Social Threats, Happiness, and the Dynamics of Meaning in Life Judgments

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Article

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Abstract

Four studies examined social relatedness and positive affect (PA) as alternate sources of information for judgments of meaning in life (MIL). In Studies 1 through 3 (total $N = 282$), priming loneliness increased reliance on PA and decreased reliance on social functioning in MIL judgments. In Study 4 ($N = 138$), daily assessments of PA, relatedness needs satisfaction (RNS), and MIL were obtained every 5 days over 20 days. Multilevel modeling showed that on days when RNS was low, PA was strongly related to MIL. Results suggest the dynamic ways that social relationships and PA inform judgments of MIL. Informational and motivational accounts of these results are discussed.

Keywords

existential meaning, social relationships, positive affect, loneliness

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> For the meaning of life differs from man to man, from day to day, and from hour to hour. What matters, therefore, is not the meaning of life in general but rather the specific meaning of a person's life at a given moment.
>
> Viktor E. Frankl, 1963/1984

Although meaning in life (MIL) is an important contributor to health and well-being (see Steger, 2009, for a review), relatively little is known about the processes that influence MIL judgments. The present studies attempt to fill this void by examining whether and how threats to meaning influence the type of information individuals draw on when judging their MIL. Our hypotheses are guided by the assumption that individuals are strongly motivated to affirm life's meaning. We believe this motivation leads individuals to base their MIL on information that affirms the meaningfulness of their existence and to discount information that potentially contradicts this optimistic worldview. The current studies specifically test this hypothesis by examining whether the cognitive accessibility of a fundamental threat to meaning, loneliness (Williams, 2009), biases the type of information people use to judge their MIL. Our dynamic approach to MIL suggests that when loneliness is accessible, people turn to alternative sources of information, unrelated to the threat, to help them maintain a high level of MIL. We focus on positive affect (PA) as this alternative source of meaning (King, Hicks, Krull, & Del Gaiso, 2006). Specifically, a series of priming studies and a daily diary study were used to test the notion that alternate, affirming sources of meaning (i.e., PA) becomes more strongly linked to MIL when information associated with loneliness is accessible. To begin, we briefly review the literature on judgment processes in subjective well-being to lay the foundation for the dynamic approach to MIL judgments from which our hypotheses are derived.

The Accessibility of Meaninglessness: The Informational Perspective

Decades of research has examined judgments of subjective well-being. Schwarz and Strack (e.g., 1991, 1999) were the first to articulate the role of basic social-cognitive processes in these types of judgments. A key component of their model is that individuals typically consult a limited amount of information when forming well-being judgments, ending the search as soon as they feel they have answered the question with an adequate degree of confidence (see also Förster, & Liberman, 2007; Schwarz, 2001). This informational perspective suggests two social-cognitive factors that influence well-being judgments: an individual's mood and relevant information that is cognitively accessible at the time of the judgment.

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With regard to mood, most research has demonstrated mood-congruent effects on well-being judgments. For example, people report higher levels life satisfaction when they are in a positive mood and lower levels of life satisfaction when they are in a negative mood (provided their mood is not attributed to a specific source; e.g., Schwarz & Clore, 1996). Notably, Schwarz and Strack (1991, 1999) suggest that mood is often such a strong determinant of well-being that pronounced mood states may serve as the *default* source of information for judgments of well-being.[1]

Although mood is an important contributor to judgments of well-being, accessible information can also bear heavily on these types of judgments. Both chronically (e.g., Diener, Suh, Lucas, & Smith, 1999; Lucas, Dyrenforth, & Diener, 2008; Schimmack & Oishi, 2005) and temporarily (Schwarz, Strack, & Mai, 1991) accessible information can influence levels of well-being. For instance, people may rely on relatively stable sources of information when judging how satisfied they are with their lives (Schimmack, Diener, & Oishi, 2002), or they may be influenced by information that is temporarily brought to the fore by contextual cues (Strack, Martin, & Schwarz, 1988). Importantly, accessible information not only influences *levels* of well-being judgments, but it also shapes the type of information used as the *basis* for those judgments. For instance, Strack et al. (1988) showed that answering questions about marital satisfaction before global life satisfaction increased the relation between the two variables (see also Schwarz et al., 1991). Similarly, subtle primes associated with "excitement" led participants to base their overall life satisfaction more heavily on their current level of excitement (Oishi, Schimmack, & Colcombe, 2003).

Clearly, researchers have made great strides in understanding the factors and processes that influence judgments of well-being, particularly life satisfaction. Currently, we know far less about judgments of MIL. However, mounting evidence suggests that MIL judgments are often susceptible to the same social-cognitive influences as other subjective well-being judgments. For instance, studies have shown that positive mood inductions increase judgments of MIL (e.g., Hicks & King, 2008). Accessible information also influences these types of judgments: Priming participants with established sources of meaning (e.g., one's family, "true self") enhances MIL ratings (e.g., Lambert et al., 2010; Schlegel, Hicks, Arndt, & King, 2009; see also Stillman et al., 2009). Similarly, the cognitive accessibility of positive information associated with meaning influences the basis for MIL judgments. To illustrate, Hicks and King (2009) showed that people who were primed with words associated with positive social relationships (e.g., *friends, family*) were more likely to base their MIL on their level of social relationship functioning. Overall, MIL judgments appear to be strongly influenced by what is experienced (i.e., PA) or brought to mind (e.g., one's relationships) at the time of the judgment.

Overall, these studies have shown that accessible information leads to assimilation effects on MIL (i.e., accessible information is incorporated into the judgment, influencing either its level or its basis). However, and importantly, research has focused almost exclusively on the accessibility of positive information. The present studies address a question that has received little empirical attention: whether and how accessible information associated with *meaninglessness* is incorporated into judgments of MIL. Does negative information, like positive information, lead to assimilation effects (and, consequently, to lower levels of MIL)? To address this question, it is critical to consider the motivational underpinnings of MIL.

The Accessibility of Meaninglessness: Motivational Considerations

Although MIL judgments are susceptible to the social-cognitive factors outlined previously, a comprehensive model of MIL must consider the contribution of motivation. After all, MIL is viewed as desirable and morally good (King & Napa, 1998; Scollon & King, 2004) and has been recognized as a central human motivation (e.g., Baumeister, 1991; Frankl, 1963/1984). Various perspectives suggest that people have a natural (and adaptive) tendency to believe their lives are meaningful (e.g., Solomon, Greenberg, & Pyszczynski, 2004). Based on these ideas, we suggest the type of information that contributes to MIL judgments may ebb and flow not only as a function of its accessibility but also to the extent that it *affirms* a positive sense of MIL. As such, when faced with potential threats to meaning, people may place more weight on information that affirms a sense of MIL and less weight on information that contradicts that belief. Thus, the negative effects of threatening information should be mitigated provided the individual has an alternative, affirming source of meaning to draw on. Such self-protective processes have long been recognized (e.g., Pyszczynski & Greenberg, 1987; Taylor & Brown, 1988). Studies have shown that people often selectively ignore threatening stimuli (e.g., Sedikides & Green, 2000) or demonstrate self-serving biases in information processing (e.g., Sanitioso, Kunda, & Fong, 1990).

These ideas fit with previous conceptualizations of the human need for meaning. The meaning maintenance model (MMM; Heine, Proulx, & Vohs, 2006) asserts that the chronic human need for meaning motivates the reinstatement of meaning in response to expectancy violations. This meaning reinstatement may be characterized by fluid compensation, such that individuals may reinstate meaning via alternate routes when expectations in a particular realm have been violated (Heine et al., 2006). Although the MMM does not directly address the phenomenological experience of MIL, this model certainly resonates with the current argument that when one source of meaning is threatened, attention may shift

to alternate sources. Likewise, Baumeister (1991) has suggested that when one of his theorized "needs for meaning" proves inadequate, people often "switch" to another source of MIL. Integrating these conceptions with contemporary perspectives on the effects of goal activation on social judgments (e.g., Förster, Liberman, & Friedman, 2007), we might conclude that threats to meaning implicitly (or explicitly) activate a goal to reinstate or affirm one's sense of MIL. As such, we expect that sources of meaning that facilitate goal attainment (i.e., provide a positive sense of MIL) will become more strongly related to MIL after this goal is activated.

Overview and Predictions

Although the informational perspective certainly informs our understanding of how positive information is processed in MIL judgments, we believe this approach may fail to fully capture how people process negative information. In line with the motivational account presented previously, we hypothesize that making negative information accessible will promote a dynamic judgment process such that people will shift the basis of their meaning to an alternative source of meaning that is unrelated to the potentially threatening information. We test this hypothesis through a series of priming studies and a daily diary study that focus on two variables that share strong links to the experience of meaning: social relationships and PA (e.g., King et al., 2006; Steger, Kashdan, Sullivan, & Lorentz, 2008). In each study, we examine whether accessible information related to loneliness influences the relations among MIL, PA, and social relationship functioning. In the following sections, we address specific predictions regarding the relations among these variables from both the informational and motivational perspectives of MIL judgments.

Positive affect. Based on our motivational perspective, we predict that PA will become a stronger predictor of MIL when concepts related to loneliness are cognitively accessible. That is, when loneliness is accessible, alternative sources of affirming information (i.e., PA) should become more strongly linked to MIL to overcome this potential existential void. Empirically, this suggests that participants in a positive mood should be relatively unaffected by the loneliness primes and maintain relatively high levels of MIL because PA provides these individuals with an alternative affirming source of MIL. If an individual is not in a positive mood, however, the accessibility of this negative information might lead to lower levels of MIL because there is no alternative affirming source. Overall, this would produce a strong linear relation between PA and MIL. Importantly, this prediction does not necessarily differ from the informational account. Recall that Schwarz and Strack (1999) suggest that people consult their mood states as information for well-being judgments. As such, an informational account of MIL judgments is still viable even if this prediction is borne out in the data.

Social relationships. A strict informational account would differ from a motivational account, however, in terms of predictions for the effects of negative primes on the use of the related source of information on MIL judgments. An informational account might suggest that negative primes will nevertheless activate related concepts, leading to assimilation effects with regard to the predictors of MIL (i.e., people will be more likely to use social relationships when judging their MIL).

In contrast, we suggest that negative primes associated with meaning (e.g., loneliness primes) may imply that the relevant source of information (e.g., social relationship functioning) is "off-limits" for the MIL judgment because the information is not unambiguously congruent with the belief that one's life is meaningful (see Park, Yoon, Kim, & Wyer, 2001, for a discussion of the effects of priming one pole of a concept on the activation of the entire dimension of that concept). This rather drastic response to threatening primes has been demonstrated in research on religious commitment and MIL (Hicks & King, 2008): Priming Christians with words related to hell effectively wiped out the relation between religiosity and MIL, regardless of levels of religious commitment. Although semantically related to religion, the valence of these primes seemed to render religious commitment a potentially disaffirming source of information for MIL judgments. Thus, in response to threatening primes, the strong need to affirm life's meaning appears to render a domain (regardless of the person's standing in that domain) temporarily irrelevant to MIL.

Strict informational and motivational accounts provide differing predictions for the influence of social threats on the relation between individual differences in social functioning and judgments of MIL. From an informational perspective, primes associated with loneliness would be expected to bolster the link between social relationship variables and MIL. In contrast, if people are motivated to affirm that life is meaningful, the opposite effect should be evident. Specifically, we predict that loneliness primes will *attenuate* the link between relationship functioning and MIL.

Overview and Predictions for Study 1

Study 1 participants completed a measure of relatedness need satisfaction (RNS) and then were suboptimally (i.e., for 40 ms) exposed to either neutral words or words related to loneliness. After priming, participants completed measures of MIL and positive mood. We predicted 2 two-way interactions, with prime condition moderating the relations of PA and relatedness to MIL judgments. Specifically, we predicted that loneliness primes would enhance the relation between PA and MIL and attenuate the relation between social relatedness and MIL.

Study 1

Method

Participants. Seventy-nine participants (55 women) enrolled in an introductory psychology course at the University of Missouri participated for course credit. Ages ranged from 18 to 22 ($M = 18.42$, $SD = .89$).

Materials and Procedure

Relatedness need satisfaction. Upon arrival, participants were instructed that they would be completing a variety of tasks. For the first task, participants completed a questionnaire packet. Embedded in the packet was the Relatedness Need Satisfaction subscale of the Basic Psychological Needs Scale (Gagné, 2003). A sample item is "People in my life care about me." In this study (and in all subsequent studies), all items were rated on a 1 (*not at all*) to 7 (*very much*) scale ($M = 5.78$, $SD = .89$, $\alpha = .81$).

Priming. Next, participants were instructed that they would complete a lexical decision task, purportedly to examine how various types of stimuli influence task performance. Participants were asked to categorize stimuli as either words (by pressing the "Z" key) or nonwords (by pressing the "/" key). Participants were told to respond as quickly as possible. They were instructed that a random string of letters would be presented before each stimulus and that "We [were] interested in how the presentation of these random stimuli influences subsequent lexical decisions." Each trial began with a "+" presented in the middle of the screen for 1,000 ms. Participants were instructed that they should stare at the "+" to help them respond as quickly as possible. After the "+", a string of "&"s was displayed for 400 ms. Immediately after the string of "&"s was presented, either the experimental ($n = 40$) or control ($n = 39$) words were presented for 40 ms. Examples of words in the experimental condition included *alone, lonely, outcast, isolated,* and *abandoned*. In the control condition participants were primed with words related to animals such as *giraffe, rabbit, elephant*, and *zebra*. Immediately after the primes, a string of "X"s was presented for 400 ms as a backward mask. After this string, participants were presented with another letter string (e.g., *irony* or *nogzp*), which served as the stimulus for the lexical decision. The primed stimuli were displayed 110 times.

MIL and PA measures. After the lexical decision task, participants were instructed to complete an Attitudes and Thoughts Survey. They first completed four items adapted from the PIL (purpose in life; Crumbaugh & Maholick, 1964; King et al., 2006; $M = 5.43$, $SD = 1.09$, $\alpha = .78$; e.g, "My personal existence is very purposeful and meaningful"). Participants then rated six positive mood adjectives (e.g., *happy, joy, pleased*) to provide a measure of current PA ($M = 4.69$, $SD = 1.11$, $\alpha = .87$; Diener, Smith, & Fujita, 1995). Participants then completed a variety of unrelated measures.

Finally, participants were debriefed and probed for suspicion. Three participants reported seeing some words (other than the targets) during the lexical decisions task; however, none of the participants were aware of the specific types of words that were displayed. Moreover, none of the participants expressed any suspicion related to the hypotheses of the study.

Results and Discussion

Preliminary analyses. A t test verified that priming condition did not influence mood ($p = .71$) or MIL ($p = .54$). MIL was positively correlated with PA ($r = .63$) and RNS ($r = .44$), and PA was positively correlated with RNS ($r = .36$; all ps $< .01$).

PA, RNS, priming, and MIL. A hierarchical regression equation was computed to examine the contribution of PA, RNS, and primes to MIL judgments. PA and RNS scores were converted to mean deviation scores and priming condition was dummy coded (0 = *control*, 1 = *loneliness*). The products of these scores, along with the dummy variable, were used as the interaction terms (Aiken & West, 1991). The main effects were entered on the first step contributing significantly (R^2 change = .45, $p < .001$), with PA ($\beta = .54$, $p < .01$) and RNS ($\beta = .25$, $p < .01$) predicting MIL. These main effects were qualified by significant PA × Condition ($\beta = .35$ $p < .05$) and RNS × Condition ($\beta = -.28$, $p < .05$) interactions, entered on the second step (R^2 change = .06, $p < .05$). The three-way interaction, entered on the third step, was not significant ($p = .26$).

To probe the two-way interactions, MIL was regressed on PA and RNS within each condition, and means were generated for individuals ± 1 SD from the mean on PA or RNS. Results are shown in Figure 1. As predicted (Panel A), PA was a stronger predictor of MIL in the loneliness condition ($\beta = .74$, $p < .001$) compared to the control condition ($\beta = .26$, $p < .08$). In contrast (Panel B), RNS was a strong predictor of MIL in the control condition ($\beta = .49$, $p < .01$) but did not predict MIL in the loneliness condition ($\beta = .07$, $p = .55$).

Supplementary analyses tested whether the strength of the regression coefficients, within condition, varied significantly across predictors (Pendhazur, 1997). In the loneliness prime condition, compared to RNS, PA was a significantly stronger predictor of MIL, $t(40) = 13.98$, $p < .01$. In the control condition, however, compared to PA, RNS was a significantly stronger predictor of MIL, $t(38) = 3.71$, $p < .01$.

The results of Study 1 support the hypothesis that the sources that are used to evaluate life's meaningfulness are sensitive to subtle contextual changes. The loneliness primes influenced judgments of MIL, but only to the extent that the individual did not have another source of information to draw on (i.e., PA) at the time of the judgment. Furthermore, the loneliness primes influenced the prediction of MIL judgments from RNS. Even among individuals for whom relationships

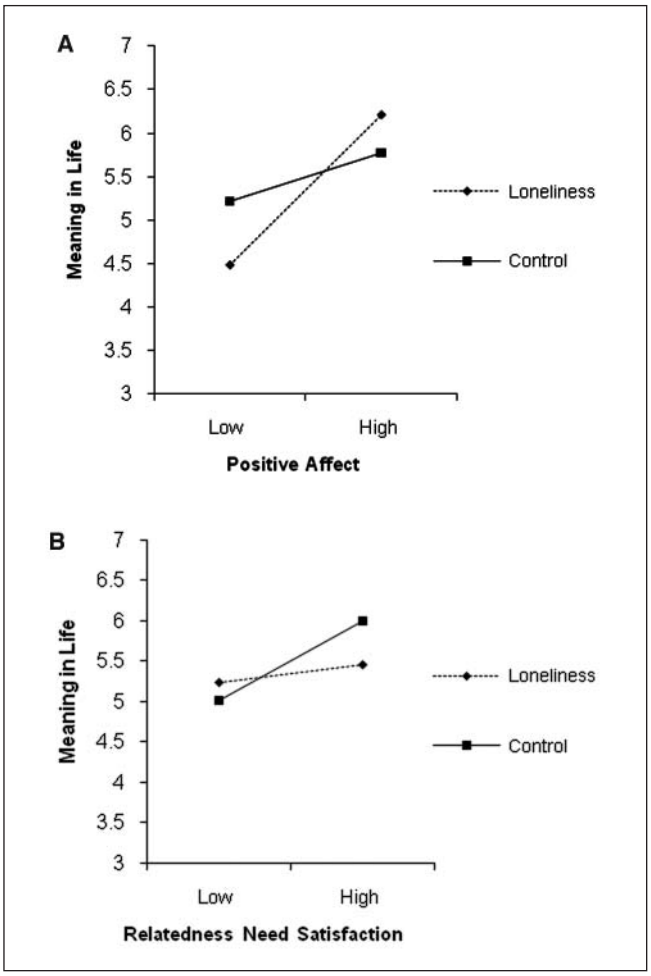

Figure 1. Meaning in life as a function of positive affect, related needs satisfaction, and prime condition, Study 1

might have indicated a positive answer to the question of MIL, RNS did not predict MIL. Priming the negative pole of the RNS dimension may be sufficient to render the entire construct "off-limits" for MIL judgments.

Study 2

Study 2 sought to replicate and extend these results. In Study 1, RNS was measured before priming. It is possible, then, that the primes might have influenced participants' feelings of relatedness, which might account for the attenuation of the relation between RNS and MIL in the loneliness condition. As such, in Study 2, RNS was measured after the primes. In this study, participants were subliminally primed with either socially neutral words or words related to loneliness. After priming, they completed measures of MIL, PA, and RNS. Again, we predicted PA would become a stronger predictor of MIL after the loneliness primes condition and RNS would become less associated with MIL after the activation of social threats.

Method

Participants. Seventy-three participants (43 females) enrolled in an introductory psychology course participated for course credit (M age = 19.21, SD = 1.48).

Materials and Procedure

Parafoveal priming. At the beginning of the laboratory session, participants were told they would be completing a variety of tasks for separate research projects. For the priming task, participants completed a "periphery decision task." Participants were told that the researchers were interested in how different random stimuli would influence their performance on the task. They were instructed that a "+" would appear in the middle of the computer screen and that this would be followed by a stimulus presented on either the right or the left side of the screen. Participants were told that their task was to indicate the side of the screen the stimulus appeared on by pressing a red circle, located on the ";" key if the stimulus appeared on the right, or a green circle, located on the "a" key, if the stimulus appeared on the left. They were instructed to focus on the "+" throughout the duration of task. The stimuli for the task were random strings of letters and numbers. Primes were presented immediately before the random stimuli in the parafoveal region of vision to the right or left of the fixation point. Stimuli presented in this region are not believed to reach conscious awareness (see Bargh & Chartrand, 2000, for a review). In this task, each word was displayed for 35 ms and immediately masked by a string of "X"s. There were 50 trials, each of which lasted 2 s.

Participants were randomly assigned to one of two conditions. In the experimental condition (n =36), primes were related to loneliness (e.g., *lonely, alone, outcast, isolated, shunned*). In the control condition (n =37), primes were related to neutral others (e.g., *people, peer, man, woman, person*).

MIL, RNS, and PA. After priming, participants completed the Meaning in Life Questionnaire (MLQ) Presence of Meaning subscale (Steger**,** Frazier, Oishi, & Kaler, 2006; M = 5.23, SD = 1.14, α = .87), which has shown convergent and discriminant validity, as well as high test–retest reliability (Steger et al., 2006; Steger & Kashdan, 2007). A sample item is "I understand my life's meaning." After completing the MLQ, participants completed the same RNS subscale (M = 6.00, SD = .85, α = .78) and Mood Adjective scale from Study 1 (M = 4.72, SD = 1.01, α = .89).

Finally, participants completed a variety of unrelated measures, and they were debriefed and probed for suspicion. No one reported seeing any of the primed words or expressed suspicion related to the hypotheses of the study.

Results and Discussion

The *t* tests comparing the prime groups revealed no differences on RNS or MIL (*p*s > .62), though there was a significant difference in PA, $t(71) = -1.99$, $p < .05$. Interestingly, those primed with loneliness reported higher PA ($M = 4.96$, $SD = 1.19$) compared to controls ($M = 4.50$, $SD = .76$).

Primary analyses examined the predictions for condition, RNS and PA, seeking to replicate the results of Study 1. The main effects were entered on the first step of a hierarchical regression equation (R^2 change = .40, $p < .001$), with condition ($\beta = -.32$, $p < .01$), PA ($\beta = .52$, $p < .01$), and RNS ($\beta = .19$, $p < .03$) predicting MIL. Once again, main effects were qualified by significant PA × Condition ($\beta = .40$, $p < .05$) and RNS × Condition ($\beta = -.35$, $p < .05$) interactions, entered on the second step (R^2 change = .07, $p < .05$). The three-way interaction was not significant ($p = .84$).

Panel A of Figure 2 shows that PA was a stronger predictor of MIL in the loneliness prime condition ($\beta = .77$, $p < .001$) compared to the control condition ($\beta = .23$, $p = .14$). Panel B shows that although RNS was a strong predictor of MIL in the control condition ($\beta = .42$, $p < .01$), as in Study 1, it did not predict MIL in the loneliness prime condition ($\beta = -.06$, $p = .60$). Supplementary analyses again showed that PA was a significantly stronger predictor of MIL than RNS in the loneliness prime condition, $t(35) = -10.54$, $p < .01$, but in the control condition, RNS was a significantly stronger predictor of MIL than PA, $t(36) = 2.62$, $p < .05$.

Studies 1 and 2 converge to suggest that the implicit activation of concepts associated with meaninglessness can influence the sources of information used in MIL judgments. Participants low in PA reported lower levels of MIL after primes associated with loneliness (rendering PA a stronger predictor of MIL after those primes). Importantly, RNS was not a significant predictor of MIL after loneliness primes, regardless of participants' levels on this individual difference.

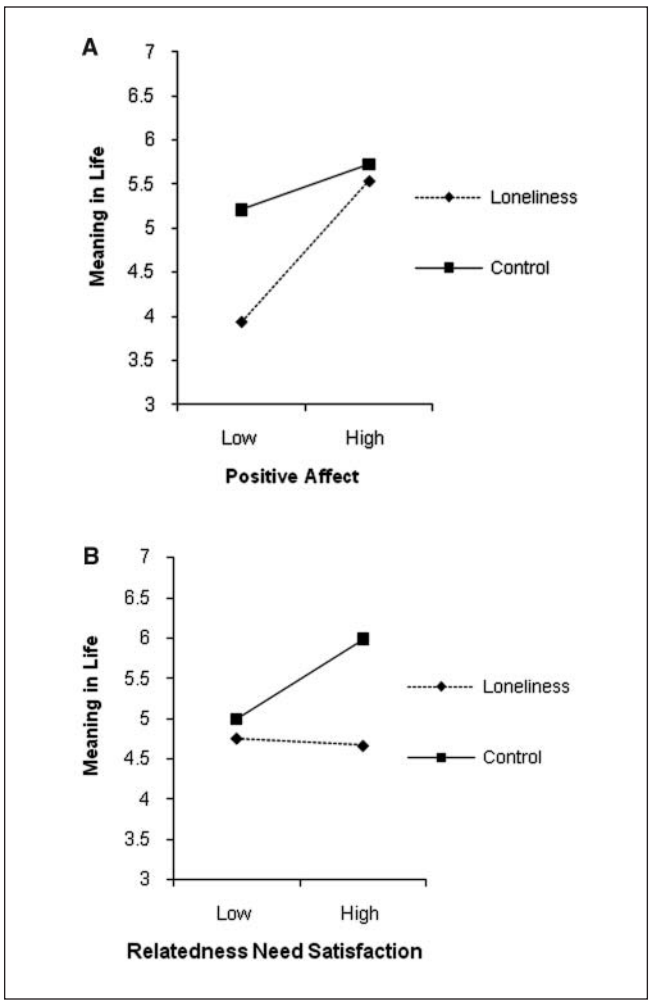

Figure 2. Meaning in life as a function of positive affect, related needs satisfaction, and prime condition, Study 2

Study 3

One purpose of Study 3 was to replicate the previous findings using a more diverse sample of participants. Whereas Studies 1 and 2 included only college student samples, in an effort to demonstrate the generalizability of these findings, Study 3 included a community sample of adults. Furthermore, in Study 3, participants wrote about a personal experience of loneliness or a control topic. We used this task because previous research has shown that such a task can influence cognitions and behaviors associated with loneliness (e.g., Pickett, Gardner, & Knowles, 2004). This procedure also allowed us to more directly test whether and how salient, personally relevant, negative information would influence MIL judgments. The measure of social functioning used in this study was a measure of loneliness. Thus, participants were consciously reminded of a personal experience of loneliness and completed a measure of social functioning directly relevant to the prime. We again predicted that in the loneliness prime condition, PA would be more strongly related to MIL, and individual differences in loneliness would be less strongly related to MIL relative to the control condition.

Method

Participants. One hundred and thirty-two University of Missouri employees (114 women)[3] participated in an online study in return for a raffle ticket for a $100 gift card at the local mall (M age = 40.9, SD = 11.39). Data from 4 participants were excluded because they did not complete the writing task, and 2 participants were excluded because they expressed suspicion about the hypotheses of the study.

Materials and Procedure

Supraliminal priming. Participants were instructed that they would complete a few unrelated tasks sponsored by the department of psychological sciences (adapted from Pickett et al., 2004). All participants first read:

> We are interested in how adults describe certain life experiences. Research in the psychological sciences has collected a large amount of information on college students descriptions of various life experiences, but surprisingly little research has been conducted on how non-student populations describe common life experiences.

Participants in the control condition ($n = 69$) were instructed:

> For this task, we are interested in how you would describe walking around the university campus. That is, think of what it is like to walk around the university campus and spend a few minutes writing about the experience. Don't worry about spelling or grammar; just write down as much detail about the experience as possible.

Participants in the experimental condition ($n = 57$) were instructed:

> For this task, we are interested in how adults describe the experience of feeling lonely. Think of a time when you felt lonely and spend a few minutes writing about the experience. Don't worry about spelling or grammar; just write down as much detail about the experience as possible.

MIL, loneliness, and PA. After the writing task, participants were instructed to complete an Attitudes and Thoughts Survey, including the MLQ Presence subscale ($M = 5.13$, $SD = 1.29$, $\alpha = .91$), followed by the UCLA Loneliness scale (Russell, Peplau, & Cutrona, 1980; $M = 2.82$, $SD = 1.14$, $\alpha = .94$). The UCLA Loneliness scale assesses subjective feelings of social isolation and has been shown to have excellent concurrent and discriminant validity (Russell et al., 1980). A sample item is, "How often do you feel you have nobody to talk to?" Participants then completed the Positive Mood Adjectives scale ($M = 4.95$, $SD = 1.39$, $\alpha = .92$) and a variety of unrelated measures, after which they responded to an open-ended suspicion check.

Results and Discussion

T tests revealed no significant differences between groups on PA ($p = .41$), MIL ($p = .60$), or loneliness ($p = .78$).

As in the previous studies, main effects were entered on the first step of a hierarchical regression equation (R^2 change = .37, $p < .001$), with PA ($\beta = .49$, $p < .001$) and loneliness ($\beta = -.19$, $p < .05$) predicting MIL. Main effects were qualified by significant PA × Condition ($\beta = .30$, $p < .01$) and Loneliness × Condition ($\beta = .35$, $p < .01$) interactions entered on the second step (R^2 change = .08, $p < .01$). The three-way interaction, entered on the third step, was not significant ($p = .67$).

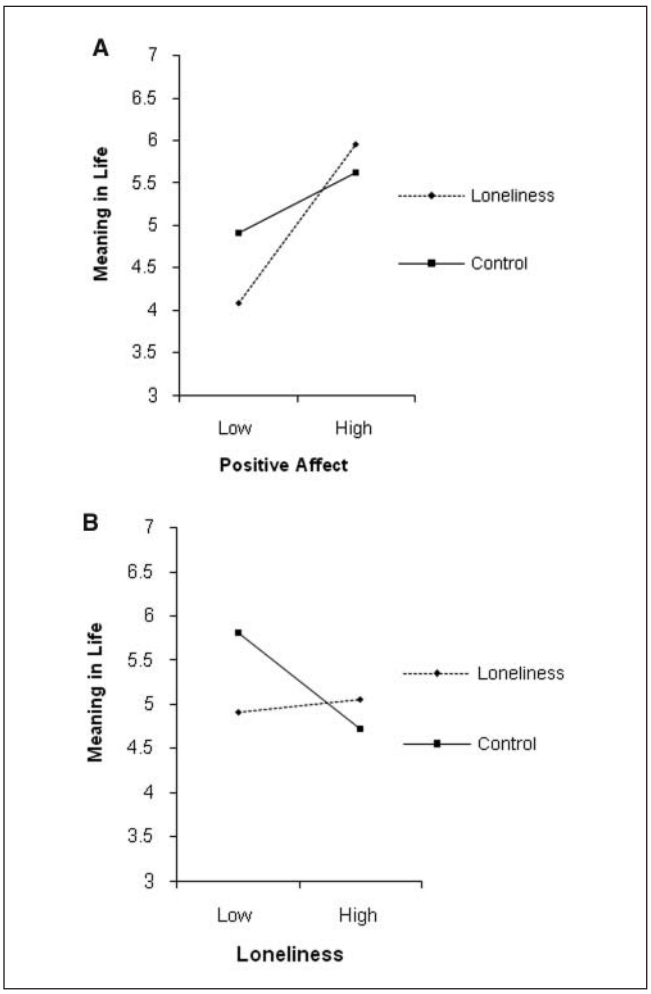

Figure 3. Meaning in life as a function of positive affect, loneliness, and prime condition, Study 3

As shown in Panel A of Figure 3, and in accord with predictions, PA was a stronger predictor of MIL in the loneliness prime condition ($\beta = .73$, $p < .01$) compared to the control condition ($\beta = .26$, $p < .05$). In contrast, as shown in Panel B, although loneliness was a strong predictor of MIL in the control condition ($\beta = -.45$, $p < .01$), it did not predict MIL in the loneliness prime condition ($\beta = .06$, $p = .62$). Thus, for individuals who had just been writing about loneliness, loneliness (even when it was low) did not predict MIL. Supplementary analyses showed that compared to loneliness, PA was a significantly stronger predictor of MIL in the loneliness prime condition, $t(57) = 5.57$, $p < .01$, whereas loneliness was a significantly stronger

predictor of MIL compared to PA in the control condition, $t(68) = 6.79$, $p < .01$.[2]

Overall, the results of Studies 1 through 3 demonstrate a remarkably consistent pattern, suggesting the influence of loneliness primes on the sources of information used in MIL judgments. As predicted, loneliness primes led to lower MIL only for individuals who were low on PA at the time of the judgment. Moreover, loneliness primes enhanced the relation of PA to MIL and attenuated the relation of individual differences in social functioning to these judgments. These findings highlight the dynamic ways that negative accessible information can influence judgments of MIL (both in terms of their levels and the information used for these judgments).

Overview and Predictions for Study 4

The purpose of Study 4 was to generalize these experimental findings to everyday life. Participants completed an online diary study every 5 days over 3 weeks. Daily reports included measures of PA, RNS, and MIL. In this study, rather than rely on primes, we examined how the relevance of PA and RNS to MIL judgments varied depending on the levels of these variables. Notably, for each daily report, the order of measures was identical, with participants completing the mood measure first, followed by RNS, and then MIL. Thus, social relationships should have been relatively more accessible than mood when judging MIL (similar to the Strack et al., 1988, study of marital and life satisfaction). Thus, from a purely informational perspective, we might expect that RNS would be strongly related to daily MIL, regardless of mood.

However, if low levels of RNS function in ways similar to the loneliness primes in Studies 1through 3, we would predict that when RNS is low, individuals will likely render MIL judgments primarily as a function of PA. Thus, for those whose social relationships are not going well, if they happen to be in a good mood, we predict a high level of MIL. In contrast, if relationships are going poorly and PA is low, life will be judged less meaningful. Thus, for these data, we predicted a significant RNS × PA interaction, such that MIL would be more strongly related to PA on days when individuals experience lower than average satisfaction with their social relationships.

Study 4

Method

Participants. One hundred thirty-eight participants (83 women) enrolled in a psychology course at the University of Missouri participated for partial course credit. Ages ranged from 18 to 27 ($M = 19.19$, $SD = 1.23$).

Materials and Procedure. Participants completed an online daily diary study four times over 3 weeks (every 5 days). Participants were told that the study involved daily assessments of personality characteristics among college students and that they should try to complete each online survey at the same time each day. The response rate across the four waves of the study was high, with approximately 88% of the participants completing all four surveys. Multilevel modeling can accommodate missing data at Level 1 (i.e., the repeated measures level); thus, missing data for the remaining participants was not a concern.

To help disguise the purpose of the study, other measures (approximately 30 items; taken from the Rational Experiential Inventory; Pacini & Epstein, 1999) were given at end of the survey. After the first survey, participants were instructed:

> Please note: the questions on the survey are very similar to the questions you already completed. For this survey, we are interested in how you feel about the questions "right now." That is, even though you may have already answered the same types of questions in the previous survey, we would like to know about your current beliefs and feelings.

Each report contained the positive mood adjectives ($M = 4.81$, $SD = 1.39$, $\alpha = .92$), RNS ($M = 5.62$, $SD = .90$, $\alpha = .86$), and the Presence subscale of the MLQ ($M = 4.69$, $SD = 1.22$, $\alpha = .90$).

Results and Discussion

Preliminary analyses. Aggregating over the days, correlational analyses indicated that, not surprisingly, mean MIL was correlated with mean PA ($r = .37$, $p < .01$) and mean RNS ($r = .48$, $p < .01$). Aggregated PA and RNS were also correlated ($r = .31$, $p < .01$).

Primary analyses. Multilevel modeling, using HLM (Version 6.02; Raudenbush & Bryk, 2002), was used to examine the prediction of daily MIL as a function of daily levels of PA, RNS, and their interaction. Multilevel modeling can appropriately accommodate the lack of independence in the observations (i.e., repeated observations within a person). The multilevel analyses included two levels. Level 1 represented the days nested within individuals. Level 2 represented mean differences between individuals. Six dummy variables were created to control for day of the week effects (Sunday was the comparison group). These dummy variables were entered as Level 1 predictors along with the three predictors of interest. PA and RNS were both standardized, and the product of these two standardized variables served as the interaction term. To control for the potential bias introduced by between-person differences in mean levels on the predictors of interest, the three primary predictors were centered within person at Level 1 and the within-person means for PA and RNS were included as Level 2 covariates (Raudenbush & Bryk, 2002; Schwartz & Stone, 1998; Snijders & Bosker, 1999). The effects of daily PA, daily RNS, and their interaction were estimated as random effects.

The results for the Level 2 covariates suggested that an individual's mean level of RNS and PA influenced individual intercepts. These effects represent the relation between a person's average amount of PA and RNS and daily MIL, and indicate that mean levels of PA ($\beta = .38$, $p < .001$) and RNS ($\beta = .56$, $p < .001$) were positively associated with daily MIL. The analyses for the Level 1 predictors revealed that state PA ($\beta = .22$, $p < .001$) predicted MIL over and above the individual's average level of PA (replicating past research; King et al., 2006). State relatedness ($\beta = .01$, $p = .06$) was not related to MIL. The small size of this effect is almost certainly due the relatively large effect of between-person relatedness that was controlled for in the model. In any case, these main effects were qualified by a significant PA × RNS interaction ($\beta = -.21$, $p < .05$).

Tests of simple slopes were conducted via recentering at 1 *SD* above and below the mean of RNS. As shown in Figure 4, these analyses revealed that the contribution of PA to MIL was much stronger on days when RNS was low ($\beta = .43$, $p < .001$) than on days when RNS was high ($\beta = .01$, $p > .80$). Thus, as predicted, the relation between daily PA and daily MIL was moderated by daily RNS, suggesting that low *levels* of RNS have effects similar to primes of loneliness. Consistent with the priming studies, only participants who were experiencing a threat to their relationships and who were low in PA reported relatively low MIL. Corroborating the experimental studies, these results suggest that when faced with a threat to RNS (whether it is via a prime in the lab or a lonely day in life), people are more likely to use PA as a source of information for MIL judgments.

The pattern of results in Figure 4 is strikingly similar to past research examining the influence of a positive relationship primes on the relation between naturally occurring PA and MIL (Hicks & King, in press, Study 3). In that work, supraliminal primes of positive social relationships produced high levels of MIL, regardless of mood. For those who were exposed to neutral primes, however, PA was a strong predictor of MIL. When positive social relationships are not salient (Hicks & King, in press) or when social relationships provide a less than positive answer (current Study 4), MIL is more likely to depend on PA.

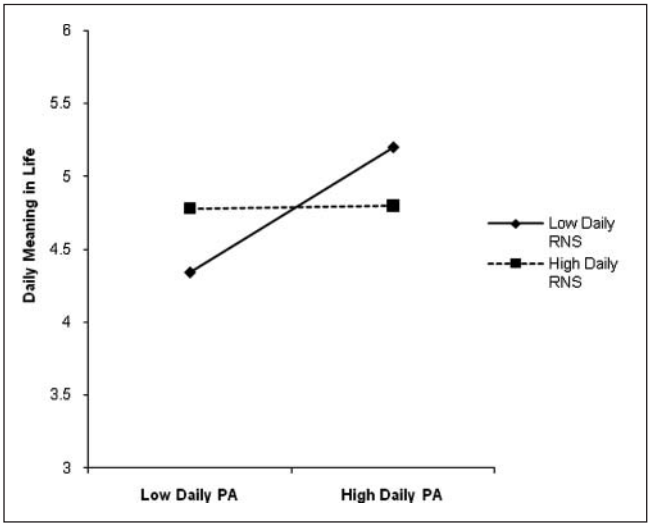

Figure 4. Daily meaning in life as a function of daily positive affect (PA) and daily related needs satisfaction (RNS), Study 4

General Discussion

The current studies highlight the complex ways accessible knowledge and mood shape judgments of MIL. Although previous research has shown that accessible positive information either increases MIL (e.g., Schlegel et al., 2009), wipes out the effects of mood on MIL (e.g., Hicks & King, 2008), or increases the relation between MIL and information associated with the prime (Hicks & King, in press), the current research suggests that accessible negative information is processed in a more dynamic fashion. Negative accessible information had no influence on MIL for individuals in a positive mood at the time of the judgment. Moreover, unlike primes associated with positive social connections (Hicks & King, in press), loneliness primes decreased the relation between social relationship functioning and MIL. Overall, the remarkably consistent patterns of two-way interactions observed across the studies shed light on the contribution of both informational and motivational processes to MIL judgments.

Informational and Motivational Accounts of MIL Revisited

Across all four studies, loneliness (whether primed or experienced) enhanced the relation between PA and MIL. For Studies 1 and 2, this effect can be readily explained by Schwarz and Strack's (1991, 1999) model of well-being judgment processes. Again, this model states that people typically use pronounced mood for well-being judgments *unless* another source of information is made salient. If they are not in a pronounced mood, however, they should turn to information that is accessible in memory. Although the suboptimal and subliminal primes used in Studies 1 and 2 likely made threatening information accessible, it is unlikely that these subtle manipulations made thoughts of loneliness truly salient (see Higgins, 1996, for a distinction between accessibility and salience). Therefore, the PA × Condition interaction effects are consistent with Schwarz and Strack's model: MIL judgments were tempered only for individuals in the loneliness prime conditions who were *not* in a pronounced positive affective state.

The results of Studies 3 and 4, however, are more difficult to explain using a strict informational account. In these studies, participants either explicitly wrote about experiences of

loneliness or completed measures of social functioning immediately before rating MIL. For these participants, information associated with loneliness was clearly salient at the time of the judgment. Despite this salience, participants in a positive mood reported high levels of MIL regardless of prime condition (Study 3) or their current level of social functioning (Study 4). These results support the idea that when an important source of MIL is potentially challenged, alternate sources of meaning become more strongly linked to MIL. It is important to note that PA in these studies might be serving as a proxy for a host of other unmeasured sources of MIL (e.g., competence, religious beliefs, etc., that are themselves typically correlated with PA). In this way, PA may serve as a particularly robust alternate source of MIL.

Further support for a motivational account of MIL judgment processes comes from the consistent Social Functioning × Condition interactions found in Studies 1 through 3. Across all three studies, loneliness primes dramatically attenuated the relation between social functioning and MIL. Again, these findings are inconsistent with a strict informational account of well-being judgment processes. From an informational perspective, primes associated with loneliness should activate the entire dimension of social relationships. This activation, in turn, should make this accessible domain even more strongly linked to MIL. Such results would be consistent with many findings that demonstrate congruence between accessible domains and the type of information used as the basis for judgments of well-being (e.g., Hicks & King, in press; Oishi et al., 2003). The present findings do not show these straightforward effects but may be explained by the possibility that individuals used alternative (and affirming) sources of meaning after primes threatening the social domain.

Interestingly, none of the priming studies revealed a three-way (Social Functioning × Social Threat × PA) interaction. These null effects are surprising for two reasons. First, research has suggested primes should only influence thoughts and behaviors to the extent that they are perceived as relevant to the individual (see Förster et al., 2007, for a review). As such, one might expect that the "shifting" effect shown in the current studies applies only to those who were currently feeling lonely. Those who were not lonely would have perceived the accessible information as personally irrelevant and therefore had no reason to ignore social relationships as a source of MIL (producing a three-way interaction). Second, research suggests that PA leads to assimilation effects (Avramova & Stapel, 2008). Drawing on this work, one might predict that lonely participants in a positive mood would report the lowest levels of MIL after social threats (i.e., another three-way interaction). Neither of these scenarios was supported by the present data. Although null effects can always be attributed to low statistical power, these findings may highlight the relatively automatic mechanisms that might influence judgments of MIL and are consistent with previous findings (Hicks & King, 2007, in press). In previous research, neither individual differences in RNS nor religious commitment interacted with both PA and (relationship or religious) primes to predict MIL. Instead, primes appear to have a general influence on the incorporation (or lack thereof) of information in judgments of MIL, which is potentially automatic and perhaps less nuanced than for other social judgments. Integrating the present findings with past research suggests that priming the positive pole of a dimension leads to the use of that dimension in MIL judgments, whereas priming the negative pole renders the dimension broadly irrelevant to the judgment. Future research on MIL judgments should continue to probe this fascinating possibility with a variety of sources of MIL.

It should be noted that, as might be expected in psychologically healthy people, the mean levels of MIL were relatively high for all studies and conditions. As such, tempering one's MIL by not consulting high RNS, for example, after the loneliness primes may have been a low-stakes sacrifice. Examining these questions in samples with truly low MIL (or who are chronically lonely) would allow for stronger conclusions about when settling for a lower level of MIL might be less attractive and how individuals might rely on various sources when MIL itself is low.

Knowledge Activation and the MIL Judgment Process

Activated knowledge structures can influence thoughts and behaviors through different mechanisms (e.g., Förster & Liberman, 2007). To understand MIL judgments (or any type of judgment), it is crucial that researchers uncover which of these mechanisms is mediating the influence of knowledge activation on judgments. For example, by activating concepts associated with loneliness, the primes may also activate concepts associated with meaninglessness because the two concepts are so closely associated in memory (Williams, 2007a, 2007b). Although semantic priming effects might have partially contributed to the current findings, based on the motivational perspective described here, we believe the loneliness primes either consciously or unconsciously activated a goal to maintain or affirm one's sense of meaning (e.g., Heine et al., 2006; see also Proulx & Heine, 2009).

Recently, Förster et al. (2007) elegantly described various ways to disentangle other types of priming effects (i.e., semantic and procedural effects) from goal activation. For example, goal activation should lead individuals to place more value on objects and behaviors that facilitate the attainment of the goal. If the goal to reinstate or affirm meaning is activated, individuals should place more value on sources of meaning. Although the enhanced reliance on PA after the loneliness primes suggests that the affective domain is considered more important to the judgment, having participants

explicitly list how much they value PA after these primes may be necessary to further demonstrate this effect.

The effects of goal activation are also evident when primes do not have an effect on individuals who would not typically expect to achieve the goal. This possibility further suggests future research should examine the meaning judgment processes of people with low MIL. These individuals may be less likely to "switch" to an alternate source of meaning because of the expectation that such a shift would ultimately prove futile.

Finally, goal activation often leads to the inhibition of other unrelated goals (Shah, Friedman, & Kruglanski, 2002). As such, we might, for example, expect that people primed with loneliness would be faster to respond to stimuli associated with the goal to reinstate meaning (e.g., stimuli associated with happiness) compared to stimuli associated with irrelevant goals. Overall, these possibilities highlight many ways accessible information and alternate sources of information, including mood, may converge to influence one's perception of MIL.

The present studies raise many other intriguing questions for future research. For instance, what are the differences between MIL and life satisfaction judgment processes? Although many of the same factors should influence both types of judgments, it may be less threatening to conclude that one's life is not satisfying than to conclude that one's life is utterly meaningless. As such, life satisfaction judgments may not be influenced by the same motivational influences described in the current research. Importantly, an aspect of this research that differs from past research on judgment processes in well-being is the inclusion of more than one source of information for the judgment, and the examination of the interactions of these sources. Because most research has not considered the potential interactive contributions of sources of information on well-being judgments, we know little about the variables that may be accounting for such judgments beyond their main effects.

In addition to contextual and affective influences on MIL judgments, future research should examine the contribution of chronic sources of meaning. Chronic sources of information are strong contributors to judgment of life satisfaction (e.g., Schimmack & Oishi, 2005). In fact, many times chronic sources of information are likely the first type of information people use when determining the degree to which their lives are satisfying (e.g., Schwarz & Strack, 1999). Because chronic sources of MIL represent stable aspects of one's belief system, they may lower the contributions of mood or temporarily accessible information to judgments of MIL.

Finally, examining the role of negative emotions in MIL judgment processes may also be fruitful endeavor. Typically, both positive and negative moods are thought to influence judgments of well-being. In our studies, however, we do not typically find independent effects of negative affect on MIL ratings (e.g., King et al., 2006, Study 5). Still, negative emotions may often have an adaptive role in the experience of MIL. For instance, negative affect may be help reinstate meaning after one's meaning systems have been disrupted by traumatic events (e.g., Steger et al., 2006). Although this process is emotionally unpleasant, searching for meaning can ultimately lead to an enriched sense of MIL (e.g., Janoff-Bulman & Yopyk, 2004).

Clearly, the present investigation invites a variety of intriguing research questions about the nature of MIL itself. These results make a compelling case for considering MIL as a judgment that may be a product of shifting sources of information. Results also highlight the fact that, despite decades of research demonstrating the importance of MIL to human functioning, we still have a great deal to learn about this construct. Confronted with the question of whether one's life is meaningful, a person might consult his or her mood or standing with regard to other important life outcomes, such as social relationships. Given that previous research has asked simply about the subjective sense of MIL, we do not know what type of information was used when forming these judgments. The present results speak to the value of thinking of MIL as the result of a judgment and attending to the various sources of that judgment. To fully understand the important construct of MIL, researchers must confront a central human dilemma: Not simply whether life is meaningful, but what it is that makes it so, in the words of Frankl, "from man to man, from day to day, and from hour to hour" (Frankl, 1963/1984, p. 110).

Authors' Notes

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Notes

1. Importantly, such mood-as-information effects are not always a function of unconscious misattribution processes. Many people believe that "moods are an integrative function of all of the experiences [individuals] have" (Schwarz & Strack, 1991, p. 37), suggesting that affective information is sometimes consciously perceived as an important component of well-being (which, of course, it is; Diener, 2009).
2. It should be noted that in Studies 1through 3, the *zero-order* correlations between related needs satisfaction and meaning in

life were significant in the experimental group (*r*s = .33, 35, –.31, *p*s < .05); however, these effects disappeared in the regression analyses.

3. The low number of men in each study precluded the exploration of gender differences. However, to examine whether the effects for positive affect (PA) in the loneliness conditions held for men, we examined only the men across the three studies. In every case, in the control condition PA was related to meaning in life judgments (average $r = .25$), but in the loneliness conditions, this relation was much stronger (average $r = .85$), suggesting that results for PA and meaning in life judgments are not specific to women only.

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