Ancillary correlational analyses indicated that these differences are mainly due to a higher frequency of positive social thoughts (family, friends, romantic life) in extraverted and emotionally stable people (supplemental Table S1). Finally, people who rated their affect were less likely to report positive thoughts than people who rated their life satisfaction, but they did not differ in the likelihood to report negative, ambivalent, or neutral thoughts (Table 3). We revisit this latter finding in Study 2.

To examine the dominant valence of each domain, we subtracted the number of negative thoughts from the number of positive thoughts within each domain and participant (Figure 3). Thoughts about social relationships (family, romantic life, and friends) as well as thoughts about leisure and career were predominantly reported in positive contexts. Health and money, in contrast, were predominantly mentioned in negative contexts. One way to interpret these findings is that people regard social relationships, work, and leisure as domains that potentially increase their SWB whereas health and money are viewed as threats to SWB.

2.2.3 Are reported thoughts related to actual SWB?—To test how strongly the reported things and events are associated with actual SWB, we estimated a series of regression models where SWB was the outcome and the frequencies of different thought reports were the predictors. Note that the distinction between outcomes and predictors only describes the role of each variable in the statistical model but does not imply any causal directionality. One of goals of the present study is to examine differential relationships between the thought reports and the three SWB components, life satisfaction, positive affect, and negative affect. One possibility to distinguish between the three components is to treat these variables as separate outcomes and to estimate separate regression models for each of them. However, this analytic approach would not permit us to test whether any observed differences in the associations between the reported thoughts and actual SWB are statistically significant.

For this reason, we treated SWB as a within-person variable measured under three different conditions with each condition corresponding to one of the three measures. This allowed us to analyze the data with a multilevel approach with the SWB component type as a within-person (Level 1) factor and the number of different thought reports as between-person (Level 2) covariates. This model corresponds to a mixed-model ANOVA except that the between-person variables are not categorical but continuous. The regression coefficients for the thought reports reflect the strength of the association between the reported thoughts and actual SWB. The regression coefficients for the (dummy-coded) SWB component type reflect mean-level differences in the SWB measures. Note that negative affect was reverse-coded for this analysis so that higher scores on all three SWB components reflect higher levels of SWB. Finally, we tested the interaction between the SWB components and the thought reports to determine whether the strength of the association between the reported thought and actual SWB differs across the three SWB components.

We first examined the relations between the relative frequencies of positive, negative, ambivalent, and neutral thoughts and actual SWB. Significant effects were found for the interaction of the SWB component with positive thoughts, $F(2, 1212) = 10.03, p < .001$, negative thoughts, $F(2, 1212) = 20.16, p < .001$, and ambivalent thoughts, $F(2, 1212) = 5.57, p = .004$, indicating that the relation between these thoughts and actual SWB differs between at least two of the three components. For ease of interpretation, we present the estimated regression coefficients for the three SWB components separately (Table 4). Positive thoughts had positive associations and negative thoughts had negative associations with all three SWB components. However, Bonferroni-adjusted post-hoc analyses revealed that the association between positive thoughts and (reverse-coded) negative affect was significantly

weaker than the association between positive thoughts and life satisfaction. Moreover, the association between negative thoughts and life satisfaction was significantly stronger than the association between negative thoughts and the other two components. Interestingly, ambivalent thoughts were significantly negatively related to (reverse-coded) negative affect such that reporting more ambivalent thoughts was associated with experiencing more negative affect. Ambivalent sources were not significantly related to life satisfaction and positive affect.

In an additional step, we used linear contrasts to test whether positive and negative thoughts differed in their relative strength of association with actual SWB. For positive and negative affect, these tests were non-significant, $L < 0.01$, $z = 0.005$, $p = .996$ and $L = 0.08$, $z = 1.43$, $p = .153$, respectively. For life satisfaction, in contrast, we found evidence for a negativity bias (Baumeister et al., 2001; Cacioppo et al., 1999). Here, the association with negative thoughts was almost twice as strong as the association with positive thoughts, $L = 0.17$, $z = 2.73$, $p = .006$.

Overall, the reported thoughts are more closely related to life satisfaction than to affect. To quantify this difference, we ran separate regression models for life satisfaction and affect balance (defined as positive affect minus negative affect) with positive, negative, ambivalent, and neutral thoughts as predictors. The rationale for examining affect balance instead of positive and negative affect separately is that life satisfaction is measured on a bipolar response scale whereas positive and negative affect are measured on unipolar response scales and therefore represent more narrow constructs. Affect balance, in contrast, is a bipolar and hence much broader construct. The proportion of explained variance was $R^2 = .34$ for life satisfaction and $R^2 = .20$ for affect balance.

Next, we tested our hypothesis that extraversion and emotional stability moderate the associations between the relative frequencies of positive and negative thoughts and actual SWB. The three-way interactions between the component, the thought report, and the personality trait were non-significant ($F_s < 1.15$), indicating that the interaction between the thought report and the personality trait does not differ between life satisfaction, positive affect, and negative affect. In a final model containing only two-way interaction effects, emotional stability significantly moderated the association between the relative frequency of negative thoughts and SWB, albeit in an unexpected direction. Contrary to our hypothesis, higher emotional stability exacerbated the negative association between negative thoughts and actual SWB, $B = -0.05$, $SE = 0.022$, $p = .017$. In addition, emotional stability attenuated the positive association between positive thoughts and actual SWB, $B = -0.05$, $SE = 0.024$, $p = .030$. Also contrary to our expectations, extraversion did not have any significant moderating effects.

Finally, we examined the relations of the relative frequencies of different positive and negative domains with actual SWB. Again, we used a multilevel model with interactions between the component and the source to test whether a specific domain has differential relations with positive and negative affect and life satisfaction. Seven out of 16 interactions were at least marginally significant ($p < .06$; Table S2 in the supplemental material). Post-hoc analyses showed that the associations of these different domains with positive and

negative affect were weak and non-significant, with two exceptions. Negative affect was significantly related to negative thoughts about family, $B = -0.30$, $t(1176) = -2.03$, $p = .042$, and positive affect was significantly related to positive thoughts about career, $B = 0.25$, $t(1176) = 2.62$, $p = .009$. For life satisfaction, in contrast, several predictors were significant (Figure 4). Both positive and negative thoughts about family, romantic life, and career were significantly associated with life satisfaction. Leisure was only related to life satisfaction if it was mentioned in positive contexts. Furthermore, there was a significant negative association between negative thoughts about money and life satisfaction. Hence, while work, family, and romantic life all contribute to life satisfaction in a positive sense, money seems to be relevant for life satisfaction only if it is absent.

2.3 Summary of Study 1

In this section, we provide a brief summary of the central findings of Study 1 and discuss an important limitation that will be addressed in Study 2. A more comprehensive discussion of the findings will be provided in the general discussion below.

As expected, most (> 80%) of the responses referred to people's life circumstances. Specifically, the most frequently reported life domains were career, family, and romantic life. These life domains were also the ones that were significantly associated with life satisfaction. In contrast, only few domain-specific thoughts had significant associations with positive or negative affect. These results indicate that, consistent with our hypothesis, people are more prone to source confusion when they think about their affect than when they think about their life satisfaction.

Other effects were also consistent with our hypotheses. For instance, consistent with the positivity offset (Cacioppo et al., 1999), positive thoughts were more frequently reported than negative thoughts. Moreover, we found a negativity bias (Cacioppo et al., 1999), such that negative thoughts are more strongly associated with life satisfaction than positive thoughts. Moreover, we found that many domains (e.g., romantic life) have both positive and negative associations with life satisfaction, depending on their subjective valence.

Both the valence and the content of the thought reports differed as a function of various individual-difference variables. We will summarize and discuss these effects in the general discussion below. Here, we focus on one particular finding that motivated us to conduct a short replication study that will be reported next. Recall that participants reported their thoughts after completing either the SWLS or the PANAS. Participants who completed the SWLS reported significantly more positive thoughts than participants who completed the PANAS; however, the two groups did not differ with respect to the number of negative, ambivalent, and neutral thoughts. Moreover, participants who completed the SWLS reported more thoughts about family, romantic life, and housing, and less thoughts about leisure than participants who completed the PANAS.

There are two possible explanations for these differences. First, in line with the conceptualization of life satisfaction and affect as related but distinct constructs, it is possible that these effects reflect that people consider different things while evaluating their affect and their life satisfaction. According to this explanation, the differences are driven by

the different item content of the two scales. Second, however, the effects might be methodological artifacts caused by the unbalanced use of positively and negatively worded items in the two scales. Specifically, all the SWLS items are positively worded whereas half of the PANAS items refer to negative emotions. It is possible that the presence of negatively worded items in the PANAS primed participants to focus more on negative things in their lives and therefore to report less positive and more negative thoughts. Our findings are only partially consistent with this explanation as we did find significant differences in the number of positive thoughts but not in the number of negative thoughts. Nevertheless, we conducted a second study with the goal to disentangle the effects of positively and negatively worded items on the valence and content of thought reports.

3 Study 2

Study 2 had two objectives. First, we examined whether the differences in the frequencies of positive thoughts and thoughts about family, romantic life, housing, and leisure between participants who completed the SWLS and participants who completed the PANAS found in Study 1 could be replicated. Second, we tested whether these differences were due to the different item content of the two scales (i.e., items measuring life satisfaction vs. items measuring affect) or due to the exclusive use of positively worded items in the SWLS and the use of both positively and negatively worded items in the PANAS.

To attain this second objective, we added two experimental conditions: one in which the participants completed only the negative affect (NA) subscale of the PANAS, and one where the participants completed only the positive affect (PA) subscale of the PANAS. If the differences found in Study 1 were driven by the item content, we should observe significant differences between those participants who completed the SWLS and those participants who completed the one of the affect scales (full PANAS, only NA, or only PA) but no significant differences between the latter three groups. If, in contrast, the differences in Study 1 were driven by the item wording, the differences should be greatest between those who responded to positively worded items exclusively (PA only, SWLS) and those who responded to negatively worded items exclusively (NA only). Those who completed the full PANAS which contains both positively and negative worded items should fall somewhere in the middle.

Apart from the two additional experimental conditions, Study 2 was an exact replication of Study 1, that is, the general procedure, the measures, and the coding of responses was identical to Study 1. This approach allowed us to rule out changes in the research design or measures as alternative explanations in case we failed to replicate the findings of Study 1.

3.1 Methods

3.1.1 Sample and procedure—The sample consisted of $N = 303$ participants (40.0 % female) with a mean age of 31.8 years ($SD = 10.84$, range from 19 to 72). The sample was predominantly composed of non-Hispanic Whites ($N = 215$, 71.0%). Participants were recruited through MTurk using the same recruitment posting as in Study 1. The average time to complete the survey was 5.5 minutes and the compensation was US\$ 0.50. The survey was available over a period of two days (Saturday and Sunday).

The procedure was the same as in Study 1. After providing informed consent and completing a personality measure, the participants were randomly assigned to completing one of four SWB measures: the SWLS (consisting of only positively worded items), the full PANAS (consisting of both positively and negatively worded items) that was also used in Study 1, the PA subscale of the PANAS (consisting of only positively worded items), or the NA subscale of the PANAS (consisting of only negatively worded items). Next, they listed the things or events they had been thinking about when answering the previous questions and rated the valence of each response. Finally, they provided demographic information.

3.1.2 Thought reports—As in Study 1, participants rated the valence of their responses by indicating whether it reflected a negative experience or a positive experience. As before, participants were allowed to select one option, both options, or neither option such that the responses could be classified as purely positive, purely negative, ambivalent, or neutral. In the present study, we focus on the frequency of purely positive and purely negative thoughts. The content of the responses was again rated by two independent raters using the same categories as in Study 1. Interrater agreement ranged from $\kappa = .76$ (health) to $\kappa = .95$ (money)³. Discrepancies were resolved through discussion.

3.1.3 SWB measures—Participants were randomly assigned to one of four conditions. Conditions 1 and 2 were the same as in Study 1. Specifically, participants completed the 5-item SWLS (Diener et al., 1985) in Condition 1 and the full 20-item PANAS (Watson et al., 1988) in Condition 2. Internal consistencies in these conditions were $\alpha = .91$ for life satisfaction, $\alpha = .93$ for positive affect, and $\alpha = .95$ for negative affect. Participants in Condition 3 only completed the 10-item PA subscale of the PANAS ($\alpha = .95$) and participants in Condition 4 only completed the 10-item NA subscale of the PANAS ($\alpha = .95$). In all conditions, participants indicated the degree to which they agreed with the statements “in general”.

3.2 Results

Valence: The average frequencies of positive and negative thoughts in the entire sample and in the four conditions are reported in Table 5. As in Study 1, positive thoughts were reported significantly more frequently than negative thoughts, $t(302) = 7.17, p < .001$. Recall that in Study 1, participants who rated their affect reported less positive thoughts than participants who rated their life satisfaction. To examine whether this effect is due to the item content or the item wording, we compared the average number of purely positive and purely negative thoughts across the four conditions. For both dependent variables, the F tests indicated significant differences between at least two of the four conditions (Table 5).

Positive thoughts were significantly more frequent among participants who completed the PA subscale and among participants who completed the SWLS than among participants who completed the NA subscale, indicating that the use of only positively worded or only negatively worded items indeed affects the frequency of positive thoughts. However, we

³The interrater agreement coefficients for the other domains were $\kappa = .84$ for friends, $\kappa = .89$ for leisure, $\kappa = .92$ for family, $\kappa = .92$ for housing, $\kappa = .94$ for housing, and $\kappa = .95$ for career.

failed to replicate the significant difference in the frequency of positive thoughts between participants who completed the SWLS and participants who completed the full PANAS found in Study 1.

Negative thoughts were significantly less frequent in those participants who completed the PA subscale than in participants who completed the SWLS or the NA subscale. If the item wording did indeed affect the frequency of negative thoughts, we would have expected to see more frequent negative thoughts in the NA condition than in the other three conditions. However, participants who completed the NA subscale did not report significantly more negative thoughts than participants who completed the full PANAS and participants who completed the SWLS. Furthermore, as in Study 1, there was no significant difference in the frequency of negative thoughts between participants who completed the full PANAS and participants who completed the SWLS. Thus, in comparison to positive thoughts, the frequency of negative thoughts seems substantially less affected by the use of negatively or positively worded items.

Domains: The frequencies of the eight life domains across the four conditions are presented in Table 6. The most frequent domains were career, leisure, romantic life, family, and friends. While the order of the domains was slightly different from Study 1, it is apparent that career and social relationships again make up the most frequently mentioned life domains.

To examine whether the frequencies of specific domains differed between the four conditions, we conducted a series of ANOVAs with the condition as the independent variable and the frequencies of specific domains as dependent variables (see Table 6). As in Study 1, significant effects were found for thoughts about family, romantic life, and leisure. In addition, we found significant differences for thoughts about money and career. In contrast to Study 1, the frequency of thoughts about housing did not differ between the four conditions.

Post-hoc comparisons with Bonferroni adjustment revealed that thoughts about family were most frequent among participants who completed the SWLS and significantly more frequent than among participants who completed the PA subscale. As in Study 1, participants who completed the SWLS reported more thoughts about family than participants who completed the full PANAS; however, this difference was only significant if the p value was not adjusted for multiple comparisons ($p = .025$ without adjustment, $p = .150$ with adjustment).

Similar results emerged for thoughts about romantic life. Participants who completed the SWLS reported more frequent thoughts about romantic life than participants in any of the other three conditions. The frequency of thoughts about romantic life did not differ between the three groups who responded to affect items.

As in Study 1, thoughts about leisure were least frequent among participants who completed the SWLS. However, in Study 2, the difference between this group and those who completed the full PANAS was no longer significant, both with and without Bonferroni adjustment. The only significant difference was the one between the SWLS group and the

PA group such that leisure-related thoughts were reported more frequently in participants who completed the PA subscale. The frequency of thoughts about leisure did not differ between the three groups who responded to affect items.

The frequency of thoughts about career and money did not differ between the three groups who responded to affect items. However, the frequency of thoughts about career was significantly higher among participants who completed the SWLS than among participants who completed any of the three affect measures, and the frequency of thoughts about money was significantly higher among participants who completed the SWLS than among participants who completed the full PANAS or the PA subscale.

3.3 Summary of Study 2

The purpose of Study 2 was to examine the extent to which the frequencies of positive and negative thoughts and the frequencies of specific domains was influenced by the scales people completed before reporting their thoughts. Our refined experimental design allowed us to examine whether the differences observed in Study 1 were due to the differences in item content between the SWLS and the PANAS or to the different use of positively and negatively worded items in these scales.

The findings indicate that the valence of the reported thoughts is affected by the item wording such that positive thoughts are more frequent if only positively worded items are used and negative thoughts are more frequent if only negatively worded items are used. However, this effect is apparently restricted to affect items and could not be replicated when responses to the full PANAS and the SWLS were compared, as we did in Study 1.

Most of the differences in the frequency of specific domains found in Study 1 were replicated in Study 2. For thoughts about romantic life, career, money, and, to a lesser degree, family, the findings are consistent with the hypothesis that these differences are driven by the item content (i.e., items measuring life satisfaction vs. affect) because for all three domains, the frequency was significantly higher among participants who completed the SWLS than among participants who completed affect scales. While the findings for leisure were not quite as supportive of the item-content hypothesis, they were clearly inconsistent with the idea that this difference may be due to the unbalanced use of positively and negative worded items in the different scales. In fact, the only significant difference was the one between those who completed the SWLS and those who completed the PA subscale, both scales that consist of exclusively positively worded items.

Overall, these results indicate that the findings on valence and domain of reported thoughts in Study 1 were not substantially biased by the unbalanced use of positively and negatively worded items in the two SWB scales used in Study 1.

4 General Discussion

In this paper, we examined what people think about when they evaluate their life satisfaction and their affect. Presumably, these thought reports are indicators for what they think might contribute to their SWB, and these assumed sources may guide their behaviors and

important decisions. In this paper, we analyzed the content and valence of these thoughts and their relationships with their actual levels of SWB.

A central finding is that people primarily consider their life circumstances such as their career and romantic life and neglect other influences such as one's own personality or temporary factors, which are both known to contribute to SWB ratings at least as strongly as life circumstances (Schwarz & Strack, 1999; Steel et al., 2008). This finding is consistent with the actor-observer asymmetry according to which people are more likely to attribute their own behaviors to situational than to dispositional factors (Jones & Nisbett, 1971). It remains to be seen whether the flipside of this asymmetry — attributing others' behaviors to dispositional rather than to situational factors — can also be found in the sources used in peer ratings of SWB.

But is this focus on life circumstances evidence for source confusion? The most frequently reported domains (career, romantic life, family) were also the ones that were significantly associated with life satisfaction, which is consistent with previous research that measured these domains directly (e.g., Cacioppo et al., 2008). Consistent with the negativity bias (Cacioppo et al., 1999), domains mentioned in negative contexts were more strongly associated with life satisfaction than domains mentioned in positive contexts. This effect was most pronounced for money which only had a significant relationship with life satisfaction if it was mentioned in negative contexts. Positive money-related thoughts, in contrast, were not associated with life satisfaction. This asymmetric effect of money is consistent with views of money as a minimal requirement for SWB (Biswas-Diener, 2008; Howell & Howell, 2008; Maslow, 1954) — a surfeit may not help, but a deficit can hurt substantially. In sum, source confusion does not seem a major source of bias in life satisfaction ratings. When people think about how satisfied they are with their lives, they think about things and events that actually matter for their life satisfaction. In the future, it would be interesting to examine whether source confusion occurs more frequently for some domains (e.g., leisure) but not for others (e.g., friends) by directly measuring people's idiosyncratic sources of SWB.

The findings were somewhat different for positive and negative affect. Compared to life satisfaction, thought reports accounted for less variance in affect balance (20%). Moreover, only few of the domain-specific responses had significant associations with positive or negative affect. These results indicate that people are more prone to source confusion when they think about their affect than when they think about their life satisfaction. This makes sense given that most reported thoughts refer to life circumstances which have weaker effects on affect than on life satisfaction (Diener et al., 2010; Luhmann, Hofmann, et al., 2012; Schimmack et al., 2008).

We did find a number of significant individual differences. For instance, older people reported more thoughts about family, health, and housing and less thoughts about friendship and career, indicating that the determinants and the quality of SWB may change over the life span (Bowling, 1995; Mogilner, Kamvar, & Aaker, 2011). Consistent with theories according to which extraverted people pay more attention to rewards and neurotic people pay more attention to threats (Elliot & Thrash, 2002), extraverted people and emotionally

stable people reported more positive thoughts and less negative thoughts than introverted and emotionally unstable people. We also hypothesized that the associations between thought reports and actual SWB would be differentially affected by extraversion and emotional stability. However, we found no significant moderating effect of extraversion and a moderating effect of emotional stability that was exactly opposite of what we anticipated. As expected, emotionally stable people report fewer negative thoughts than emotionally unstable people; however, these negative thoughts are more strongly associated with actual SWB in emotionally stable people than in emotionally unstable people. One possible explanation is that when rating their SWB, emotionally stable people consider negative things in their lives only when they are truly negative whereas emotionally unstable people consider positive things only when they are truly positive. Put differently, emotionally stable people may be more likely to interpret ambivalent things or events as something positive whereas emotionally unstable people may be more likely to interpret ambivalent things or events as something negative. An alternative explanation is that the positive effect of emotional stability on SWB is attenuated when more negative and less positive thoughts are reported, indicating that emotional stability accounts for less individual differences in SWB when very positive or very negative thoughts are present.

4.1 Limitations and future research

This paper raises a number of interesting questions for future research that could not be answered here due to limitations of the present studies. The first limitation concerns the age composition of the sample. It should be emphasized that our samples were much more heterogeneous than previous studies that relied heavily on undergraduate students; however, young adults nevertheless comprised the majority of our participants. Developmental life-span theories (e.g., Carstensen, Isaacowitz, & Charles, 1999; Heckhausen, Wrosch, & Schulz, 2010) suggest that people's goals and values change over the life course, particularly in old age, and it is therefore plausible to assume that different age groups think about different things when they rate their SWB. Our study provided initial evidence that this is the case, but the sample did not include a sufficient number of older adults to analyze these effects more systematically. Interesting questions for future research are: How does the prevalence of specific thoughts change with age? Are these changes gradually or abrupt, for instance due to major life events? Is source confusion more or less prevalent in older adults than in younger adults?

A second limitation concerns the measurement of valence. In these studies, valence was measured with two yes/no items that allowed us to distinguish between positive, negative, neutral, and ambivalent thoughts. In future studies, it should be considered to measure valence continuously to allow a more fine-grained analysis of the degree of valence of different thoughts. This approach could also be used to examine our hypothesis that emotionally stable persons only report highly negative thoughts but not slightly negative thoughts.

Finally, we focused on extraversion and emotional stability as predictors of individual differences. These two personality traits were chosen because they are the most important personality correlates of SWB (Steel et al., 2008). This does not imply, however, that

extraversion and emotional stability are the only two personality characteristics that matter. For instance, it is plausible to assume that conscientious people think more about achievements, optimistic people report more positive and less negative thoughts, and people with strong materialistic values think more about materialistic sources such as housing, consumption, or money. Hence, another direction for future research is to examine individual differences in thought reports in a more comprehensive fashion.

4.2 Conclusion

People who want to change their lives presumably change those things that they perceive as the source of their current discomfort. The present paper found that people most frequently consider their social environment when they evaluate their SWB. Changes or disruptions of social relationships can sometimes lead to increases in SWB (e.g., after divorce; Luhmann, Hofmann, et al., 2012), but they can also make people more lonely (Mauss, Tamir, Anderson, & Savino, 2011). An exciting avenue for future research is therefore to examine how people's beliefs about what contributes to their SWB influence important life decisions and future well-being.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 2.

Domain differences in the absolute frequencies of responses and the relative proportions of positive, negative, ambivalent, and neutral thoughts in Study 1.

Notes. Error bars depict standard errors for the total average frequencies. Domains that share a letter do not differ significantly in the average frequency as indicated by Bonferroni-adjusted pairwise comparison tests ($ps > .05$). The average frequencies for career and family were significantly higher than the frequencies of all other domains, and the average frequency of career was significantly higher than the average frequency of family.

Figure 3. Means and 95% confidence intervals for the difference between the number of positive and the number of negative thoughts within each domain in Study 1 ($N = 414$). Positive values indicate that on average, more positive than negative thoughts were reported for this domain.

Figure 4. Regression of life satisfaction on positive and negative life domains in Study 1 ($N = 414$). The bars depict the regression coefficients with standard errors.
 * Regression coefficient is significant at $\alpha = .05$.

Table 1

Means, standard deviations, and correlations for the number of responses, female gender, age, relationship status, personal income, college education, extraversion, emotional stability, reporting affect vs. life satisfaction, life satisfaction, positive affect, and negative affect in Study 1.

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11
No. of sources	2.97	1.41	--										
Female	0.64	0.48	.13	--									
Age	34.95	12.54	.07	.15	--								
In a relationship	1.49	0.50	.00	.09	.23	--							
Income	5.34	3.00	-.03	-.14	.20	.21	--						
College	1.42	0.49	.00	-.02	-.09	-.04	-.28	--					
Extraversion	3.86	1.55	.10	.03	.17	.16	.16	-.07	--				
Emotional Stability	4.75	1.43	-.01	-.14	.21	.08	.11	-.10	.25	--			
Affect vs. life satisfaction ¹	0.50	0.50	-.12	-.01	-.03	.03	-.05	-.03	-.07	-.09	--		
Life satisfaction	3.02	1.08	-.07	-.04	.00	.27	.12	-.10	.31	.35	-.07	--	
Positive affect	3.31	0.83	.02	-.03	.16	.13	.11	-.03	.36	.39	-.05	.52	--
Negative affect	2.04	0.91	.08	.07	-.21	-.11	-.11	.13	-.18	-.49	.07	-.45	-.24

Notes. N = 414.

¹ Dummy-coded variable with 0 = life satisfaction ratings and 1 = affect ratings.

Table 2
Correlations between the five significant predictors and the eight dichotomized domains in Study 1.

Domain	Age	In a relationship	Emotional stability	Extraversion	Affect vs. life satisfaction ^I
Family	.12*	.26***	.09	.13**	-.10*
Friends	-.11*	-.11*	.02	.08	-.01
Romantic life	.03	.12*	-.07	.10*	-.16***
Health	.13**	-.02	-.06	.06	-.04
Money	.03	-.09	-.13*	-.08	-.07
Career	-.11*	-.09	-.05	-.02	-.05
Housing	.17***	.07	-.04	.07	-.20***
Leisure	-.03	-.03	.11*	.06	.14**

Notes. N = 414.

^I Dummy-coded variable with 0 = life satisfaction ratings and 1 = affect ratings.

* $p < .05$.

** $p < .01$.

*** $p < .001$. Gender was not significantly correlated with any of the eight domains.

Table 3

Means and standard deviations for the absolute frequencies of positive, negative, ambivalent, and neutral thoughts and their correlations with relationship status, extraversion, emotional stability, and affect vs. life satisfaction ratings in Study 1.

Valence	M	SD	Pairwise comparisons ¹				Correlations			
			Positive thoughts	Negative thoughts	Ambivalent thoughts	In a relationship	Extraversion	Emotional stability	Affect vs. life satisfaction ²	
Positive thoughts	1.29	1.28				.18***	.18***	.20***	-.10*	
Negative thoughts	0.85	1.19	<i>t</i> = -6.07***			-.11*	-.11*	-.24***	-.05	
Ambivalent thoughts	0.44	0.81	<i>t</i> = -11.71***	<i>t</i> = -5.64***		-.05	.09	.00	-.07	
Neutral thoughts	0.36	0.76	<i>t</i> = -12.95***	<i>t</i> = -6.88***	<i>t</i> = -1.24	-.06	-.05	.01	.08	

Notes. *N* = 414.

¹ Pairwise comparisons with Bonferroni-adjusted *p* values. *df* = 1238 for all pairwise comparisons

² Dummy-coded variable with 0 = life satisfaction ratings and 1 = affect ratings.

* *p* < .05,

** *p* < .01,

*** *p* < .001. Age and gender were not significantly correlated with thoughts of any of the four valences.

Regression of life satisfaction, positive affect, and reversed negative affect on positive, negative, ambivalent, and neutral thoughts in Study 1. Regression coefficients were estimated in a single mixed model where the type of SWB component was included as a within-person factor.

Table 4

Valence	Life satisfaction			Positive affect			Negative affect (reversed)		
	B	SE	p	B	SE	p	B	SE	p
Positive thoughts	0.22 ^a	0.04	< .001	0.15 ^{a,b}	0.04	< .001	0.10 ^b	0.04	.005
Negative thoughts	−0.39	0.04	< .001	−0.15 ^c	0.04	< .001	−0.20 ^c	0.04	< .001
Ambivalent thoughts	0.01 ^d	0.06	.928	0.01 ^d	0.06	.909	−0.19	0.06	.001
Neutral thoughts	−0.07 ^e	0.06	.225	−0.03 ^e	0.06	.663	−0.07 ^e	0.06	.204

Notes. N = 414. Coefficients that share a letter do not differ significantly (*p*Bonferroni > .050)

Table 5

Means and standard deviations for the absolute frequencies of positive and negative thoughts in the total sample and in the four experimental conditions in Study 2.

Valence	Total sample		LS group		PANAS group		NA group		PA group		F test
	M	SD	M	SD	M	SD	M	SD	M	SD	
Positive thoughts	1.76	1.40	1.95 ^a	1.41	1.68 ^{a,b}	1.41	1.32 ^b	1.34	2.09 ^a	1.35	$F(3, 299) = 4.58, p = .004$
Negative thoughts	0.88	1.13	1.07 ^a	1.20	0.87 ^{a,b}	1.32	1.16 ^a	1.03	0.43 ^b	0.79	$F(3, 299) = 6.54, p < .001$

Notes. Participants in the LS group completed the SWLS. Participants in the PANAS group completed the full PANAS. Participants in the NA group and in the PA group completed the PA and NA subscales of the PANAS, respectively. Ns are 303 for the total sample, 74 for the LS group, 77 for the PANAS group, 77 for the NA group, 75 for the PA group. Means that share a letter do not differ significantly ($p_{\text{Bonferroni}} > .050$).

Table 6

Means and standard deviations for the absolute frequencies of responses referring to eight life domains in the total sample and in the four experimental conditions in Study 2.

Domain	Total sample		LS group		PANAS group		NA group		PA group		F test
	M	SD	M	SD	M	SD	M	SD	M	SD	
Career	0.51	0.72	0.82	0.88	0.43 ^a	0.70	0.39 ^a	0.61	0.40 ^a	0.59	$F(3, 299) = 6.63, p < .001$
Leisure	0.41	0.75	0.22 ^a	0.63	0.36 ^{ab}	0.65	0.44 ^{ab}	0.79	0.60 ^b	0.87	$F(3, 299) = 3.74, p = .012$
Romantic life	0.34	0.54	0.54	0.60	0.30 ^a	0.54	0.30 ^a	0.54	0.21 ^a	0.44	$F(3, 299) = 5.19, p = .002$
Family	0.32	0.62	0.49 ^{ab}	0.83	0.26 ^{ab}	0.47	0.35 ^{ab}	0.66	0.19 ^b	0.43	$F(3, 299) = 3.26, p = .022$
Friends	0.20	0.43	0.24	0.46	0.22	0.45	0.22	0.45	0.12	0.33	$F(3, 299) = 1.26, p = .287$
Housing	0.18	0.46	0.30	0.61	0.16	0.43	0.10	0.35	0.17	0.42	$F(3, 299) = 2.37, p = .070$
Money	0.16	0.37	0.26 ^a	0.47	0.09 ^b	0.29	0.18 ^{ab}	0.39	0.09 ^b	0.29	$F(3, 299) = 3.52, p = .015$
Health	0.08	0.30	0.07	0.25	0.14	0.45	0.05	0.22	0.04	0.20	$F(3, 299) = 1.83, p = .142$

Notes. Participants in the LS group completed the SWLS. Participants in the PANAS group completed the full PANAS. Participants in the NA group and in the PA group completed the PA and NA subscales of the PANAS, respectively. Ns are 303 for the total sample, 74 for the LS group, 77 for the PANAS group, 77 for the NA group, 75 for the PA group. Means that share a letter do not differ significantly ($p_{\text{Bonferroni}} > .050$).