

The Cognitive and Hedonic Costs of Dwelling on Achievement-Related Negative Experiences: Implications for Enduring Happiness and Unhappiness

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Increasing evidence suggests that multiple cognitive and motivational processes underlie individual differences in happiness (Lyubomirsky, 2001, 2008). One behavior that is associated with (un)happiness is self-reflection or dwelling. We hypothesized that unhappy individuals would be inclined to dwell about themselves, and that this behavior would have a variety of adverse consequences. Three studies tested the prediction that, unlike their happier peers, unhappy participants would be sensitive to unfavorable achievement feedback, likely to dwell about its implications and, hence, show impaired attention during important academic tasks. The results of Studies 1 and 2 showed that unhappy participants who had “failed” relative to peers subsequently displayed increased interfering thoughts; spent the most time performing a portion of the graduate record examination; and later demonstrated impaired reading comprehension. Study 3 experimentally induced versus inhibiting dwelling and found that the manipulation only impacted unhappy students. Implications of our results for the consequences of dwelling for work and social functioning, as well as for detracting from enduring happiness, are discussed.

Keywords: happiness, dwelling, rumination, social comparison, cognitive interference

“Finish each day and be done with it. You have done what you could; some blunders and absurdities have crept in; forget them as soon as you can. Tomorrow is a new day; you shall begin it serenely and with too high a spirit to be encumbered with your old nonsense.” – Ralph Waldo Emerson

In a memorable scene from *Annie Hall*, Woody Allen’s character approaches an attractive, cheery couple on a Manhattan street. “You look like a very happy couple . . . How do you account for it?” he asks. “I am very shallow and empty, and I have no ideas and nothing interesting to say,” the woman replies. “And I am exactly the same way,” adds the man.

The suggestion implicit in this scene—that happiness is equated with a want of self-examination—meets with much folk wisdom and some derision. The corresponding notion is that unhappy folks are the ones who engage in thoughtful self-analysis, deep introspection, and insightful reflections about world affairs. The focus of this paper is on the purported link between unhappiness and dwelling. Our premise is that unhappy people do, indeed, engage in greater dwelling than their happier peers. However, their dwelling on themselves and their world is not thoughtful and insightful, but rather maladaptive and disruptive—a cognitive process that

brings to bear a host of adverse outcomes and may ultimately both result from and promote unhappiness.

Cognitive and Motivational Processes in Well-Being

A rich tradition of theory and research has tackled the millennia-old question of what is happiness—its character, determinants, and consequences (see Diener, Suh, Lucas, & Smith, 1999; Lyubomirsky, 2001, 2008; Lyubomirsky, King, & Diener, 2005, for reviews). Increasing evidence suggests that, rather than “objective” circumstances, a set of subjective psychological processes, such as goal seeking, comparisons, and coping responses, are associated with individual differences in happiness. Such work supports a construal theory of happiness—that is, multiple cognitive and motivational processes moderate the impact of events and circumstances on well-being (Lyubomirsky, 2001). A construal framework suggests that to understand the nature of enduring happiness (and unhappiness), we must understand the cognitive and motivational processes that characterize happy (and unhappy) people. Supporting this model, dispositionally happy and unhappy individuals have been found to differ in ways consistent with their respective temperaments in hedonically relevant psychological processes, such as social comparison, dissonance reduction, regret, self-evaluation, and person perception (Lyubomirsky & Ross, 1997; Lyubomirsky & Tucker, 1998; Lyubomirsky, Tucker, & Kasri, 2001).

For example, a series of studies has shown that unhappy individuals appear to be relatively more sensitive to information carrying *hedonic stakes*—especially unpleasant ones—such as feedback about the performance of their peers or the outcomes of personal decisions. In experiments that expose students to unfavorable social comparisons (e.g., a competing team receives a

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higher score), unhappy participants show significant declines in their moods, self-confidence, and evaluations of abilities (Lyubomirsky & Ross, 1997; Lyubomirsky et al., 2001). Notably, this research on the cognitive processes that distinguish happy people from their less happy peers has a complement in the depression literature, which has shown persuasively that negative cognitive and attributional styles contribute to the etiology and maintenance of depressive episodes (e.g., Abramson, Metalsky, & Alloy, 1989; Beck, 1967; Persons & Miranda, 1992).

In sum, past research has brought into relief some critical differences between how happy and unhappy folks construe themselves, their lives, their peers, and the world around them. Less happy individuals appear to experience and react to events and circumstances in relatively less positive and less adaptive ways, which seem to support their unhappiness and negative self-views (Lyubomirsky, 2001; Lyubomirsky & Tucker, 1998; for parallel research on dysfunctional thinking and depression, see Abramson, Seligman, & Teasdale, 1978; Beck, 1967; Hollon, 2006, among others). A critical question concerns the causal direction of these effects. Two literatures bearing on this issue suggest that the causality is bidirectional. First, emerging work with randomized controlled happiness-enhancing interventions shows that effortfully practicing particular cognitive strategies (e.g., thinking optimistically or gratefully) reliably increases happiness in the short term and for as long as 6 months later (for reviews, see Boehm & Lyubomirsky, 2009; Lyubomirsky, 2008; Sin & Lyubomirsky, 2009). Second, a meta-analysis of 225 correlational, longitudinal, and experimental studies proffers evidence that happiness (and the positive emotions that accompany it) leads people to think and behave in ways that foster success (e.g., by perceiving the self—and one's health, relationships, and jobs—more positively and charitably, and coping effectively with stress; Lyubomirsky, King, et al., 2005). In this paper, we report three studies examining the role of another critical cognitive process associated with unhappiness—namely, dwelling.

What's So Bad About Dwelling?

Recent laboratory research suggests that, when faced with hedonically unpleasant or objectionable information, unhappy individuals appear to monitor such information carefully and conscientiously—for example, by exerting effort to bolster their well-being and self-esteem by actively (albeit unsuccessfully) pursuing favorable ways to compare themselves with others (Lyubomirsky & Ross, 1997; Lyubomirsky et al., 2001). Extending this reasoning, in the present research, we predicted that unhappy participants (but not happy ones) would be inclined to dwell—that is, think in repetitive or circular fashion—about themselves, their outcomes, and their moods. Notably, such dwelling was expected to have a variety of adverse consequences.

Preliminary self-report data show that unhappy individuals are prone to dwell on negative life events, to be introspective and self-preoccupied, to be self-conscious, and to focus on their (often negative) moods (Lyubomirsky & Kasri, 2009). Furthermore, research on related constructs (e.g., rumination, self-focused attention, self-consciousness, intrusive thinking, and self-awareness) suggests that excessive, chronic, and intrusive dwelling is associated with a host of adverse outcomes (see Lyubomirsky & Tkach, 2004; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008, for re-

views; cf. Greenberg & Pyszczynski, 1986; Robinson & Alloy, 2003). Depressed and neurotic individuals, as well as those displaying generalized, social, and test anxiety, score higher on measures of self-consciousness and self-focused attention (see Ingram, 1990; Musson & Alloy, 1988; Pyszczynski & Greenberg, 1987, for reviews), suggesting that high levels of thinking about the self are symptomatic of psychological disorder, not psychological health (for work on adaptive forms of self-focusing, see Segerstrom, Stanton, Alden, & Shortridge, 2003; Trapnell & Campbell, 1999).

In the present research, we focus on two particular pernicious consequences of dwelling—namely, cognitive interference and impaired concentration. When people persist in dwelling on themselves, even when a situation calls for refocusing on a particular task or goal, their chronic self-examination is likely to consume valuable cognitive resources and harm concentration. For example, a student who just received disappointing news about a test may find herself unable to concentrate on her studying, reading the same sentences over and over again, as her mind keeps wandering to her test results. Similarly, a husband's thoughts about a recent fight with his wife or about a distressing diagnosis are likely to impair his concentration while socializing or working.

Chains of recurring thoughts, questions, and self-reflections about a previous failure represent a common, even adaptive, reaction—a way of processing, assimilating, and learning from the setback (e.g., Carver, 1996; Clark, 1996). However, research suggests that some people have a difficult time inhibiting, self-distracting, or disengaging from such thoughts (Joormann, 2004; Linville, 1996), with adverse results. If a student is unable to stop dwelling on her test grade (or the quarrel she had last night), she will be unable to direct her full attention to the task at hand (studying for a subsequent test or working on an urgent project) and, ultimately, will end up harming her performance. In other words, dwelling that is characterized by intrusive and repetitive thoughts, images, and memories can produce undesirable cognitive interference.

Not surprisingly, ruminative, intrusive thoughts have been found to deplete people's cognitive resources, tax short-term memory (Krames & MacDonald, 1985), and impair their abilities to concentrate on task-relevant cognitions and behaviors (Martin & Tesser, 1989; Muraven, Tice, & Baumeister, 1998; Sarason, Sarason, Keefe, Hayes, & Shearin, 1986). For example, in a series of studies, dysphoric students induced to ruminate about themselves and their moods spent more time completing both important and trivial academic tasks and reported having more difficulty concentrating while performing those tasks than dysphoric students induced to distract themselves (Lyubomirsky, Kasri, & Zehm, 2003). Cognitive interference has also been shown to be a critical mediator of the relationship between poor performance and social anxiety, test anxiety, stress, and worry (Klinger, 1984; Mathews, 1990; Sarason, 1984; Segal, 1996). In the current research, we propose that unhappy individuals faced with unflattering achievement-oriented feedback will experience a similar form of cognitive interference and, as a result, will endure similar negative consequences.

The Current Studies

The present research sought to integrate the distinct literatures discussed above in a single set of studies. Accordingly, our three

studies used a diverse set of measures of dwelling and its consequences and shared several common features. In Studies 1 and 2, self-nominated happy and unhappy students were first led to believe they either “succeeded” or “failed” relative to their peers at an anagram-solving task. We predicted that, unlike their happier peers, unhappy participants would be sensitive to unfavorable (vs. favorable) achievement-related feedback, dwell about its implications and, hence, show relatively higher levels of negative moods, negative thoughts, and impaired attention and performance during important academic tasks. Study 3 extended these quasi-experimental findings, by testing whether it is the combination of unhappiness and dwelling (triggered by failure) that produces adverse outcomes, and not either factor alone. In this study, happy and unhappy students all experienced failure and then were induced either to dwell or to inhibit their dwelling (via distraction).

Study 1

Our first study, set in an academic domain, required students to complete the verbal portion of the graduate record examination (GRE) and allowed us to assess some of the pernicious consequences of dwelling. Because the GRE task was performed entirely on a computer, we were able to assess students’ pace and performance on the task, as well as the number of times that they returned to reread previously encountered material. If unhappy individuals are more inclined to dwell on negative feedback, they would be expected to experience relatively more interfering, off-task thoughts during such academic tasks as the GRE, and, thus, to read more slowly and less accurately.

This study conferred unfavorable comparison (or “relative failure”) feedback by means of a real-life peer, who performed alongside the participant in the laboratory. In addition, we included a control (i.e., no false feedback) condition, as well as a condition that allowed us to test whether unhappy individuals dwell on all unfavorable feedback, or whether they are able to disengage from dwelling if given an opportunity to discount the information. We hypothesized that unhappy students would reveal the signs and consequences of dwelling—namely, impaired concentration and reduced pace—after underperforming on an academic task relative to a peer, but only when they are unable to discount the peer’s performance.

Method

Overview

Our false feedback manipulation required happy and unhappy students to solve anagrams either alone (control condition) or in the presence of a peer (actually an experimental confederate) who solved the same set of anagrams at a pace much faster than themselves (*relative failure* conditions). In the *relative failure-relevant* condition, both the participant and the confederate were instructed to solve the same number of anagrams, but in the *relative failure-nonrelevant* condition, the participant learned that the peer was required to solve half as many anagrams (thus gaining an opportunity to discount the peer’s faster rate). Following the anagram task, students read an 8-paragraph passage from the GRE, which was presented on a series of computer screens, and answered 12 surprise multiple-choice questions about this passage.

The time it took them to read each segment of the reading passage was recorded by the computer. Participants also reported their level of concentration and understanding of this “reading task.”

Participants

Introductory psychology students at a large public university ($N = 74$; mean $[M]_{\text{age}} = 19.8$, standard deviation $[SD] = 3.32$) received either course credit or \$5 for their participation. Although data regarding ethnicity were not collected, the participant pool is approximately 40% Asian, 20% Latino(a), 25% Caucasian, 10% African American, and 5% “other.”

Participants were selected on the basis of their responses to the four-item Subjective Happiness Scale (SHS; Lyubomirsky & Lepper, 1999), which was presented as part of an omnibus questionnaire administered earlier. The first two items on the scale ask respondents to characterize themselves using absolute ratings (1 = *a very unhappy person*; 7 = *a very happy person*) and relative to their peers (1 = *much less happy*; 7 = *much more happy*), respectively. The third and fourth items respectively characterize happy people (“Some people are generally very happy; they enjoy life regardless of what is going on, getting the most out of everything”) and unhappy people (“Some people are generally not very happy; although they are not depressed, they never seem as happy as they might be”) and ask participants to what extent each characterization describes them (1 = *not at all*; 7 = *a great deal*). Responses to the four items, which showed good internal consistency (Cronbach’s $\alpha = .85$), were combined and averaged to provide a single composite score, ranging from 1 to 7.¹ A sample of 39 “happy” (30 female and 9 male) and 35 “unhappy” (25 female and 10 male) participants (i.e., those whose composite scores were above and below the median, respectively, on the SHS) were recruited by telephone. The mean happiness score was 5.54 ($SD = 1.17$) for happy participants and 4.05 ($SD = 0.72$) for unhappy participants.

Scores on the Beck Depression Inventory (BDI; Beck, 1967) were also collected from the same omnibus questionnaire, and students with scores of 16 and above—those classified as mildly to moderately depressed—were excluded from all our studies (see Beck & Beamesderfer, 1974).

Procedure and Materials

Design. The design was a 2×3 fully crossed factorial, with two levels of happiness status (happy vs. unhappy) and three levels

¹ This composite measure of global subjective happiness has been found to have good to excellent validity and reliability in dozens of studies with diverse populations. For example, the SHS has demonstrated high internal consistency (α range from .85 to .95 in seven different studies), a unitary structure, high test-retest stability ($r = .90$ for 4 weeks and 0.71 for 3 months), and a strong association with informant ratings ($r = .65$). It further has shown high correlations with measures of theoretically related constructs, such as resilience ($r = .45$; Smith et al., 2008), optimism (r range from .47 to .62 in four studies; Scheier & Carver, 1985), self-esteem (r range from .53 to .58 in four studies; Rosenberg, 1965), extraversion ($r = .36$; Eysenck & Eysenck, 1975), and positive emotionality ($r = .48$; Tellegen, 1985), suggesting that happiness is related, but not equivalent, to these constructs. For more detailed information on this measure, see Lyubomirsky and Lepper (1999).

of feedback (relative failure-relevant, relative failure-nonrelevant, and control). In the relative failure-relevant condition ($n_s = 10$ and 13, for the unhappy and happy groups, respectively), the confederate solved anagrams at a much faster pace than the participant, and the participant was led to believe that this other “subject” was solving the same number of anagrams as him or her. In the relative failure-nonrelevant condition ($n = 12$ for both unhappy and happy participants), the confederate also solved anagrams at a faster pace than the participant, but this time the participant was told that the other “subject” was required to solve fewer anagrams per card. In the control condition ($n_s = 13$ and 14 for the unhappy and happy groups, respectively), students performed the anagram task alone.

Introduction and preliminary questionnaire. The experiment was introduced as a study of “cognitive performance” and “cognitive styles.” Accordingly, all were told that they would spend 15 min solving a series of anagram puzzles during the experimental session. To bolster this cover story, a number of filler items—including questions about how often participants solved puzzles, how much they enjoyed them, how important it is for them to be good at them, as well as their scholastic aptitude test scores (SAT)—were embedded in the various questionnaires administered throughout the study.

Anagram-solving task and false feedback manipulation. After the participants had completed the preliminary “filler” questionnaire, a male experimenter, who was unaware of participants’ happiness status, gave instructions for the anagram-solving task, modeled after a procedure developed by Lyubomirsky and Ross (1997, Study 1). He began by handing each participant a sample puzzle card containing three anagrams—that is, Y-O-W-N-S (SNOWY), N-O-T-I-X (TOXIN), and A-S-S-I-B (BASIS)—and indicated that such cards would be used throughout the task. In all three conditions, the participants were instructed to solve two out of three anagrams on each card before proceeding to the next one. In the two relative failure conditions, however, presumably “to save time,” a fellow student solved anagrams alongside each participant. This student, actually a confederate, was asked to solve either two out of three anagrams (relative failure-relevant condition) or one out of three anagrams (relative failure-nonrelevant condition). The assignment to solve “2 out of 3” versus “1 out of 3” anagrams was ostensibly based on a preprinted randomized schedule. At this point, the experimenter further explained that upon unscrambling any two anagrams on each anagram card, participants were to write their solutions and the card number on their answer sheet, then hand the card back to the experimenter and receive a new card containing new anagrams. Participants were also given a notebook to use as scratch paper (one page per card). In the two relative failure conditions, the back-and-forth handing of the anagram cards as the participant and the confederate worked side-by-side throughout the 15-min period, along with the consecutive numbering of the cards and the turning of notebook pages, served to make it highly salient to participants that their “peer” was performing at a faster pace. However, the peer’s faster pace could be discounted in the relative failure-nonrelevant condition (as the peer’s task was easier), but not in the relative failure-relevant condition (as the peer’s task was identical to that of the participant).

Reading task. Participants were then given instructions for the “reading task”—an achievement test ostensibly being pretested for a study on indicators of academic success. A reading passage

from the GRE (about the career of D. W. Griffith) was presented in eight segments, each on a separate computer screen. Students were told to use the mouse to advance to the “next page” or return to the “previous page.” After these instructions were given, participants stayed in the experimental room to perform the task. In the two false feedback conditions, to avoid arousing the participant’s suspicions, the confederate was led outside (ostensibly to “another computer”).

A HyperCard program recorded how long it took students to read each passage segment and tracked their progress through the screens. When participants reached the last segment of the passage, instructions appeared on the screen to call the experimenter. The experimenter then gave participants a scantron sheet to use in answering 12 (“surprise”) questions about the passage that they had just read. Each question was presented on a separate computer screen, and the computer recorded how long it took participants to answer each question.

Follow-up questionnaire. After finishing the questions about the reading passage, participants were asked to rate how well they were able to concentrate and how well they were able to understand the passage (1 = *not at all*, 7 = *a great deal*). As a manipulation check, they were also asked to recall how many anagrams per card the “other subject” (i.e., the confederate) had been asked to solve.

Results and Discussion

Because no main effects or interactions emerged with sex, all analyses were conducted by collapsing across this variable.

Manipulation Checks

Overall, participants solved a mean of 10.8 anagrams ($SD = 1.40$) during the allotted 15-min period. An analysis of variance (ANOVA) revealed no significant differences in the number of anagrams solved between happy and unhappy participants or among the three experimental conditions (both $F_s < 1$).

In the two relative failure conditions, participants correctly recalled the experimenter’s instructions for the number of anagrams to solve per card. That is, in the relative failure-relevant condition, they recalled that the confederate was instructed to solve two anagrams per card ($M = 1.95$, $SD = 0.38$) and, in the relative failure-nonrelevant condition, they correctly recalled that the confederate was instructed to solve only one anagram per card ($M = 1.00$, $SD = 0.00$).

Overview of Statistical Analyses

We hypothesized, first, that the failure-relevant group would show a slower reading pace and poorer reading comprehension, as well as report a compromised ability to concentrate and understand the passage, than the failure-nonrelevant and control groups. Importantly, we predicted that *unhappy* participants in the failure-relevant condition, in particular, would primarily account for this difference among the three experimental conditions. To test these a priori hypotheses, three sets of planned contrasts were conducted (Rosenthal & Rosnow, 1985; see also Rosnow & Rosenthal, 1989): (a) comparing the relative failure-relevant group to the relative failure-nonrelevant and control groups; (b) comparing

unhappy participants in the relative failure-relevant condition with those of the other five conditions; and (c) comparing happy and unhappy participants within the relative failure-relevant condition.

Reading Pace

In most academic settings, test time is closely linked with test performance (Mandinach, Bridgeman, Cahalan-Laitusis, & Trapani, 2005). Thus, an important indicator of performance is the amount of time a student takes to read or complete an exam. As predicted, a planned contrast revealed that participants in the relative failure-relevant condition (where the supposed peer solved the same number of anagrams at a much faster rate) spent more time on the entire reading task (i.e., reading the GRE passage and answering questions) than participants in the relative failure-nonrelevant and control conditions, $F(1,67) = 13.33, p < .001, r = .41$. Important, according to a planned contrast, most of this difference was apparently owed to the unhappy participants in the relative failure-relevant condition, who spent the most time (in min) on the reading task of the six groups ($M_s = 10.11$ vs. 7.64), $F(1, 67) = 13.42, p < .001, r = .41$ (see Figure 1, top left). Also,

unhappy students in the relative failure-relevant condition spent more time reading than happy participants in the same condition ($M_s = 10.11$ vs. 8.44), $F(1, 67) = 4.03, p < .05, r = .24$. Notably, although we do not report them in the interest of space, an identical pattern of results was found after decomposing this finding into two parts—time to read the passage and time to answer the multiple-choice questions.

Illuminating the above results, unhappy students who were outperformed by a peer reread parts of the GRE passage more frequently than those in the other five groups, $F(1, 67) = 7.43, p < .01, r = .32$ (see Figure 1, top right), and more frequently than happy students in the same condition, $F(1, 67) = 5.81, p < .05, r = .28$. However, when results are combined for the happy and unhappy students, the responses of those in the failure-relevant condition did not differ from those in the failure-nonrelevant or control conditions ($F = 2.48$).

Reading Comprehension

Disconfirming our hypothesis, no significant group differences were found for reading comprehension, as indicated by scores on

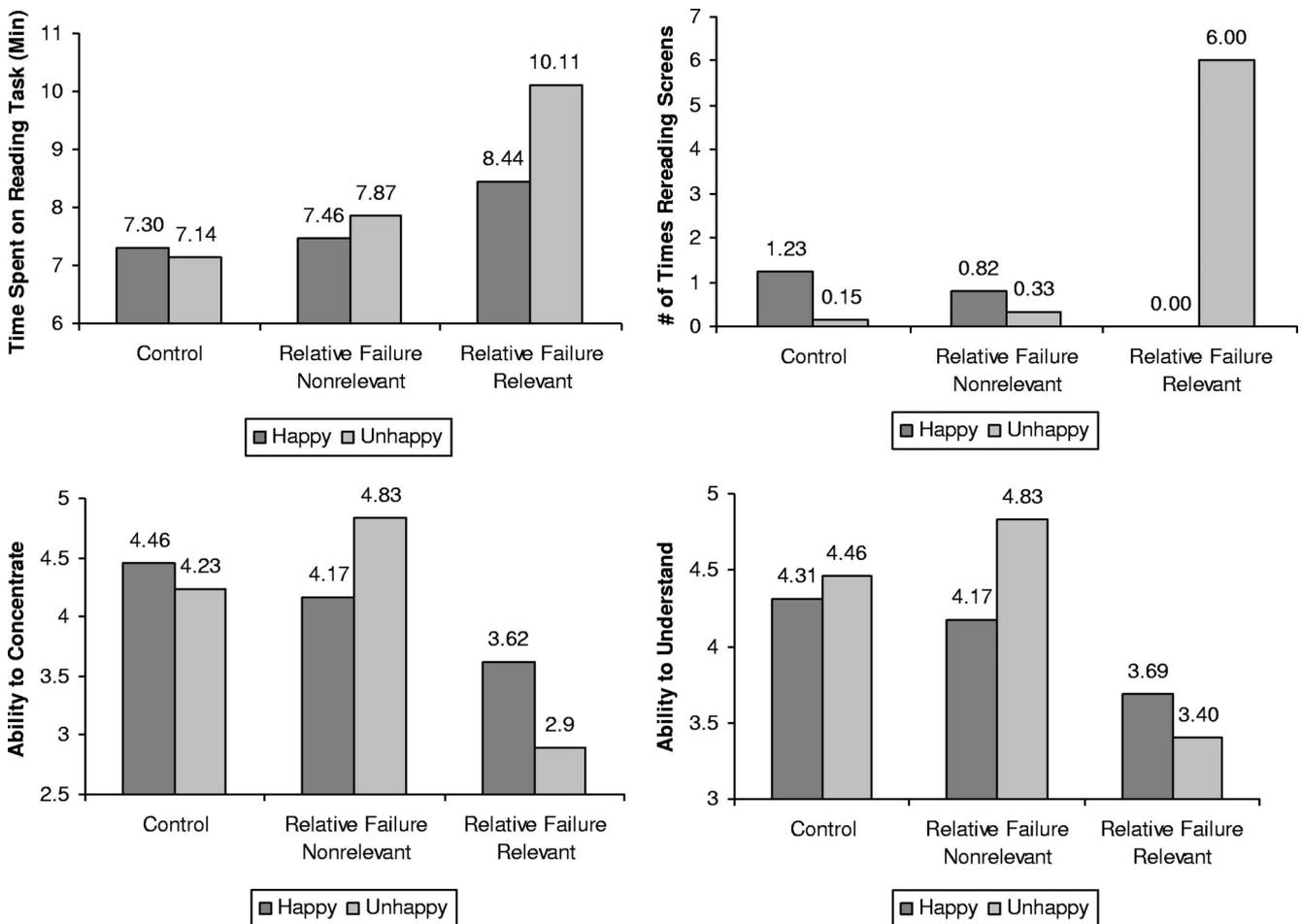


Figure 1. Time spent on reading task (top left panel), number of times rereading screens (top right panel), ability to concentrate (bottom left panel), and ability to understand the passage (bottom right panel) in response to control, relative failure-nonrelevant, and relative failure-relevant conditions (Study 1).

the 12 multiple-choice questions (M_s between 5.77 and 6.75). However, a closer look at our data suggests that if the unhappy participants in the failure-relevant condition had been interrupted at the average time that participants in the five other groups had needed, they would have completed only 71.6% of the reading task, not even reaching 40% of the test, and their reading comprehension scores would have almost certainly suffered.

Postperformance Self-Reports

Ability to concentrate. According to a planned contrast, the relative failure-relevant group reported a significantly lower ability to concentrate than the relative failure-nonrelevant and control groups, $F(1, 67) = 10.99, p < .01, r = .38$. This effect was particularly striking with regard to unhappy participants in the relative failure-relevant condition, whose reported ability to concentrate was the lowest of the other five groups, $F(1, 67) = 8.32, p < .01, r = .33$ (see Figure 1, bottom left). Thus, given their diminished concentration, it is not surprising that unhappy students exposed to relevant unpleasant feedback spent significantly more time on the GRE reading task than did all the other groups. However, significant differences between happy and unhappy participants in the relative failure-relevant condition were not found ($F < 2$).

Ability to understand passage. Finally, participants in the relative failure-relevant condition reported a compromised ability to understand the reading passage than participants in the relative failure-nonrelevant and control conditions, $F(1, 67) = 5.72, p < .05, r = .28$. Unhappy students in particular reported the lowest ability to concentrate compared to the remaining five groups, although this contrast was only marginally significant, $F(1, 67) = 3.14, p < .09, r = .21$ (see Figure 1, bottom right). A planned contrast comparing happy and unhappy participants in the relative failure-relevant condition failed to reach statistical significance ($F < 1$).

Summary

Although significant group differences were not found in reading comprehension, unhappy students in the failure-relevant condition spent the most time on the reading task and reread the passage more frequently than all other groups and than happy participants in the same condition. Accordingly, these results suggest that unhappy students' dwelling after facing unfavorable information had at least one tangible negative result—that is, increased time needed to perform subsequent tasks. Furthermore, when comparing all six groups together, unhappy students in the failure-relevant condition reported the lowest ability to concentrate and to understand the passage.

The relative failure-nonrelevant condition offered participants in this study an opportunity to discount the superior performance of a peer through the knowledge that this peer was assigned an easier task. Eyeballing the pattern of results in Figure 1 suggests that the responses of participants in this condition mirrored those of participants who were not provided with any (false) peer feedback at all. That is, relative to those in the control condition, students exposed to a social comparison that they were able to discount did not report a compromised ability to concentrate or understand the GRE passage and did not spend an increased amount of time

reading the passage and answering the multiple-choice questions. Thus, both happy and unhappy participants alike were able to “shrug off” and otherwise ignore the superior performance of a peer when a rationale was provided for that superior performance.

Study 2

In Study 1, we were unable to observe one particularly harmful consequence of dwelling on negative outcomes—namely, we failed to find a decrement in performance among unhappy participants exposed to unfavorable information. However, as noted, our null results may be due to the finding that, following the experience of “relative failure,” unhappy individuals spent more time performing subsequent tasks and this extra time may have masked any possible performance decrements. To test this alternative hypothesis directly, in Study 2, we gave all participants a (surprise) time limit to complete the very same reading task used in Study 1.

Study 2 assessed the tendencies of happy and unhappy students to dwell on their outcomes right after exposure to either unfavorable achievement feedback (relative “failure”) or favorable feedback (relative “success”). This study further gave us an opportunity to measure many more key variables—moods, off-task thinking, pace, and performance—in a single session. Mood was measured at three time periods—before and after the false feedback manipulation, and after the GRE task. Hence, the study allowed us to assess whether following “failure,” unhappy students would be particularly inclined to show negative moods and interfering thoughts, as well as whether these detrimental mood effects would be maintained through the end of the study. Finally, we were able to test whether dwelling mediates the relationship between negative feedback and sad mood.

Method

Overview

Participants completed a paper-and-pencil anagram-solving task, which contained either easy anagrams (*relative success*) or impossible ones (*relative failure*). Furthermore, these two conditions led participants to believe that they had either handily outperformed their peers or that they had considerably fallen short. As in Study 1, after the manipulation, students read a GRE passage and answered surprise multiple-choice questions about it. However, the participants were “cut-off” by the experimenter after 7 min if they had not finished both the reading task and the multiple-choice questions. Students completed measures of mood at the outset of the experiment, after the anagram-solving task, and after the reading task. A measure of interfering thoughts was administered after the reading comprehension task. Finally, a “memory” test, in which students replicated to the best of their abilities the content of the reading passage, was also used as a measure of comprehension. Unlike Study 1, all post-GRE tasks were completed on a computer.

Participants

Students at a public university ($N = 51; M_{\text{age}} = 19.2, SD = 2.11$) received either course credit or \$7 for their participation. Using a similar procedure to Study 1, 27 “happy” (13 female, 14

male) and 24 “unhappy” (12 female, 12 male) participants (from the top and bottom quartiles of the distribution of SHS scores; median [*Mdn*] = 5) were recruited by telephone. The mean happiness score was 6.15 (*SD* = 0.46) for happy students and 3.53 (*SD* = 0.51) for unhappy ones.

Procedure and Materials

Design. The design was a 2 (happy vs. unhappy) \times 2 (relative success vs. relative failure) factorial. Two social comparison conditions were created using a procedure described by Egloff and Krohne (1996; cf. Brown & Dutton, 1995). In the failure condition, participants were led to believe that their performance on an anagram-solving task was considerably lower than that of their peers. In contrast, in the success condition, participants were led to believe that they had outperformed their peers.

Baseline affect. Mood was assessed with the Positive Affect Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988), with 10 items measuring positive affect (PA; α = .86) and 10 items measuring negative affect (NA; α = .83) on 5-point Likert-type scales.

Anagram-solving task and false feedback manipulation. After participants completed the affect measure, the experimenter gave them instructions for the 10-min anagram-solving task. All students received a sheet with 20 anagrams on it. In the relative failure condition, 12 of these anagrams were impossible to solve and the remaining ones were very difficult. However, participants were told that the average undergraduate solves 14.1 anagrams in the allotted 10 min. Thus, participants were led to believe that their performance was considerably lower than that of “the average college student.” By contrast, in the relative success condition, participants received a sheet with 20 extremely easy anagrams. The instructions indicated that the average college student solves 12.1 anagrams in 10 min, leading participants to perceive themselves as outperforming their peers. After the verbal instructions, the experimenter gave the participant the anagram sheet and left the room, returning after the allotted time was up.

Postfeedback affect. To assess changes in students’ moods in light of their own performance in the two false feedback conditions, students were asked to complete the PANAS for a second time (α = .88 for PA and α = .84 for NA); change scores were created by subtracting the postfeedback overall PA and NA scores from the baseline ones.

Reading comprehension task. Students were then given instructions regarding the reading task, which was very similar to that used in Study 1. Unlike in Study 1, however, after the initial instructions were given, the experimenter left the room and waited outside for 7 min. If participants signaled the experimenter that they were finished before the 7 min were up, the experimenter prepared them for the next phase. However, if participants were not done with the task after 7 min (e.g., had not finished both the reading task and subsequent 12 surprise multiple-choice questions), the experimenter interrupted them and prepared them for the next phase.

Postperformance cognitive interference, affect, and memory. After participants had completed the reading comprehension task (or were cut off by the experimenter), they were administered a follow-up questionnaire, which included the Cognitive Interference Questionnaire (CIQ; Sarason & Stoops, 1978). The CIQ assesses the

extent to which people experience off-task thoughts that are perceived as interfering with concentration. Specifically, the questionnaire asked participants to rate on 5-point Likert-type scales the frequency of 21 possible task-relevant and irrelevant thoughts they might have had while doing the GRE task (1 = *never*, 5 = *very often*; Cronbach’s α = .92). Sample items include “I thought about how poorly I had done,” “I thought about how others have done on this task,” “I thought about friends,” and “I thought about personal worries.” The mean overall CIQ score served as a direct measure of participants’ dwelling.

To avoid asking participants to complete the PANAS for a third time and raising their suspicions about the hypotheses of the study, a very simple mood measure was used—that is, students rated how sad, down, and depressed they felt (1 = *not at all*, 7 = *extremely*). These ratings were combined into a single index of post-reading-task sad mood (α = .84). Similar Likert-type scales have been used successfully in a number of previous studies to measure mood (e.g., Aspinwall & Taylor, 1993; Pitman et al., 1990; Wenzlaff, Wegner, & Klein, 1991).

As a second measure of reading comprehension, participants were then asked to reproduce and type, to the best of their abilities, the entire reading passage. Two “blind” independent judges established criteria for coding this “memory test” (r between judges = 0.92). The key elements of the passage were assigned 0 to 5 points based on the accuracy and level of detail in participants’ summaries. For our key measure of reading comprehension, we computed a composite of participants’ standardized score on the multiple-choice questions and this (standardized) memory test score. (They were correlated at r = .46.) The results for each of these variables analyzed separately are almost identical to that of the composite.

Results and Discussion

Because no main effects or interactions emerged with sex, all analyses collapsed across sex of students. The sample sizes were as follows: happy/success (n = 13); unhappy/success (n = 13); happy/failure (n = 14); and unhappy/failure (n = 11).

Baseline Measures

Happy participants began the study in a significantly more positive mood (M_s = 3.15 vs. 2.59), $t(47) = 3.00$, $p < .01$, $r = .40$, and in a significantly less negative mood (M_s = 1.34 vs. 1.60), $t(35) = 2.07$, $p < .05$, $r = .33$, than did their unhappy peers.²

Manipulation Checks

Overall, students who had “succeeded” solved a mean of 19.92 (out of 20) anagrams during the allotted 10-min period, whereas those who had “failed” solved a mean of 4.50 (out of 20, of which only 8 were solvable), $t(28) = 66.98$, $p < .001$, $r = 1.0$. No significant difference emerged in the number of anagrams solved

² To test whether the results of this study were mediated by differences in baseline mood, rather than the presumably more stable self-assessments of subjective happiness, all the analyses were redone using the participants’ premanipulation mood as the covariate. Rather than taxing our readers unnecessarily, we shall merely note here that such analyses yielded results very similar to those obtained when mood was not treated as a factor.

by happy and unhappy participants ($t < 1$). Hence, any subsequent between-groups differences in our primary dependent variables could not be attributed to between-groups differences in actual performance. Participants in all conditions also correctly recalled how many anagrams they were told their peers purportedly solved in 10 min.

Overview of Statistical Analyses

Our general hypothesis was that the responses of unhappy students would be sensitive to the experience of failure versus that of success, but that happy students would show similar responses in these two conditions. These hypotheses were tested through two planned pair wise comparisons, based on a priori hypotheses: (a) comparing unhappy participants in the failure and success conditions and (b) comparing happy participants in the failure and success conditions. We also compared unhappy participants who had experienced failure to those in the three remaining conditions.

Postfeedback Affect

Supporting our hypothesis that unhappy students who “fail” would be most sensitive to hedonically relevant information, a planned contrast revealed that unhappy participants who failed showed the largest decrease in PA of the four groups, $F(1, 45) = 3.78, p < .06, r = .28$. Also, as predicted, unhappy students who failed showed larger decreases in PA than those who succeeded ($M_s = -0.45$ vs. -0.01), $F(1, 45) = 4.46, p < .05, r = .30$. In contrast, supporting our hypothesis, there was no significant difference in changes in PA between happy students who failed and those who succeeded ($M_s = -0.29$ vs. -0.03 ; $F < 2$). This pattern of results was not mirrored in our analyses of changes in NA, however (M_s between -0.13 and 0.05).

Postperformance Measures

Reading pace. As in Study 1, we hypothesized that because unhappy students are more likely to dwell on negative outcomes, a failure experience would impair their subsequent reading concentration and ability to “digest” and comprehend what they are reading. Consequently, after 7 min (at which time the experimenter interrupted all participants still working), they would have read less of the assigned passage and answered fewer multiple-choice questions. Supporting this hypothesis, a planned contrast revealed that unhappy participants who failed were interrupted after 7 min on earlier screens (out of 20 total) than unhappy participants who succeeded, $F(1, 47) = 5.18, p < .05, r = .32$. In contrast, as expected, there was no difference between happy participants who failed and those who succeeded ($F < 1$). Finally, as predicted, unhappy students who failed were interrupted on earlier screens than the remaining three groups, $F(1, 47) = 8.08, p < .01, r = .38$ (see Figure 2, top left). The percentage of each group who were prevented from completing the task after being cut-off were as follows: unhappy/failure (73%), unhappy/success (46%), happy/failure (43%), and happy/success (54%).

Further supporting our hypothesis and replicating Study 1, unhappy students who failed spent marginally significantly more time reading than those who succeeded, $F(1, 47) = 3.60, p = .06, r = .27$. As predicted, no difference emerged between happy

students who failed and those who succeeded ($F < 1$). Also, as expected, unhappy students who failed spent the most time on the passage of the four groups, $F(1, 47) = 3.90, p = .05, r = .28$ (see Figure 2, top right). Because over half of the participants were not given the opportunity by the experimenter to finish the multiple-choice questions, group differences in time spent on these questions were not analyzed.

Reading comprehension. Notably, supporting our hypothesis, unhappy students who previously failed showed marginally worse reading comprehension, as indicated by their performance on the multiple-choice question and recall of the reading passage, than did unhappy students who previously succeeded, $F(1, 47) = 3.08, p < .09, r = .25$. As expected, no difference emerged between happy students who failed and those who succeeded ($F < 2$). Furthermore, unhappy students who failed displayed the worst reading comprehension of the four groups, $F(1, 47) = 4.80, p < .05, r = .30$ (see Figure 2, bottom left).

Cognitive interference. Planned contrasts revealed that, as compared with unhappy students who succeeded, unhappy students who failed showed higher scores on the CIQ, $F(1, 47) = 6.70, p < .05, r = .35$. This result suggests that failure prompted unhappy students to demonstrate more off-task and interfering thoughts. As predicted, no difference emerged between happy students who failed and those who succeeded (both $F_s < 1$). Finally, of the four groups, unhappy students who failed had the highest CIQ scores, $F(1, 47) = 13.40, p < .001, r = .47$ (see Figure 2, bottom right).

End-of-study sad mood. Supporting our predictions, unhappy participants who failed at the anagram task reported higher sad mood—even at the very end of the study session—than unhappy participants who succeeded ($M_s = 3.61$ vs. 2.67 , respectively), $F(1, 47) = 3.89, p = .05, r = .28$. However, as expected, no difference emerged in sad mood between happy participants who failed and those who succeed ($M_s = 2.36$ vs. 2.15 ; $F < 1$). Also, as expected, unhappy students who failed showed the highest sad mood of the four groups, $F(1, 47) = 9.40, p < .01, r = .41$.

Mediation Analyses

Because our feedback manipulation had a differential effect on mood, we next addressed the intriguing question of whether the links between happiness and feedback status (i.e., unhappy/failure vs. unhappy/success, happy/success, and happy/failure) and end-of-study sad mood may be mediated by participants’ dwelling. That is, does dwelling on unpleasant feedback serve to prolong negative mood in unhappy people? Three analyses were conducted to test a mediation model (Baron & Kenny, 1986). To test whether the link between group status and mood was mediated by CIQ score (the dwelling measure), the first analysis regressed poststudy sad mood on the feedback group status variable (coded as 0, 1, 1, 1) and yielded a significant effect ($\beta = -0.40, p = .003$). The second analysis regressed CIQ score on the feedback status variable ($\beta = -0.47, p = .001$). Finally, poststudy sad mood was regressed on both group status ($\beta = -0.14, p = .28$) and CIQ score ($\beta = 0.58, p < .001$). When CIQ score was included, the relation between group status and poststudy sad mood was reduced to nonsignificance, suggesting that cognitive interference is an important mediator of the relationship. A Sobel test confirmed that self-reported cognitive interference significantly mediated the re-

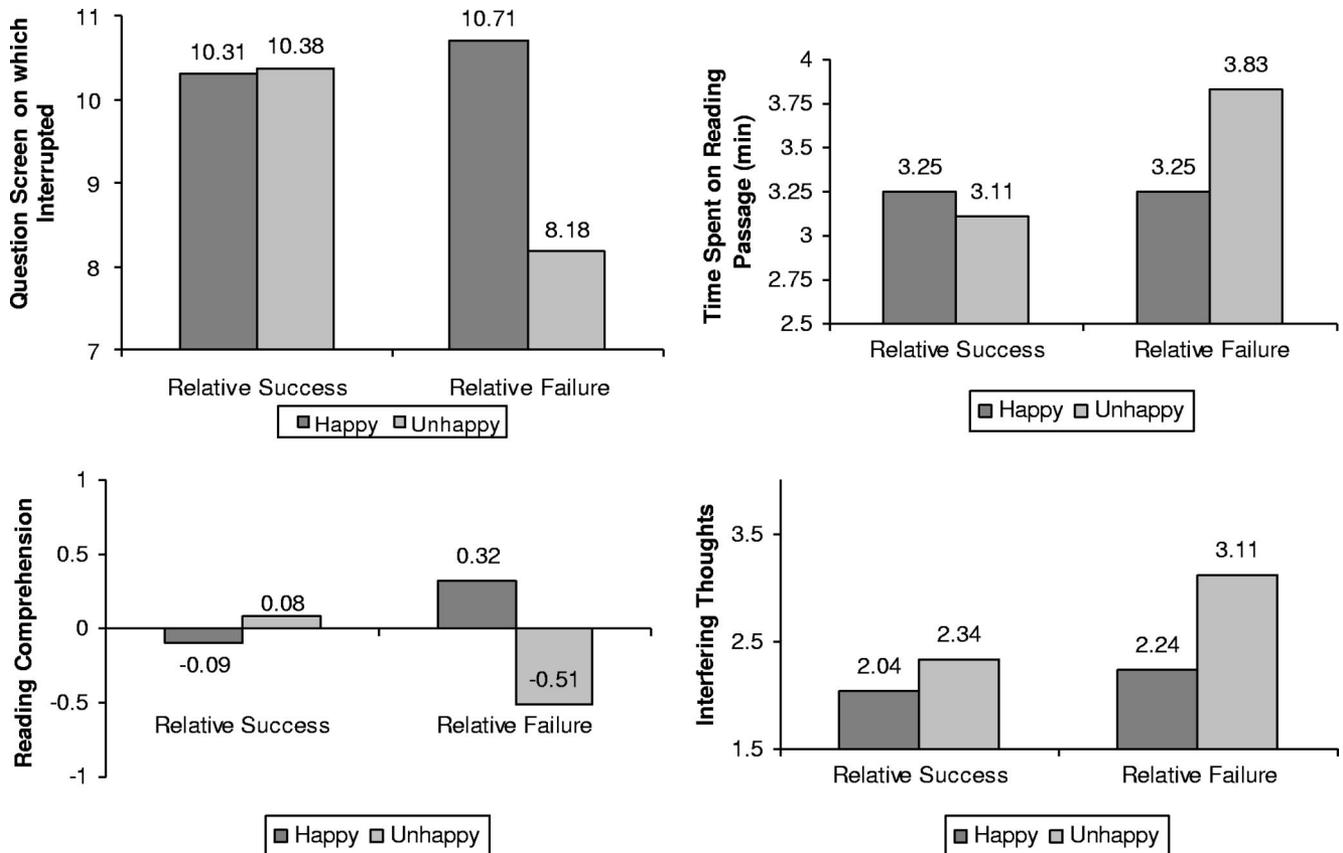


Figure 2. Question screen on which participants were interrupted (top left panel), time spent on reading passage (top right panel), reading comprehension (bottom left panel), and interfering thoughts, as assessed by the CIQ (bottom right panel) in response to relative success versus relative failure (Study 2).

lation between group status and negative mood, $Z = 3.11$, $p = .002$.

Summary

Taken together, the results from Study 2 suggest that when unhappy students experience achievement-related failure and then are asked to complete the GRE in a limited amount of time, their performance suffers. They take longer to read and their reading comprehension (as assessed by multiple-choice questions and later memory for the passage) is reduced. Although Study 1 indicated that unhappy participants faced with failure are able to perform adequately when given ample time, Study 2 suggested that their performance declines when time is constrained.

Furthermore, unhappy individuals who experienced failure showed decreased positive affect immediately after the anagram task, and their mood remained low relative to the other groups even at the end of the study. Finally, and perhaps most important, this study provided evidence that unhappy individuals' dwelling in the face of failure may mediate the relationship between performance feedback and subsequent negative mood.³

Study 3

Mediational analyses in Study 2 revealed that one of the reasons that unhappy participants experience greater NA after failure is

that they dwell on it. Although these results are suggestive of the key mechanism underlying unhappy people's responses to unpleasant achievement outcomes, the correlational nature of the study prevents us from making causal conclusions. Indeed, our

³ Readers might question whether the effects reported thus far reflect the role of happiness rather than that of self-esteem, optimism, extraversion, neuroticism, or other "individual difference" variables that anecdotal and empirical evidence alike suggest should be correlated with happiness (e.g., Larsen & Ketelaar, 1991; Roberts, Gilboa, & Gotlib, 1998; see Lyubomirsky, Tkach, & DiMatteo, 2006, for a review). Fortunately, three of these personality characteristics (self-esteem and optimism in Study 2, and self-esteem and extraversion in Study 3) were assessed in our preexperimental omnibus questionnaire, providing us with an opportunity to address this question. To this end, following Lyubomirsky and Ross (1997), we conducted analyses of covariance on all the dependent variables of interest, using self-esteem (Rosenberg, 1965), optimism (Scheier & Carver, 1985), and extraversion (Eysenck & Eysenck, 1975) as separate covariates. The results of these analyses uniformly showed that covarying out each of these three variables failed to meaningfully reduce or eliminate the effects associated with happiness. That is, introducing either self-esteem, optimism, or extraversion as a covariate did not account for our between-groups differences, leaving the pattern of "corrected" means virtually unaltered or, for a number of measures, even stronger. Furthermore, when each of these three variables were substituted for happiness as the basis for classifying participants, the pattern of results, while often in the predicted direction, was substantially weaker and most often nonsignificant.

first two studies were quasi-experimental, and thus could not shed light on whether dwelling would bolster NA and other adverse consequences in all individuals, or whether being unhappy in the first place must be a precondition for dwelling and its effects.

Our third and final study sought to redress this shortcoming by experimentally inducing dwelling versus inhibiting it, and examining the effects of this manipulation on several other outcomes expected to be associated with dwelling—namely, NA, (low) self-confidence, and (low) verbal performance. To this end, all participants in Study 3 experienced relative failure via the anagram task used in Study 2. Following the failure, participants were randomly assigned to think either about their feelings and personal concerns or about neutral images and objects.

We posit that the key mechanism underlying the link between unhappiness and dwelling is not just negative mood, but that unhappy individuals are distinguished by habitual patterns of thinking and behavior and have developed over time an extensive semantic network of multiple negative memories and cognitions. This network, we argue, is likely activated by negative experiences and maintained or even strengthened by dwelling. Accordingly, the experience of failure (or negative mood) in a generally happy person is not expected to produce the same deleterious results, because the habits and the negative semantic networks are not in place. Thus, we predicted that inducing (vs. preventing) dwelling in happy people would have no effect, but that inducing dwelling in unhappy people would magnify negative mood and other adverse consequences, whereas preventing dwelling would reduce them.

Method

Overview

As in Study 2, happy and unhappy students experienced “failure” by performing impossible anagrams. However, no students experienced “success.” Following the anagram task, students were randomly assigned to a dwelling condition (e.g., “think about what your feelings might mean”) or a distraction condition (e.g., “think about clouds forming in the sky”). Thus, the design was a 2 (happy vs. unhappy) \times 2 (dwelling vs. distraction) factorial. Each of the four groups had 18 participants, with the exception of the unhappy/distract group ($n = 17$).

After dwelling or distracting, students completed the same GRE task that was used in Studies 1 and 2. As before, the time it took each participant to read the passage and complete the reading comprehension multiple-choice items was recorded. In addition, participants completed measures of NA, self-confidence, and thoughts about their experience of failure.

Participants

Psychology students at a public university ($N = 72$; $M_{\text{age}} = 19.7$, $SD = 2.71$) participated in our study in exchange for course credit. Using the same selection procedure as Study 2, a sample of 36 happy (29 female, 7 male) and 36 unhappy (28 female, 8 male) participants (from the top and bottom quartiles, respectively; $Mdn = 5$) were recruited by telephone. The mean SHS score was 6.13 ($SD = 0.37$) for happy participants and 3.80 ($SD = 0.56$) for unhappy participants.

Procedure

The procedure for Study 3 was very similar to that of Study 2, with the following exceptions. First, because all participants experienced relative failure, only negative mood was measured (with the PANAS at baseline and after the anagram task [$\alpha = .71$ and $\alpha = .85$, respectively], and with the three-item sad mood measure used in Study 2 after the focusing manipulation [$\alpha = .69$]). A mood difference score was computed after converting all ratings to 5-point scales. Similar approaches to creating change scores from different types of scales have been used by other researchers (e.g., Aspinwall & Taylor, 1993; Lyubomirsky, Caldwell, & Nolen-Hoeksema, 1998). Second, self-confidence was assessed at baseline and before and after the manipulation. Third, participants were randomly assigned to a dwelling or a distraction (focusing) condition shortly after failing at the anagram task. Fourth, we did not administer the CIQ or a reading passage recall task, but we did add two additional measures throughout the session (see below). Finally, the key outcome variables were assessed after the focusing manipulation.

Materials Unique to Study 3

Focusing manipulation. To induce versus inhibit our participants from dwelling, we used a procedure originally developed to manipulate rumination and distraction among dysphoric individuals (cf. Nolen-Hoeksema, 1991). Students were instructed to spend 8 min thinking about 32 items (cf. Morrow & Nolen-Hoeksema, 1990) that required them, in the dwelling condition, to focus on their feelings and personal attributes (e.g., think about “your character and who you strive to be” and “why you react the way you do”) and, in the distraction condition, to focus externally on matters removed from emotions or the self (e.g., think about “clouds forming in the sky” and “the shape of the state of California”). We expected that in unhappy individuals, the persistent inward versus outward focus demanded by this manipulation, when coupled with a fresh experience of failure, would produce (vs. hinder) repetitive thoughts and dwellings about the failure.

In introducing this induction, we told participants that their task would require them “to focus [their] mind on a series of ideas and thoughts” and to “use [their] ability to visualize and concentrate.” The items in both conditions had been previously rated as affectively neutral by independent coders. After the allotted time, the experimenter administered measures of mood and self-confidence, followed by the reading comprehension task. As a manipulation check, all students were asked at the end of the study to recall the instructions for the focusing task and to describe exactly what they had done during the stipulated 8 min. Codings of two independent judges indicated that our participants correctly understood the instructions (e.g., visualizing ideas on each page, flipping through the items again if finished before the time limit) and had been able to direct their focus as requested (e.g., on images vs. feelings) during the 8-min period.

Self-reported importance and attributions. After finishing the reading comprehension task, participants were asked two questions about the earlier anagram-solving task at which they had “failed”—first, how important it was for them to have performed well on the anagram task (1 = *not at all*, 7 = *a great deal*) and, second, to what extent their (low) ability (i.e., “not [being] very

good at solving anagrams”) contributed to their (poor) performance on the task (1 = *not at all*, 2 = *a little*, 3 = *moderately*, 4 = *quite a bit*, 5 = *a great deal*).

Results and Discussion

Because no main effects or interactions emerged with sex, all subsequent analyses collapsed across sex of students.

Baseline Measures and Manipulation Checks

Interestingly, happy and unhappy participants did not differ in their reports of negative mood at the start of the study ($M_s = 0.67$ vs. 1.14 , $p = .14$, $r = .18$); however, the pattern of means was in the expected direction. Although this finding is somewhat surprising, several previous studies (e.g., Lyubomirsky & Tucker, 1998) have found smaller differences between happy and unhappy individuals in negative moods than in positive moods.

On average, participants solved 4.3 out of 20 anagrams correctly during the allotted 10-min period, with no significant differences between the happy and unhappy group. Students also correctly recalled how many anagrams they were told their peers purportedly solved.

Overview of Statistical Analyses

Because unhappy individuals are characterized by habitual patterns of negative thinking and negatively biased semantic networks, we hypothesized that our focusing manipulation would significantly influence their responses, such that inducing dwelling would magnify the adverse consequences of failure, and inhibiting dwelling (through distraction) would reduce them. Happy individuals, by contrast, were not expected to be sensitive to the focusing manipulation; their responses were predicted to be similar to unhappy participants in the failure conditions of the previous studies. These predictions were tested with the following planned pair-wise contrasts, based on our a priori hypotheses: (a) comparing unhappy participants in the dwelling and distraction conditions and (b) comparing happy participants in the dwelling and distraction conditions. We also contrasted unhappy participants in the dwelling condition to everyone else.

Postfailure Affect and Self-Confidence

Following the “relative failure” experience, both happy and unhappy participants showed significant and comparable increases in negative mood ($M = 0.30$, $SD = 0.51$, $t(72) = 5.02$, $p < .001$, and decreases in self-confidence ($M = -0.69$, $SD = 0.96$, $t(72) = -6.09$, $p < .001$). Thus, our failure manipulation was “successful” for the happy group and the unhappy group, with no group differences for either variable ($t_s = -.07$ and $.55$ for mood and self-confidence, respectively).

Postmanipulation Changes in Affect and Self-Confidence

Supporting our hypothesis that unhappy students, but not happy ones, would be sensitive to the focusing manipulation, a planned contrast revealed that unhappy participants induced to dwell after the anagram task reported bigger increases in NA from before to

after the manipulation than unhappy participants induced to distract ($M_s = 1.58$ vs. 0.47), $F(1, 67) = 9.83$, $p < .01$, $r = .36$. In contrast, as expected, no significant difference emerged between happy students who dwelled or distracted ($M_s = 0.61$ vs. 0.22 ; $F < 2$). Finally, unhappy participants induced to dwell reported the largest increases in NA, $F(1, 67) = 16.10$, $p < .001$, $r = .44$, of the four groups.

A significant difference also emerged in changes in self-confidence between unhappy students who dwelled versus distracted, $F(1, 67) = 4.18$, $p < .05$, $r = .24$ ($M_s = -1.11$ vs. -0.06). Furthermore, as expected, happy participants who dwelled versus distracted were similar on this variable ($M_s = 0.11$ vs. 0.28 ; $F < 1$). Finally, unhappy students in the dwelling condition showed the largest decreases in self-confidence of the four groups, $F(1, 67) = 8.78$, $p < .01$, $r = .34$.

Postperformance Measures

Reading pace. We hypothesized that, for unhappy individuals, dwelling about failure would impair their subsequent pace and performance at academic tasks, whereas being prevented from dwelling (via distraction) would buffer those impairments. By contrast, we did not expect our manipulation to have a noticeable effect on happy individuals. Supporting this hypothesis, a planned contrast revealed that unhappy participants who dwelled spent significantly more time reading the passage than those who distracted, $F(1, 67) = 5.83$, $p < .05$, $r = .28$. As predicted, there was no difference between happy students who dwelled and those who distracted ($F < 1$). Also, as expected, unhappy students who dwelled spent the most time on the passage of the four groups, $F(1, 67) = 8.36$, $p < .01$, $r = .33$ (see Figure 3, top left).

Reading comprehension. Supporting our predictions, a planned contrast showed that unhappy students induced to dwell suffered the worst reading comprehension performance of all the groups, $F(1, 67) = 7.23$, $p = .01$, $r = .31$ (see Figure 3, top right). Furthermore, unhappy students induced to dwell performed marginally worse on the multiple-choice questions than did unhappy students induced to distract, $F(1, 67) = 2.83$, $p = .10$, $r = .20$. Finally, as expected, no difference emerged between happy students who dwelled versus distracted ($F < 1$).

Thoughts about the failure experience. Two other findings merit consideration, both of which concerned participants’ perceptions of the anagram task at which they had “failed.” Notably, at the end of the study, unhappy students who dwelled reported that it was more important for them to be good at solving anagrams, $F(1, 68) = 12.15$, $p = .001$, $r = .39$, and were more likely to attribute their failure to their low ability, $F(1, 67) = 7.82$, $p = .01$, $r = .32$, than unhappy students who distracted. No such differences were found within the happy group (both $F_s < 2$). Finally, of all four groups, unhappy students who dwelled had the highest scores both on importance of anagram-solving ability, $F(1, 68) = 9.80$, $p = .01$, $r = .36$, and on attributions of failure to their own low ability $F(1, 67) = 7.51$, $p = .01$, $r = .32$ (see Figure 3, two bottom panels).

Summary

The results of Study 3 were consistent across all our variables. In short, the combination of unhappiness and dwelling was asso-

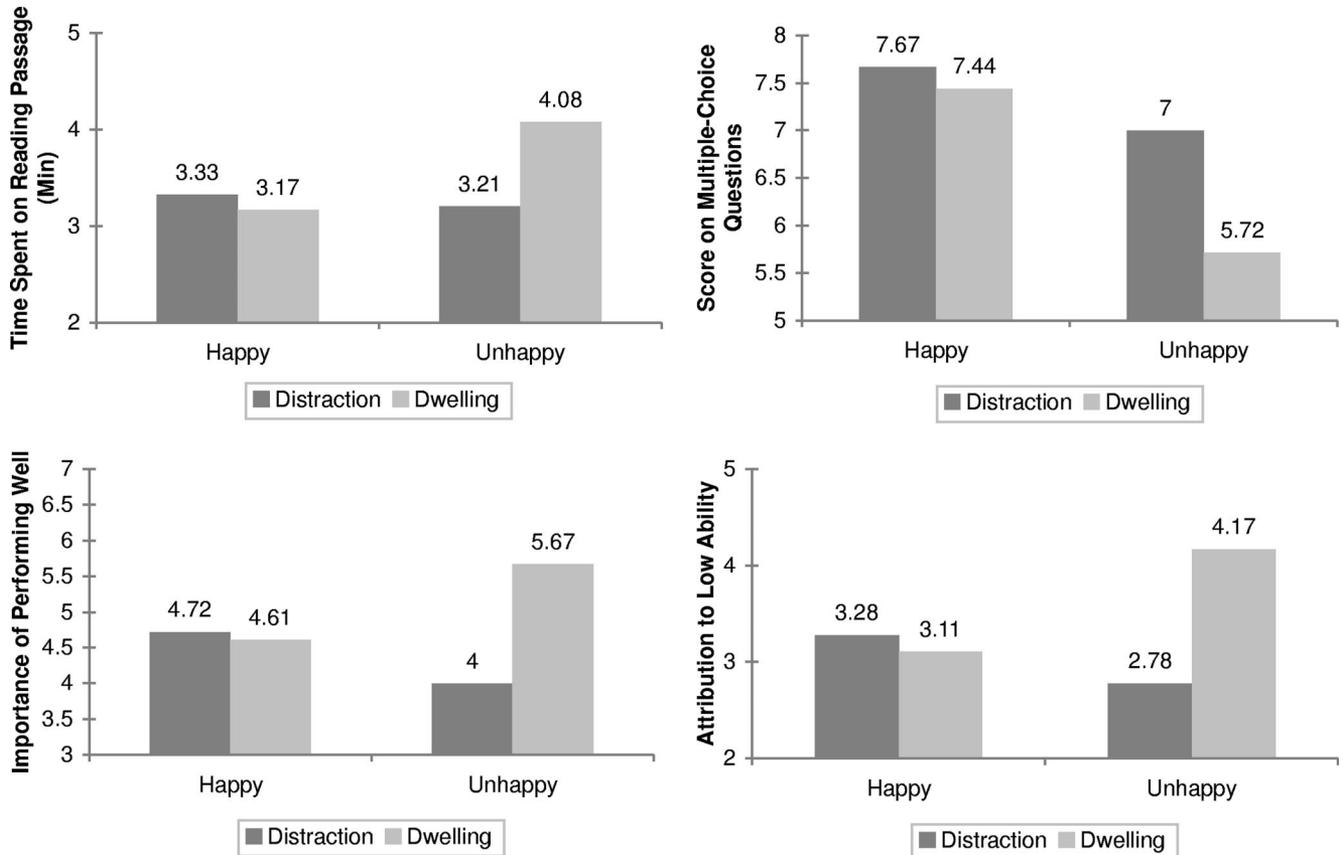


Figure 3. Time spent on reading passage (top left panel), score on multiple-choice questions (top right panel), importance of performing well (bottom left panel), and attribution to low ability (bottom right panel) in response to an induction of distraction versus dwelling (Study 3).

ciated with greater increases in negative moods and greater decreases in self-confidence, and with slower reading pace on the GRE and poorer performance. Furthermore, analyses of two new variables proved instructive: Unhappy individuals induced to dwell were more likely than all the other groups to rate performing well at solving anagrams (the task at which they had failed) as being important and to attribute their experimentally induced failure to low ability. Notably, as we predicted, whether or not happy individuals were prompted to dwell or to distract had essentially no impact on them.

General Discussion

Three studies explored the hypothesis that, in contrast to their happier peers, unhappy people are particularly vulnerable to negative achievement-related outcomes, inclined to “dwell” extensively on the implications of such outcomes, and, consequently, to experience declines in mood, increased interfering thoughts, and impaired concentration on important academic tasks. Unhappy students exposed to unfavorable feedback relative to their peers expressed diminished moods (Study 2), indicated more difficulty concentrating (Study 1) and more frequent off-task thoughts (Study 2), took more time completing a GRE test (Studies 1 and 2), and showed poorer performance (Study 2) relative to all the other

groups. These two studies provide evidence that unhappy students are not only prone to dwelling, but also to experience its deleterious consequences. Still, an important piece of the puzzle with respect to the link between dwelling and (un)happiness had been missing—that is, whether dwelling makes all people unhappy (and the baggage that comes with it) or whether being chronically unhappy leads to dwelling. To speak to this issue, we conducted a third study, which induced unhappy and happy people to dwell, or inhibited them from doing so. Although the results of Study 3 do not provide a definitive answer to the question of causal direction, they suggest an intriguing dynamic—namely, that it is the combination of unhappiness and dwelling that produces adverse consequences, with each factor being a necessary, but not sufficient condition.

Our findings advance knowledge about individual differences in strategies used to manage negative information and, specifically, how these differences bear out in happy and unhappy people. Taken together, these results offer suggestive evidence that unhappy people who underperform at achievement tasks appear to dwell and scrutinize their experience—a behavior that likely besieges them with negative thoughts and feelings that ultimately distract them from the task at hand. Perhaps they find themselves asking why they had performed so badly and recalling instances of

past inferior performances. Or, perhaps they try to persuade themselves—albeit unsuccessfully—that they should not care that other students are better at such a trivial and unimportant skill as unscrambling words. In sum, we speculate that unhappy individuals may have trouble stopping themselves from dwelling about their negative performance, and thus may be unable to shake off the unfavorable self-relevant information. Indeed, even at the very end of our studies, unhappy participants were still expressing persistent diminished moods (Study 2) and pessimistic attributions about their failure (Study 3).

In contrast, happy individuals do not appear to be so adversely affected by their presumed underperformance, even when pushed to dwell on it, as we attempted to do in Study 3. Instead, they seem capable of quickly rationalizing or discounting the superior performance of a peer—at least when the implications are not very serious or threatening. Alternatively, happy individuals may simply be more successful at self-distracting and absorbing themselves in other tasks—even exams! Unpleasant feedback and negative experiences are a ubiquitous and inescapable part of daily life, and it appears that happy individuals have the ability either not to begin dwelling on them, or to disengage from dwelling fairly swiftly, such that their moods, thinking, and concentration are relatively unaffected.

The behavior shown by unhappy people in our studies appears not only unproductive, but also maladaptive. First, their responses to unpleasant feedback are likely to interfere with their performance on cognitively demanding tasks in daily life, such as reading, writing, listening, presenting, and test taking. If an unhappy person is frequently dwelling about problems and negative events, she may suffer from a reduced capacity to pay attention to important meetings at work, to friends during social interactions, or to her family's demands at home. Thus, cognitive interference may prevent unhappy people from functioning at optimal levels (cf. Lyubomirsky, King, et al., 2005), which could further reinforce unhappiness. Future studies could investigate the potential adverse consequences of chronic dwelling in nonacademic settings, as well as explore whether the processes and consequences of dwelling in our unhappy participants are mirrored in clinically depressed individuals (cf. Ingram, 1990; Pyszczynski & Greenberg, 1987).

Second, unhappy people facing failure exhibit interfering thoughts and negative moods that may ultimately relate to and contribute to unhappiness. Supporting this notion, we found in Study 2 that the receipt of unfavorable feedback was associated with enhanced dwelling in unhappy participants, and, in turn, with subsequent increases in negative mood by the end of the study. In short, the relation between negative feedback and negative mood was mediated by dwelling.

Limitations and Future Research Questions

An important consideration involves the extent to which differences found between happy and unhappy participants may have been moderated by differences in their baseline moods during each study. For example, in Study 2, happy participants reported more positive moods at baseline than did their less happy peers. Controlling for these initial group differences in mood through covariance analysis, however, did not significantly change our results. Although such statistical procedures cannot definitively rule out the mood-as-moderator hypothesis, we can be reassured by find-

ings that mood-lifting and mood-depressing manipulations on happy and unhappy participants do not tend to eliminate critical between-groups differences (Lyubomirsky, 1995).

Furthermore, because our happy and unhappy participants were typically selected from the top and bottom of the distribution of happiness scores, we do not know whether the group differences we found are due to uncommonly high happiness of the happy group, uncommonly high unhappiness of the unhappy group, both, or neither. Then again, people from top or bottom halves or quartiles are not really extreme, and the mean happiness levels of our groups were comparable to those found in other samples (e.g., Lyubomirsky & Lepper, 1999).

Our research illuminates the cognitive and hedonic consequences of one particular psychological process—namely, dwelling—and links these consequences to individual differences in hedonic functioning. Future research could explore these processes with novel paradigms and settings, and with different, more “objective” measures of the signs and consequences of dwelling. Although our studies profited from the use of both direct and indirect measures of dwelling—allowing the advantages of one method (e.g., speed at task) to partially compensate for the drawbacks of another (e.g., self-report)—further research could extend this work by using alternative techniques. The possibilities include assessing vigilance performance by recording participants' ability to stay alert (e.g., Dittmar, Warm, Dember, & Ricks, 1993); tracking eye movements to assess lapses in concentration; measuring changes in pupil size, which have been linked with cognitive effort and cognitive load (e.g., Granholm, Morris, Sarkin, Asarnaow, & Jeste, 1997; Siegle, Steinhauer, Carter, Ramel, & Thase, 2003); and using the experience sampling method (Csikszentmihalyi & Larson, 1987; e.g., Moberly & Watkins, 2008) to capture changes in off-task thoughts in naturalistic settings.

Conclusions

Our three studies provide evidence that dwelling on negative achievement-related information can trigger a host of adverse outcomes. Unhappy individuals were found to be keenly responsive to unfavorable social comparison feedback, perhaps relying too much on other people as standards for self-evaluation. The consequence is that they suffered in their moods and appeared to be plagued with negative, invasive thoughts (e.g., Why did I do so badly? Maybe I did deserve that C after all). Such thoughts are likely to intrude during important activities, as well as during trivial everyday tasks and chores. Research on cognitive interference shows that off-task cognitions deplete an individual's cognitive resources and raise demands on attentional capacity (e.g., Mikulincer, 1989; Pierce et al., 1998; Sarason, 1984; cf. Sarason, Pierce, & Sarason, 1996). Not surprisingly, because dwelling divides attention, fewer attentional resources can be directed toward a specific task—whether it is reading a sales report, listening to a dinner date, cooking for a dinner party, or balancing a checkbook—prompting a decline in the amount of information that can be processed (Baddeley & Hitch, 1994). It is thus not unexpected, as we found, that unhappy students who previously “failed” showed evidence of dwelling and were later slower and less capable of performing a fairly demanding verbal task. Fortunately, however, our results also contained some good news. As

Study 3 revealed, even chronically unhappy people can avoid the symptoms and consequences of dwelling following failure when immediately compelled to distract their attention outside the self. This strategy likely takes effort and committed practice (cf. Lyubomirsky, 2008; Lyubomirsky, Sheldon, & Schkade, 2005), but the benefits are undisputed.

Reflecting and introspecting, or plumbing one's feelings in the face of obstacles and problems, is considered valuable and adaptive in today's Western culture. Very happy people, who do not appear to spend much time engaged in deep self-examination and analysis, are regarded as having achieved happiness "at the price of some ignorance," as Anatole France has quipped. However, research evidence does not bear out that happy people are more "ignorant" than their less happy peers (Lyubomirsky, King, et al., 2005). Indeed, the studies reported here suggest that the dwelling on negative experiences that appears to characterize unhappy people has some dire consequences—for their functioning at school, work, and social settings—and, ultimately perhaps, for their levels of enduring well-being.

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New Journal Announcement: *Couple and Family Psychology: Research and Practice*

The Publications and Communications Board of the American Psychological Association (APA) and Division 43 of the APA (Society for Family Psychology) have joined together to launch the journal *Couple and Family Psychology: Research and Practice* (CFP) in 2012. CFP, to be published quarterly, will be a scholarly journal publishing peer-reviewed papers representing the science and practice of family psychology. CFP is intended to be a forum for scholarly dialogue regarding the most important emerging issues in the field, a primary outlet for research particularly as it impacts practice and for papers regarding education, public policy, and the identity of the profession of family psychology.

As the official journal for APA Division 43, CFP will provide a home for the members of the division and those in other fields interested in the most cutting edge issues in family psychology. Unlike other journals in the field, CFP is focused specifically on family psychology as a specialty practice, unique scientific domain, and critical element of psychological knowledge. The journal will seek and publish scholarly manuscripts that make a contribution to the knowledge base of family psychology specifically, and the science and practice of working with individuals, couples and families from a family systems perspective in general.

Mark Stanton, PhD, ABPP, is the Inaugural Editor of CFP. Manuscripts should be submitted electronically via the journal's Manuscript Submission Portal under the Instructions to Authors at <http://www.apa.org/pubs/journals/cfp>.