

Research Article

Which Thoughts Count?

Algorithms for Evaluating Satisfaction in Relationships

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ABSTRACT—*Individuals differ in both their motivation to obtain incentives in their relationships (approach goals) and their motivation to dampen the threats in their relationships (avoidance goals). When evaluating relationship satisfaction, individuals with strong approach goals should weigh positive features in their relationships more heavily than do individuals low in approach goals, and individuals with strong avoidance social goals should weigh negative features more than do individuals with weaker avoidance social goals. In a study testing this idea, participants were randomly signaled several times a day to report their positive (passion) and negative (insecurity) thoughts about their current romantic partner. At the end of the day, they reported their overall relationship satisfaction. The results confirmed the hypotheses: Algorithms used to assess relationship satisfaction differ as a function of goal strength. We discuss the results not in terms of biases in subjective evaluation, but rather in terms of variations in the very definition of satisfaction.*

The quality of close relationships is closely linked to health and well-being: People who report having satisfying social ties are physically healthier and psychologically happier than those who do not (Diener & Seligman, 2002; Uchino, Cacioppo, & Kiecolt-Glaser, 1996). Judgments of relationship satisfaction are subjective evaluations, and these global judgments have been associated with personal and dyadic outcomes. For example, research has shown strong associations between marital satisfaction and psychiatric disorders (e.g., Whisman, 1999), and marital satisfaction is a strong predictor of subsequent divorce (e.g., Devine & Forehand, 1996). Although it is generally understood that global relationship satisfaction is a function of rewarding features of the relationship minus the costs or punishments involved in the relationship (e.g., Kelley & Thibaut,

1978; Rusbult, 1983), little work has examined the relative weight that rewards and costs are given in global judgments of relationship satisfaction.

An intuitive prediction would be that one “unit” of a reward carries the same weight as one “unit” of a cost in global satisfaction evaluations. However, decades of research on cognitive heuristics and biases have shown that the weight assigned to information used in evaluations and decisions is neither intuitive nor linear (e.g., Nisbett & Ross, 1980). For example, studies have consistently found that potential losses receive more weight than potential (equivalent) gains (Kahneman & Tversky, 1979). Evidence also suggests that individual differences predict the strength of such biases. For example, Idson, Liberman, and Higgins (2000) found that gains were experienced more intensely by individuals chronically high in promotion focus than by those low in promotion focus, whereas losses were experienced more intensely by individuals chronically high in prevention focus than by those low in prevention focus. It is reasonable to posit that individual differences in the subjective experience of gains and losses would subsequently determine global evaluations of experience and influence future decisions.

Research has shown that the cognitive algorithms employed in the service of close relationships are equally complicated. Murray and Holmes (1994) have shown that individuals engage in a variety of cognitive gymnastics to ward off feelings of doubt about their partners and relationships. Partners’ apparent faults are turned into virtues; or when faults must be acknowledged, they are followed by “yes, but,” to quickly explain them away (Murray & Holmes, 1994). In turn, these cognitive biases seem to influence relationship satisfaction, such that idealized images of the partner are associated with greater relationship satisfaction (Murray, Holmes, & Griffin, 1996). These nimble cognitive constructions likely stem from needs for positive impressions of interdependent relationships in the face of the threats inherent in them.

The current research is based on the idea that individuals differ in both their motivation to obtain incentives in their relationships and their motivation to dampen the threats in their relationships. Recent research on social motives and goals (e.g.,

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Gable, 2006; Gable & Strachman, 2007) has shown that social goals can be focused on incentives and desired end states—approach—or on threats and undesired end states—avoidance. Stronger approach social and relationship goals have been associated with less loneliness, greater well-being, increased sexual desire, and more satisfying relationships, concurrently and over time, whereas stronger avoidance goals predict more loneliness, greater anxiety about relationships, decreased commitment, higher dissolution rates, and more physical symptoms, concurrently and over time (Elliot, Gable, & Mapes, 2006; Gable, 2006; Impett, Gable, & Peplau, 2005; Impett, Strachman, Finkel, & Gable, in press).

Although mechanisms linking approach and avoidance social goals to outcomes have not been fully explored, attention likely plays a role. Maner, Gailliot, Rouby, and Miller (2007) found evidence for goal-congruent preconscious attention biases; individuals with unrestricted sociosexual orientation (but not those with restricted sociosexual orientation) showed attention biases toward potential mating targets. Complementing this work on domain-congruent attention biases, work in our lab has found evidence for biases congruent with regulatory focus. For example, approach social goals were positively correlated with attention to smiling faces, and avoidance social goals were positively correlated with attention to frowning faces (Gable & Berkman, 2008, Study 2; see also Derryberry & Reed, 1994).

In the current study, we tested the hypothesis that another possibly powerful mechanism through which approach and avoidance social goals influence relationship outcomes lies in the algorithms used to determine global relationship satisfaction. Previously, Updegraff, Gable, and Taylor (2004) examined a similar question in the context of general approach and avoidance motivation and positive and negative emotions. The results showed that life-satisfaction ratings were more strongly tied to positive affect in high-approach participants than in low-approach participants. In the current study, we used experience-sampling methods to randomly sample participants' positive and negative thoughts about their romantic relationships throughout the day; at the end of the day, participants also provided a measure of their global satisfaction. We hypothesized that when evaluating daily relationship satisfaction, individuals with strong approach social goals would weigh positive features in their relationships more heavily than would individuals low in approach social goals, and that individuals with strong avoidance social goals would weigh negative features more heavily than would individuals with weaker avoidance social goals. We operationalized positive and negative features as momentary feelings of passionate love and insecurity, respectively.

METHOD

Participants

Participants were 48 students (18 men, 30 women) recruited from the University of California, Los Angeles, commu-

nity¹ through advertisements for a study on motivation and relationships. To be eligible for the study, a student had to be involved in a “long-term romantic relationship” and to have daily contact with the romantic partner (only one member of a couple was eligible). The average age of participants was 21.8 years ($SD = 4.37$; range = 18–40 years); they had been dating their partners an average of 28.78 months (2.40 years; $SD = 28.24$ months; $Mdn = 24$ months; range = 2–168 months); 13 participants lived with their partners; 5 were engaged and 3 were married. Participants reported spending an average of 6.7 waking hours alone with their partners each day ($SD = 3.9$) the previous week. They were paid \$40.00. Participants were contacted 6 months later to determine their relationship status. Thirty-one (65%) responded; of these, 6 (19%) had broken up with their partner.

Procedure

Participants reported to the laboratory for an initial questionnaire session; they provided demographic information and completed individual difference and general relationship-quality measures. The experience-sampling portion of the study began the following day and lasted for 10 days. Participants were issued a Palm Pilot programmed to randomly beep eight times between the hours of 10 a.m. and 10 p.m. They were instructed on how to operate the device and how to silence the beep when engaged in activities that prevented them from responding (e.g., during class). Participants were told to complete an assessment each time they heard the signal, and each Palm Pilot was programmed to turn off if the participant did not attend to the signal within 2 min. Participants were instructed to complete the measures only if they could do so privately (e.g., out of their partner's view) and safely (e.g., not while driving on the freeway). They were not able to turn on the device to initiate a signal; thus, if they missed a signal, that assessment was missing.

At the same session, participants were given instructions for completing the end-of-day assessments. They were given the phone number to a voice-mail box and an e-mail address and were instructed to call in or e-mail each night before going to bed. All participants were given a laminated card with their subject ID number and the end-of-day question (with response scale) printed on it. They simply called or sent an e-mail, giving their ID number and the number corresponding to their response. Experimenters retrieved participants' data each day, and reminders were sent to those who failed to respond, to encourage them to remember the following evening. Only end-of-day assessments received by noon the following day were considered valid.

¹Eleven additional participants completed the initial questionnaire session, but their devices failed during experience sampling ($n = 5$) or they failed to complete the end-of-day assessments and experience-sampling questions on the same days ($n = 6$). These participants did not differ from those with usable data in length of relationship, strength of approach and avoidance social goals, or the initial measure of relationship satisfaction.

One-Time Measures

The one-time measures were administered at the initial questionnaire session.

Positive and Negative Affectivity

The 20-item Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) was used to measure general individual differences in positive affectivity (PA; $\alpha = .82$) and negative affectivity (NA; $\alpha = .78$).

Social Goals

Approach and avoidance social goals were measured with the Approach and Avoidance Social Goals Scale (Elliot et al., 2006), which consists of eight items referencing close relationships and friendships (four avoidance and four approach statements). An example avoidance item is “I will be trying to make sure that nothing bad happens to my close relationships,” and an example approach item is “I will be trying to enhance the bonding and intimacy in my close relationships.” Participants responded on 7-point scales (1 = *not at all true of me*, 7 = *very true of me*) to indicate what they would be trying to do throughout the next few months ($\alpha = .86$ for the approach subscale and $.75$ for avoidance subscale). The correlation between the two subscales was significant in this study, $r = .61$, $p < .01$. In analyses, the two goals were entered simultaneously to account for this shared variance.

Relationship Satisfaction

Overall relationship satisfaction was measured with Rusbult, Martz, and Agnew’s (1998) Satisfaction Scale, which consists of five items. Example items are “I feel satisfied with our relationship” and “My relationship is much better than others’ relationships.” Participants responded on a 9-point scale (1 = *don’t agree at all*, 9 = *agree completely*; $\alpha = .93$).

Signaled Measures

Momentary Positive Feelings About the Relationship

Three modified items from the Passionate Love Scale (Hatfield & Sprecher, 1986) were used to assess positive relationship feelings: “Right now, I feel excited thinking about the next time my partner and I will be together”; “Right now, my partner seems to be on my mind”; and “Right now, I possess a powerful attraction to my partner.” Participants responded on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*). The signal-level (ignoring day and person), day-level (collapsing across signals, ignoring person), and person-level (collapsing across signal and day) alphas were $.75$, $.80$, and $.85$, respectively. A composite score of positive feelings at each signal was created by averaging responses to the items, and a day-level score was calculated by averaging the composite score across the signals the participant responded to that day. The mean day-level score was 5.31 ($SD = 1.06$).

Momentary Negative Feelings About the Relationship

We created three items based on the anxiety dimension of Brennan, Clark, and Shaver’s (1998) attachment scales to assess negative relationship feelings: “Right now, I feel like my partner and I could be closer”; “Right now, I feel insecure in my relationships”; and “Right now, I feel I need reassurance that I am loved.” Participants responded on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*). The signal-level (ignoring day and person), day-level (collapsing across signals, ignoring person), and person-level (collapsing across signal and day) alphas were $.75$, $.80$, and $.84$, respectively. A composite score of negative feelings at each signal was created by averaging responses to the items, and a day-level score was calculated by averaging the composite score across the signals the participant responded to that day. The mean day-level score was 2.65 ($SD = 1.31$).

Activities

To assess activities important in a relationship, we asked participants whether they had “done anything fun” (“yes” or “no”) and “had any arguments” (“yes” or “no”) with their partner since the last beep. The percentage of signals (across the day) at which participants reported having done something fun with their partner was 31, and the percentage of signals at which they reported having had an argument with the partner was 5.

End-of-Day Measure: Relationship Satisfaction

Daily relationship satisfaction was assessed with a single item, “How was your relationship today?” Participants responded using a 7-point scale (1 = *terrible*, 4 = *OK*, and 7 = *terrific*). The mean score was 5.50 ($SD = 1.15$).

RESULTS

Our central analyses predicted end-of-day reports from thoughts about the relationship collected throughout the day. Thus, we could analyze only data from days on which participants both completed the end-of-day assessment and responded to at least one signal during the day. Participants completed both kinds of assessments on a total of 414 days (86.25% of all possible days), an average of 8.62 days ($SD = 1.7$; range = 3–10) per person. They responded to an average of 5.9 beeps ($SD = 1.9$; range = 1–8) on these valid days.² Data were analyzed using multilevel modeling techniques in the HLM computer program (HLMwin v. 6.02; Raudenbush, Bryk, Cheong, & Congdon, 2004). The data set had two levels, days nested within persons. Level 1 (i.e., daily) predictors were centered around each individual’s mean across the study. This technique, known as group-mean centering, accounts for between-persons differences on the predictor variables and assesses whether day-to-day changes from a participant’s own mean were associated with changes in the outcome variable, consequently unconfounding between- and

²All means and alphas reported are based on valid days.

within-persons effects. Intercepts were modeled with random components free to vary; we report the unstandardized coefficients.³

We constructed a model in which momentary positive thoughts and momentary negative thoughts were tested simultaneously as predictors. In this model, the z scores of the approach- and avoidance-goal variables were included as moderators of the intercept and both slopes.⁴ Overall (and not surprisingly), we found that positive thoughts positively predicted end-of-day satisfaction, $b = 0.31$, $t(405) = 2.65$, $p < .01$, and negative thoughts negatively predicted end-of-day satisfaction, $b = -0.16$, $t(405) = 2.04$, $p < .05$. These results indicated that on days the average participant⁵ had more positive (passionate) and fewer negative (insecurity) thoughts about his or her partner, the average participant was more satisfied with his or her relationship overall. However, the intercept and both slopes were moderated by goals. Specifically, the effect of approach goals on the intercept was significant, $b = 0.23$, $t(45) = 2.06$, $p < .05$, and the effect of avoidance goals on the intercept was marginally significant, $b = -0.19$, $t(45) = 1.70$, $p < .10$. In short, participants with strong approach goals were more satisfied than those with weak approach goals, and participants with strong avoidance goals were less satisfied than those with weak avoidance goals, on a daily basis.

Testing our critical hypotheses, we found a significant effect of approach goals on the slope for momentary positive thoughts, $b = 0.29$, $t(405) = 2.41$, $p < .05$; but avoidance goals did not moderate the positive-thoughts slope, $b = -0.10$, $t(405) = 0.82$, $p > .40$. Also, we found a significant effect of avoidance goals on the slope for momentary negative thoughts, $b = -0.27$, $t(405) = 2.48$, $p < .05$, and although approach goals did not significantly moderate the negative-thoughts slope, there was a marginal effect in the opposite direction, $b = 0.19$, $t(405) = 1.8$, $p < .10$. As the top panel of Figure 1 shows, participants with strong approach goals heavily weighed positive thoughts in their end-of-day assessments (slope = 0.59), but positive thoughts contributed virtually nothing to end-of-day assessments among participants with low approach goals (slope = 0.01). Also, the bottom panel of Figure 1 shows that participants with strong avoidance goals heavily weighed negative thoughts in their end-of-day assessments (slope = -0.43), but participants with low avoidance goals had a small slope in the opposite direction (slope = $+0.11$). In short, the amount that increases in positive and negative thoughts about the relationship contributed to overall feelings of satisfaction differed in accordance with an

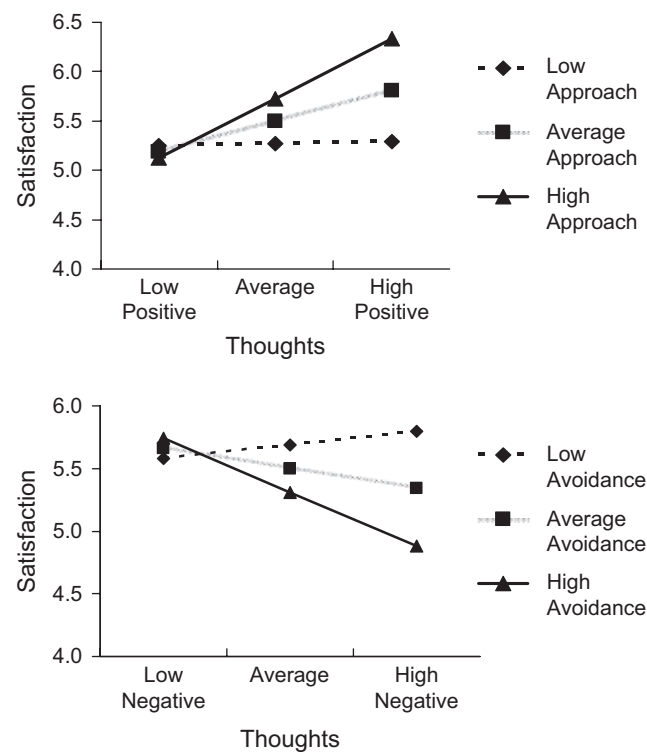


Fig. 1. Associations between momentary thoughts about the partner and end-of-day relationship satisfaction. The top graph shows results for positive thoughts of passion, separately for participants with low, average, and high approach goals, and the bottom graph shows results for negative thoughts of insecurity, separately for participants with low, average, and high avoidance goals. *Low* represents scores at 1 standard deviation below the mean on the goal or thoughts measure, *average* represents scores at the mean on the goal or thoughts measure, and *high* represents scores at 1 standard deviation above the mean on the goal or thoughts measure.

individual's social goals, such that positive thoughts were meaningful to participants high on approach, and negative thoughts were meaningful to those high on avoidance. These results are particularly interesting because the analyses accounted for differences in the experience of negative and positive thoughts throughout the day, such that coefficients represent changes in end-of-day assessments associated with deviations from participants' own averages in momentary thoughts.

We constructed additional models that controlled for initial relationship satisfaction, daily activities (percentage of responses in which participants indicated having done something fun or having an argument with the partner⁶), and sex of participant; the hypothesized moderating effects of goals remained significant in these models. In addition, three-level models

³In addition, we tested models in which the predictor variable was not centered. The results of these models were similar to those of the models using group-mean-centered predictors.

⁴We also tested approach and avoidance goals separately as moderators to rule out suppression effects. Approach goals significantly moderated the slope for positive thoughts ($b = 0.21$, $p < .05$). Avoidance goals were a marginally significant moderator of the slope for negative thoughts ($b = -0.16$, $p = .08$).

⁵In this model, the average participant is one who scored at the mean for both approach and avoidance social goals.

⁶Daily activities were not tested as predictors of end-of-day satisfaction in the same manner as thoughts because the occurrence of these activities required the partner's presence since the last signal (between 10 a.m. and 10 p.m.). To estimate the amount of time partners were together, we asked participants if their partner was present at the time of the beep. The percentage who said "yes" (34%) varied considerably from day to day and person to person. Thus, activities or lack thereof was likely to be heavily influenced by random factors, such as the partner's work schedule.

(signals nested within days, nested within person) were constructed to assess whether time of day when the signal occurred was related to momentary thoughts. Time of the signal was unrelated to negative thoughts about the partner; however, positive thoughts about the partner did increase later in the day, $b = 0.02$, $t(2411) = 4.1$, $p < .01$. This effect was not moderated by either approach or avoidance goals ($ps \geq .25$). Nevertheless, we constructed an additional three-level model controlling for time of day of the signal to determine whether strength of approach goals remained a significant moderator of the influence of positive thoughts on end-of-day satisfaction, and it did ($p < .05$).

Individual differences in PA and NA were tested as possible alternative explanations for the pattern of results. For example, participants with high PA scores could have reported stronger approach goals and weighed positive thoughts more heavily in their end-of-day satisfaction ratings than those with low PA scores. Approach and avoidance social goals were not significantly correlated with PA or NA (rs ranged from .022 to $-.16$, $ps > .25$). In addition, when PA and NA were modeled as moderators of the associations of passion and insecurity with satisfaction, they were not significant predictors of either slope ($ps > .25$). Finally, all of our hypothesized effects of goals remained significant when PA and NA were included in the models ($ps < .05$). Thus, there is no evidence that individual differences in PA and NA could account for our findings.⁷

A final question was whether the end-of-day assessments of relationship satisfaction were meaningful in terms of long-term outcomes. That is, were the global assessments of relationship satisfaction correlated with future relationship status? To answer this question, we examined the data from the 31 participants who responded to the follow-up, comparing the 25 respondents who remained in the same relationships with the 6 who were no longer with their partners. Using analysis of variance with length of relationship at the time of the study as a covariate, we found that participants who broke up with their partners had significantly lower end-of-day satisfaction than those who remained with their partners, $F(1, 28) = 5.19$, $p < .05$ (estimated marginal means = 4.93, $SE = 0.30$, and 5.68, $SD = 0.15$, respectively). The two groups did not differ on initial satisfaction ratings, approach goals, avoidance goals, positive momentary thoughts, or negative momentary thoughts ($ps > .10$).

DISCUSSION

Every day, relationship partners have myriad interactions with one another and may experience an array of feelings and thoughts about their relationship. Some of these interactions,

thoughts, and feelings are pleasant, positive, and rewarding; and some of these interactions, thoughts, and feelings are unpleasant, negative, and threatening. However, differences in how people integrate the good, the bad, and the mundane experiences surrounding their relationships into global perceptions of relationship quality and decisions about whether to stay or leave have been largely unexamined. The current study provides convincing evidence that many individuals do not treat different thoughts about the relationship equally. Individuals who were actively pursuing incentives (high approach) based their evaluation of relationship satisfaction on the presence or absence of positive thoughts of passion. Individuals who were actively avoiding threats based their evaluation of relationship satisfaction on the presence or absence of negative thoughts of insecurity.

Although the pattern of results obtained here could be seen as evidence for bias, we would disagree with this characterization. Rather, we interpret this pattern of results as indicating that there are individual differences in the meaning of relationship satisfaction. For some people, changes in active positive thoughts (such as passion) may not be diagnostic of relationship quality, whereas for others, this information is critical. Likewise, for some people, changes in active negative thoughts (such as insecurity) are irrelevant to satisfaction judgments, but for others, these thoughts may be the sole determinant of satisfaction.

Our results have many implications, not the least of which concern intervention strategies aimed at changing the pattern of thoughts about the partner. It may be that even if such attempts are successful at changing positive or negative thoughts about the partner, these changes may have little effect on relationship satisfaction. Another implication is that individuals with strong avoidance goals may be setting themselves up for dissatisfaction, especially as the relationship becomes increasingly interdependent and the inevitable doubts and insecurities surface.

Our focus on thoughts and not on interactions in the current study contributes to our confidence that other processes known to be associated with approach and avoidance motivation—particularly reactivity to negative events and exposure rates to positive events—did not account for the findings. Previous research found that avoidance goals predicted differences in reactivity to negative events, and approach goals predicted exposure to positive events (Gable, Reis, & Elliot, 2000), and these effects may indeed lead to differences in thoughts about the partner. However, it would be difficult to see how event reactivity or exposure could account for the weighing of those thoughts.

Future research is needed to determine whether factors other than the thoughts examined here show similar patterns of associations with global satisfaction evaluations. For example, do behaviors such as the occasional rebuff or criticism from a partner carry more weight in satisfaction judgments for individuals with strong avoidance goals than for those with weak

⁷We also assessed neuroticism, extraversion, and overall feelings of passionate love as possible third-variable explanations. Social goals were not significantly correlated with these variables (although neuroticism did have a marginally significant correlation with avoidance goals). We also ran three additional versions of our critical model that included these variables; they did not significantly moderate slopes for positive or negative thoughts, and the coefficients for social goals remained significant (or marginally significant).

avoidance goals? Does the unexpected gift or loving gesture carry more weight for individuals with strong approach goals than for those with weak approach goals?

In the current research, we examined the influence of differences in current goals on subjective evaluation. The source of these differences is likely part dispositional and part situational. Previous work has found that individual differences in sensitivity to reward and punishment are rather stable (e.g., Carver & White, 1994), yet approach and avoidance goals have been experimentally manipulated and are thus likely sensitive to the current environment (e.g., Elliot & Harackiewicz, 1994; Strachman & Gable, 2006). Regardless of the source of differences in the strength of approach and avoidance goals, our results show a possible mechanism through which social goals affect outcomes: the use of different weighting functions in the algorithms for subjective satisfaction evaluations. In a deeper sense, researchers may sometimes be comparing apples and oranges when examining people who report the same satisfaction level. For some, being satisfied may mean feeling passionate; for others, it may mean feeling secure; and for still others, it may mean both.

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