Interactive Effects of Mood and Task Framing on Creative Generation

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ABSTRACT: This study introduced a motivational compatibility account for the influence of mood on creative generation. Building upon the feelings-as-information framework, it was proposed that positive moods signal to individuals that they are safe, motivating them to take advantage of this presumed safety by seeking stimulation and incentives (i.e., having fun), whereas negative moods signal to individuals that there are problems at hand, motivating them to solve these problems. Based on these assumptions, it was predicted that positive and negative moods should enhance effort on creative generation tasks construed as compatible with the motivational orientations they respectively elicit. Specifically, positive, relative to negative, moods were predicted to enhance effort on tasks construed as fun and silly, whereas negative, relative to positive, moods were predicted to bolster effort on tasks construed as serious and important. Evidence for this model, and several of its underlying assumptions, was adduced in 3 experiments in which mood was manipulated and participants completed creative generation tasks that were framed as either fun or serious. Results are discussed with an eye toward addressing alternative theoretical explanations.

Over the past 2 decades, social psychologists have been at the forefront of what may be seen as a second stage of the cognitive revolution (Baars, 1986), a movement to establish and elucidate the role of affect in information processing and task performance. The fruits of their labor have been substantial, with innumerable studies now demonstrating that affective experiences profoundly shape the course of judgment, decision making, and problem solving (see Clore, Schwarz, & Conway, 1994; Martin & Clore, 2001; for reviews). This research has drawn inspiration from a number of innovative theories meant to organize and explain how moods and emotional states impact cognition and action (e.g., Forgas, 1995; Isen, 1987; Wegener & Petty, 1994); however, perhaps no theoretical framework in this area of inquiry has been as far-reaching in its influence as the feelings-as-information model developed by Schwarz and his colleagues (see e.g., Schwarz, 1990, 2001; Schwarz, Bless, & Bohner, 1991; Schwarz & Clore, 1996). Essentially, Schwarz and his associates propose that affective states serve to inform individuals about the nature of their current situation. Positive affective states signal that the current situation is safe, suggesting to the individual that cognitive effort is unnecessary unless specifically required by other ongoing goals or directives. In addition to spurring a reduction or withholding of effort, the safety signal conveyed by positive states is also posited
to engender a proclivity toward risk taking and the use of novel or creative alternatives. In corresponding fashion, feelings-as-information theorists propose that negative affective states signal that the current situation is problematic, suggesting to the individual that cognitive effort is required to assess and remedy this undesirable or threatening state of affairs. Beyond intensifying effort, the problem signal conveyed by negative states is also posited to enhance risk-aversion and inhibit the use of novel alternatives.

In recent years, a prodigious amount of empirical evidence has been adduced in support of this model. For instance, in the domain of persuasion, it has been repeatedly demonstrated that individuals in bad moods exhibit more attitude change in response to strong, rather than weak, arguments, whereas those in good moods exhibit moderate and equal attitude change irrespective of argument quality (Bless, Bohner, Schwarz, & Strack; 1990; Bless, Mackie, & Schwarz, 1992; Sinclair, Mark, & Clore, 1994). Consistent with the feelings-as-information approach, these findings suggest that negative affective states, such as bad moods, relative to positive affective states, such as good moods, increase the motivation to engage in effortful information processing, in this case leading to greater elaboration of the content of persuasive messages. Correspondingly, in the domain of impression formation, it has been found that individuals in bad moods are less likely to rely on stereotypes in making interpersonal judgments than those in good moods (e.g., Bodenhausen, 1993; Bodenhausen, Kramer, & Süßer, 1994). To the extent that stereotypes constitute "rules of thumb" meant to save the time and energy required to process individuating information (Macrae, Milne, & Bodenhausen, 1994), these findings are also consistent with the notion that negative, relative to positive affective states, promote expenditure of cognitive effort, in this case inhibiting the use of heuristics involving category membership. Parallel findings have also emerged from the domain of problem solving, where it has been shown that individuals in negative affective states exhibit superior performance on a range of tasks that demand careful, effortful processing (e.g., correlation estimation, Sinclair & Mark, 1995; logical reasoning, Fiedler, 1988), whereas those in positive affective states exhibit impaired performance on such tasks (e.g., Fiedler, 1988; Isen, Means, Patrick, & Nowicki, 1982; Melton, 1995; Sinclair & Mark, 1995). Together, these findings, and others, offer strong converging support for the core predictions of the feelings-as-information framework.

Of course, even casual perusal of this veritable sea of findings inevitably brings to mind the question: Do individuals in negative affective states always outwork, outthink, and outperform those in positive states? As alluded to earlier, according to Schwarz and his colleagues (e.g., Schwarz, 1990; Schwarz & Bless, 1991), affective states are not only posited to influence the quantity of processing, but to also influence the quality or style of processing. Specifically, whereas negative affective states are generally posited to increase the effort invested in a given task, they are also predicted to increase risk-aversion and to diminish the use of novel alternatives. Therefore, on measures of creativity and cognitive flexibility, which presumably demand increased risk-taking and novelty-seeking rather than sheer effort, positive relative to negative affective states should enhance rather than undermine performance. In line with this prediction, a number of studies have suggested that positive, relative to neutral and/or negative affect promotes more flexible categorization (e.g., Isen & Daubman, 1984; Murray, Sujan, Hirt, & Sujan, 1990), facilitates insight problem solving (Isen, Daubman, & Nowicki, 1987), and leads to the generation of more original ideas (e.g., more unusual word associations; Isen, Johnson, Mertz, & Robinson, 1985; see also, Hirt, McDonald, & Melton, 1996).

Unfortunately, for a number of reasons, the aforementioned findings may be seen as offering only tentative support for the predictions of the feelings-as-information model. For instance, a number of the most prominent studies within this line of inquiry merely demonstrate that positive mood facilitates creativity or cognitive flexibility relative to a control group (e.g., Isen & Daubman, 1984; Study 1; Isen et al., 1985, Study 2), and as such, fail to additionally establish whether negative mood leads to the predicted decrease in performance on tasks of this ilk. Moreover, when negative affect conditions have been included, the
results have often failed to support the feelings-as-information approach. For instance, in one set of well-known studies (Isen & Daubman, 1984, Studies 2 & 3), cognitive flexibility was marginally increased relative to a control group amongst participants in a negative mood. Likewise, in a more recent study, Kaufmann and Vosburg (1997) adduced evidence that negative, relative to positive affective states enhance, rather than diminish insight problem solving performance.

Other studies have indeed demonstrated increments in creativity under positive, relative to negative, mood, yet defied interpretation in terms of feelings-as-information. For instance, in one noteworthy experiment, Hirt, Levine, McDonald, Melton, and Martin (1997) manipulated not only positive versus negative affect, but also whether participants were cued as to the original source of their moods. A critical corollary of the feelings-as-information model is that affective experiences will only influence performance when they are considered informative regarding the task situation itself (Schwarz & Clore, 1996). Restated, to the extent that feelings are attributed to a source that is irrelevant to the current task, the individual should discount them, preventing the feelings from influencing task performance. In their experiment, Hirt and his colleagues (1997) found that positive, relative to negative, mood bolstered creativity even when participants were cued that their feelings were irrelevant to the task. As such, their findings suggest that even if positive moods do reliably enhance creativity, the feelings-as-information model may not suffice to account for the phenomenon.

In sum, the feelings-as-information model parsimoniously accounts for the empirically well-established tendency of negative, relative to positive, affective states to bolster the effort invested in cognitive processing across multiple domains of judgment and problem solving. On the other hand, its complementary predictions regarding facilitative effects of positive, relative to negative, affect on creativity and cognitive flexibility have not been as consistently supported. Given the relative sparsity and ambiguity of the available findings, additional evidence is likely required in order to more comprehensively assess Schwarz and his colleagues’ predictions (e.g., Schwarz, 1990) regarding qualitative influences of affective experience on cognitive style.

Upon consideration, even if ongoing investigation largely fails to confirm that moods induce qualitatively distinct processing styles, the feelings-as-information model may still be readily extended to make interactive predictions regarding the effects of mood on task performance. How is this possible? Although Schwarz and his associates have tended to emphasize their behavioral prediction that negative affect, relative to positive affect, should bolster processing effort, the core of their model pertains to the specific signal value of positive versus negative affective states. Here, to succinctly reiterate, they have suggested that positive affective experiences signal that the current situation is safe, whereas negative affective experiences signal that the current situation is problematic. Inasmuch as problematic situations require effort aimed at their resolution, whereas safe situations require no change, negative affective states should spur increased task motivation relative to positive affective states.

However, extrapolating from Schwarz’s logic, it is likely that, given their differential signal value, positive and negative affective states not only elicit different quantities of motivation, but engender qualitatively different goals. Simply stated, as implied by Schwarz (1990), the problem signal elicited by negative affective states should motivate those in such states to seek out and solve problems. In corresponding fashion, and consistent with numerous other theorists (e.g., Frijda, 1986; Isen, 2000; Schaller & Cialdini, 1990), it is possible that the safety signal elicited by positive affective states should motivate those in such states to take advantage of their presumed safety by seeking stimulation and pursuing incentives, activities that would be ill advised under less benign circumstances.

Assuming that individuals in positive and negative affective states do adopt these distinct objectives, their processing effort should be at least partly influenced by the compatibility between these objectives and the nature of the task at issue. Specifically, given that tasks seen as facilitating goal attainment increase motivation and tasks seen as impairing goal attainment reduce motivation (see e.g., Sheldon & Elliot, 1999), positive, relative to negative, affective states should bolster effort on tasks viewed as fun and silly, inasmuch as such tasks are compatible.
with the motive to seek incentives and incompatible with the motive to solve problems (a relatively serious endeavor). In corresponding fashion, negative, relative to positive, affective states should enhance effort on tasks viewed as serious and important, inasmuch as such tasks are compatible with the desire to solve problems and incompatible with fun seeking.

The present study was aimed at providing an initial test of this motivational compatibility hypothesis derived from the feelings-as-information framework. In three experiments, following a mood manipulation, participants completed creative generation tasks that were framed as either fun and silly or serious and important. In these tasks, participants were asked to list as many items as possible that matched a certain criteria (e.g., as many creative uses for a brick as they could think of). Such tasks were administered because they not only enable analysis of the quantity of items generated (an index of processing effort; e.g., Martin, Ward, Achee, & Wyer, 1993), but also permit analysis of qualitative differences in the creativity of items generated, controlling for fluency. The latter may be used to (re)assess whether positive mood indeed bolsters creativity relative to negative mood (e.g., Schwarz, 1990; Schwarz, 2001; see also, Isen, 2000) due to effects on processing style as opposed to sheer processing effort.

It was predicted that the fun-seeking motive elicited by positive mood would increase processing effort on creative generation tasks framed as fun and silly, relative to those framed as serious and important, whereas the problem-solving motive elicited by negative mood would increase processing effort on generation tasks framed as serious and important, relative to those framed as fun and silly. More abstractly stated, it was predicted that participants would intensify effort on creativity tasks that were described as compatible with the motives elicited by their current mood states and would withdraw effort from creativity tasks that were described as incompatible with the motives elicited by these states. Due to the inconsistency of findings in the existing literature, no predictions were made regarding mood effects on creativity controlling for sheer fluency. However, the inclusion of task framing manipulations enabled an exploratory assessment of whether any such effects are moderated by the compatibility of the task (construed as fun vs. serious) with mood-elicited goals.

Experiment

Method

Participants. Sixty-five undergraduates at the University of Missouri–Columbia were recruited for a study described as involving a number of separate tasks, including one in which they would be asked to write about themselves. Participants completed the study in groups of up to 5 during sessions that lasted approximately 30 min, and received course credit for participation.

Procedure. Upon arrival, participants were seated at computer stations, visually isolated from one another by means of sound-attenuating para-vents. The entire procedure was administered by computer using MediaLab experimental software (Jarvis, 1998). Participants were randomly assigned to the positive or negative mood conditions. Moods were manipulated using a procedure modeled closely after that developed by Bless, Bohner, Schwarz, and Strack (1990). Specifically, in the positive mood condition, participants were given the following instructions on screen:

Missouri Life-Event Inventory (MLI)

Over the course of their lifetimes, everyone experiences pleasant events. We are currently developing a questionnaire that will provide us with a systematic understanding of what these events entail. This questionnaire will be entitled the “Missouri Life-Event Inventory”.

As a preliminary step, the construction of the MLI requires collecting a large number of peoples’ accounts of real life events. These collected accounts will provide the basis for the development of the questionnaire. At present, we’d like you to help us with this phase of the project.

Please think of a past event from your own life that made you feel really good at the time, one that was very joyous or amusing.

Take your time to imagine this pleasant life-event and try to re-experience it in your mind. Afterwards, in the space provided, please describe the pleasant life-event as vividly and completely as possible.
Answering the following questions might help you come up with the vivid description we need:

- How exactly did you feel?
- What specific things happened to make you feel the way you did?
- Did the event elicit thoughts or imagery that intensified your feelings?

Please try to re-experience the good feelings you felt at the time.

Participants in the negative mood condition received analogous instructions to think of a past event that made them feel “really bad at the time, one that was very sad or troubling.” Participants were informed by the computer that they would have approximately 10 min to complete their writing task. In actuality, the computer terminated the task after 9 min. Afterwards, participants were administered a manipulation check on their current mood (“How do you feel right now?”) on a Likert scale anchored at 1 (very bad) and 9 (very good). The check was embedded within a set of five filler questions meant to preserve the integrity of the cover story. These included items regarding the clarity of the task instructions, how boring and how exciting the participants found the writing task, how difficult it was recall the life-event they wrote about, and how often they typically thought about what they wrote about.

After completing these Likert items, participants were introduced to the next part of the study, one involving completion of the ostensibly unrelated creative generation task. Here, participants randomly assigned to the fun task framing condition were told:

The next task is a bit silly, but fun. Please list as many creative uses for a brick as you can think of. The uses you come up with should neither be typical nor virtually impossible.

To emphasize that the task was fun, these instructions were printed in red ink on a pink screen with the header “Alternative Uses Task” printed in Comic Sans MS font, meant to convey a spirit of playfulness. In contrast, participants randomly assigned to the serious task framing condition were given the following instructions on screen:

The next task may appear trivial, yet it has significant implications. Essentially, it assesses skills that are involved in a number of important psychological processes, including memory and problem solving. It has also been found to be strongly associated with general intelligence (IQ). We are currently trying to identify the specific factors that influence performance on this task.

**TASK INSTRUCTIONS:** Please list as many creative uses for a brick as you can think of. The uses you come up with should neither be typical nor virtually impossible.

These instructions were printed in black ink on a white screen with the header “ALTERNATIVE USES TEST” printed in Arial font, meant to emphasize the serious nature of the task.

Afterwards, a new screen appeared on which participants were to enter their brick uses in a vertical list. They were given no time limit for their work and the only “stop rule” suggested was that they should continue until they could no longer generate any additional brick uses. Upon completing the task, participants were administered three additional Likert probes, two meant to assess the extent to which participants were motivated to engage in a fun activity (“To what extent do you feel like watching a comedy film right now?”) and “To what extent do you feel like hearing a good joke?”), the other meant to assess the extent to which they were motivated to engage in a more somber activity (“To what extent do you feel like hearing a sad song?”), all items anchored at 1 (not at all) and 9 (extremely). Participants were then probed for suspicions, debriefed, and released. No suspicions regarding the connection between the mood induction and the creative generation task were voiced.

The experiment employed a 2 (Mood: positive vs. negative) × 2 (Task Framing: fun vs. serious) between-participants factorial. The main dependent measure was the number of brick uses generated (i.e., fluency) as an index of processing effort. As alluded to earlier, the creativity of generated uses

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1Although administration of only a single alternative uses test item (i.e., brick) may have allowed for undue error in measurement, additional items were not included because it was assumed that participants’ situationally-induced moods would have faded over time such that they would have had little or no influence on subsequent dependent measures.
were also analyzed. To get an objective assessment, eight independent scorers (all graduate students in a social psychology seminar) were asked to rate the creativity of the different uses participants generated on a Likert scale anchored at 1 (not at all creative) and 9 (very creative). These ratings (z = .86) were used to compute a mean creativity score for each participant (summed ratings for each response offered, divided by the total number of responses tendered). Examples of relatively creative responses included “to bake it in a pie and send it to your lover in jail to help him or her break out” and “to use it as a focus point for a woman in labor to help get her mind off the pain.” Examples of responses that were relatively low in creativity included “to build a retaining wall” and “to break a window.”

Results and Discussion

Manipulation check. In order to assess whether the mood induction was successful, a t-test was conducted on participants’ scores on the manipulation check. As predicted, participants in the positive mood condition reported significantly more positive feelings (M = 7.38; SD = 1.11) than those in the negative mood condition (M = 4.44; SD = 2.00), t(63) = 7.31, p < .0001. Both cell means were also significantly different from the scale midpoint (5); tpositive = 17.17, p < .0001; tnegative = 2.26, p < .03. A supplementary Mood × Task Framing ANOVA on responses to the manipulation check revealed no other significant effects.

Quantitative aspects of performance. As discussed above, our main prediction was for an interaction between Mood and Task Framing on the number of brick uses generated (i.e., fluency). More specifically, it was expected that participants in positive moods would generate more brick uses when the task was framed as fun rather than serious, whereas participants in negative moods would generate more brick uses when the task was framed as serious rather than fun. The results of Experiment 1 partially supported these predictions. An ANOVA on the number of brick uses listed revealed a main effect of task framing, F(1, 61) = 4.03, p < .05, suggesting that participants generated more items when the task was framed as serious (M = 9.06; SD = 5.25) rather than fun (M = 7.00; SD = 3.09). This effect was qualified by the predicted Mood × Task Framing interaction, F(1, 61) = 5.95, p < .02, reflecting that participants in positive moods produced more entries when the task was framed as fun (M = 8.50; SD = 3.72), as opposed to serious (M = 7.93; SD = 3.06), whereas participants in negative moods produced more entries when the task was framed as serious (M = 10.06; SD = 6.55), as opposed to fun (M = 5.59; SD = 1.33). However, upon closer inspection, planned comparisons revealed that the increase in fluency for participants in the positive/fun relative to the positive/serious condition was not statistically reliable, t < 1, whereas the increase in fluency for those in the negative/serious relative to the negative/fun condition was highly reliable, t(61) = 3.14, p < .004.

In line with our hypothesis, these findings suggest that individuals in negative moods, who are presumably motivated to locate and solve problems, withhold or withdraw effort from fun and silly creativity tasks, tasks that are incompatible with their serious objectives. Inconsistent with our original predictions, participants in positive moods were about equally productive on the creativity task regardless of task framing. Although speculative, these results may suggest that it is more difficult, if not outright risky to withdraw effort from serious tasks, even if an individual is motivated to have fun (cf. Schwarz, 2001) As such, participants in positive moods may have (perhaps begrudgingly) decided to invest effort in the generation task despite its incompatibility with their motivational propensities. Such a state of affairs would be consistent with Isen’s (2000) proposal that individuals in positive moods are more flexible—here, flexibility may be reflected in the willingness of individuals in positive moods to process effortfully both when the task is compatible with their mood-elicited motives, as well as when circumstances render a different, albeit incompatible, motive more adaptive.

Qualitative aspects of performance. Beyond enabling us to test our main hypothesis regarding the number of brick uses generated, the present design also allowed us to test whether mood influenced the creativity of the uses that participants
listed, holding fluency constant. As discussed earlier, Schwarz (e.g., 1990; Schwarz & Bless, 1991) and others (e.g., Isen, 1987, 2000) have proposed that positive, relative to negative, moods should bolster creativity beyond sheer fluency. In the present study, this hypothesis was tested by averaging for each participant the creativity ratings assigned by independent coders to the brick uses he or she had generated. An ANOVA on the resultant mean creativity index revealed no significant effects of the experimental factors. To cast a wider net for any creativity effects, the creativity of brick uses indexed by their order of entry was also analyzed. This analysis did reveal a single main effect of mood on the first use listed by participants, \( t(63) = 1.97, p = .053 \), indicating that the first item generated by participants in positive moods (\( M = 2.63; SD = 1.66 \)) was rated as more creative than that generated by participants in negative moods (\( M = 1.89; SD = 1.36 \)). Inasmuch as there were no other effects of mood on the creativity of items in other ordinal positions, this may suggest that the effect of mood on creativity is reliable, albeit ephemeral.

To additionally probe for any influence of our experimental factors on creativity, participants’ responses were recoded in a somewhat different manner. Instead of simply collecting and averaging the creativity ratings tendered by a group of independent coders, a new pair of independent coders were asked to first separately rate the creativity of the participants’ entries, then to collaboratively produce a unitary set of creativity ratings after resolving all discrepancies in their initial judgments by means of discussion. This coding methodology was modeled after that developed by Hirt and his colleagues; Hirt et al., 1997; Hirt et al., 1996; Murray et al., 1990). An ANOVA on this new index of creativity revealed a marginal main effect of Mood, \( F(1, 61) = 3.00, p = .08 \), qualified by an interaction between Mood and Task Framing, \( F(1, 61) = 5.25, p < .03 \). The interaction reflected a pattern of means analogous to that found for the number of uses generated—participants in positive moods generated brick uses that were roughly equivalent in creativity irrespective of task framing (\( M_{\text{fun}} = 4.78; SD_{\text{fun}} = 1.34; M_{\text{serious}} = 4.43; SD_{\text{serious}} = 1.37 \)), whereas participants in negative moods generated more creative entries when the task was framed as serious (\( M = 4.62; SD = 1.47 \)) rather than fun (\( M = 3.50; SD = 0.90 \)). However, this effect was utterly eradicated when the number of uses generated was included as a covariate in the ANOVA, \( p > .49 \). Therefore, the present exploratory analysis offers little support for the notion that mood influences cognitive style, and thereby creativity, in a manner independent of sheer processing effort.

**Supplemental measures.** One important assumption of our model is that individuals in positive moods are motivated to engage in fun activities, whereas individuals in negative moods are motivated to engage in relatively somber activities. To test this hypothesis, responses to our three posttask motivational probes were analyzed. Here, as predicted, participants in the positive mood condition reported significantly more interest in two fun activities, watching a comedy film (\( M_{\text{positive}} = 6.35; SD_{\text{positive}} = 2.15; M_{\text{negative}} = 4.97; SD_{\text{negative}} = 2.29 \), \( t(63) = 2.50, p < .02 \), and hearing a good joke (\( M_{\text{positive}} = 6.93; SD_{\text{positive}} = 1.65; M_{\text{negative}} = 5.32; SD_{\text{negative}} = 2.14 \), \( t(63) = 3.37, p < .002 \), whereas participants in the negative mood condition reported significantly more interest in a somber activity, listening to a sad song (\( M_{\text{positive}} = 2.71; SD_{\text{positive}} = 1.55; M_{\text{negative}} = 5.32; SD_{\text{negative}} = 2.48 \), \( t(63) = 5.03, p < .0001 \). These findings are consistent with the notion that positive and negative moods elicit distinct motivational inclinations, inclinations that may be either compatible or incompatible with the task at hand.

**Summary of Experiment 1**

Overall, the results of Experiment 1 were partially supportive of our original predictions. In line with our model, participants in negative moods were more productive when the experimental task was framed as serious rather than fun, that is, as compatible with their mood-elicited motivational orientations. Contrary to predictions, participants in positive moods were equally productive regardless of task framing. Inasmuch as serious tasks may be construed as requiring effortful processing, it was suggested that this pattern may reflect an adaptive tendency among individuals in positive...
moods to engage in tasks that are incompatible with their mood-elicited motivational orientations when the circumstances deem it necessary (cf. Isen, 2000; Schwarz, 2001).

With regard to Schwarz’s (e.g., 1990) prediction that positive, relative to negative, moods elicit a cognitive style that bolsters creativity, as with many other studies in this line of research, our own findings could offer but weak and inconsistent support at best. Using an initial creativity coding scheme, it was only found that positive mood enhanced the creativity of the very first response tendered by participants. Using a second coding scheme (one more widely employed in this line of research), no effects of mood on creativity free of variance shared with sheer fluency were found—as such, in the present study, there was no evidence for a qualitatively distinct, mood-elicited processing style that could account in variance in creativity beyond that accounted for by simple processing effort.

Given the provocative nature of our initial findings, we decided to replicate the present design in Experiment 2. In this second experiment, a new condition was also added that would help us assess whether the effects at hand are, indeed, driven by a process of feelings-as-information. As mentioned earlier, according to Schwarz and his associates (e.g., Schwarz & Clore, 1996), affective experiences influence cognition and action by way of the information they provide, but only when this information is construed as relevant to the task at hand. When individuals conclude that the affective states they are currently experiencing do not constitute responses to their current situation, but merely represent the aftereffects of responses to situations past, they are predicted to correct for the improper influence of these states on their behavior. So, for instance, when participants in whom mood has been experimentally induced are cued as to the source of their moods when completing a subsequent task, they will no longer view their affective states as informative regarding how to complete the task at hand, and should attempt to prevent their moods from contaminating their responses (see e.g., Schwarz & Clore, 1983). The results of this correction process may be manifested in an outright elimination of mood effects (e.g., Hirt et al., 1997) or in their reversal (e.g., DeSteno, Petty, Wegener, & Rucker, 2000). In the latter case, individuals overcorrect for the potential biasing influence of task-irrelevant affective states by deliberately responding in a manner that they believe represents the opposite of how they would have responded in the absence of correction (Wegener & Petty, 1997).

Building upon this logic, in Experiment 2, some participants were assigned to receive a source cue just before the creative generation task, reminding them that their mood states had been produced by the experimental induction and were, therefore, irrelevant to the task. In line with the present feelings-as-information approach, it was predicted that participants not administered this source cue would demonstrate interactive effects of mood and task framing on creative generation analogous to those found in Experiment 1; however, participants to whom the source cue was administered were predicted to exhibit either no effect of mood on generation or a reversal of the interactive effects found in the first experiment (suggesting an overcorrection for perceived bias).

### Experiment 2

#### Method

**Participants.** One hundred and five undergraduates at the University of Missouri–Columbia were recruited for a study described as involving a number of separate tasks, including one in which they would be asked to write about themselves. Participants completed the study in groups of up to 5 during sessions that lasted approximately 30 min, and received course credit for participation.

**Procedure.** The procedure was virtually identical to that of Experiment 1, with two major exceptions. First, for the sake of converging operations, instead of listing creative uses for a brick, in the present experiment participants were asked to “list as many unusual modes of transportation as [they] could think of,’” and instructed that the modes they listed “should be as creative and out of the ordinary as possible” (cf. Hirt et al., 1997). Second, as alluded to above, a new factor was
added to the design (Source Cue). Here, participants in the no cue condition were administered essentially the same procedure as in Experiment 1, whereas those in the cue condition were inquired about their current mood state not only directly after the mood induction (as part of a manipulation check unobtrusively embedded within a set of filler items) but again, immediately before beginning the creative generation task (cf. DeSteno et al., 2000; Gasper, 2003). This blatant second mood probe was meant to remind individuals that their current affective states resulted from writing about their positive or negative life events earlier in the session, and had no bearing on the generation task at hand.

The creativity of the modes of transportation listed by participants was assessed by a pair of independent coders who rated the creativity of each response on a 5-point scale with 1 indicating the most common responses and 5 indicating the most novel and creative responses. After separately coding the entire set of responses, the coders then resolved their discrepancies by means of discussion, ultimately producing a unitary set of consensually agreed upon creativity ratings. Examples of relatively creative modes of transportation included “riding on Pinocchio’s nose as it grows from his lies” and “scoring a Top 40 Hit (your ticket to stardom)”; examples of relatively mundane modes of transportation included “walking” and “riding a bicycle.”

Results and Discussion

Manipulation check. In order to assess whether the mood induction was successful, a t-test was conducted on participants’ scores on the manipulation check. As predicted, participants in the positive mood condition reported feeling significantly more positive ($M = 7.53; SD = 1.45$) than those in the negative mood condition ($M = 4.07; SD = 2.06$), $t(103) = 9.88, p < .0001$. Both cell means were also significantly different from the scale midpoint (5). A supplementary Mood x Task Framing ANOVA on responses to the manipulation check revealed no other significant effects.

Quantitative aspects of performance. Our main prediction was for a three-way interaction between Mood, Task Framing, and Source Cue on the number of modes of transportation generated. More specifically, it was predicted that in the no cue condition, participants in negative moods would generate more modes when the task was framed as serious rather than fun, whereas participants in positive moods would generate either the same number of modes irrespective of task framing (replicating Experiment 1) or more modes when the task was framed as fun rather than serious (in line with our original predictions). However, in the cue condition, it was predicted that either no effects of mood (indicating correction for the biasing influence of the mood induction) or an interaction between Mood and Task Framing inverse in its pattern to that found in the no cue (indicating overcorrection for presumed bias) would be obtained.

Overall, the results of Experiment 2 supported these predictions. An ANOVA on the number of modes of transportation listed revealed only a Mood x Task Framing x Source Cue interaction, $F(1, 97) = 5.37, p < .03$. As depicted in Table 1, and elucidated by planned comparisons, when no source cue was provided, the pattern of means was closely akin to that found in Experiment 1, with participants in positive moods demonstrating equivalent fluency regardless of task framing, $t < 1$, and with participants in the negative/serious

| Source Cue | Positive | | | Negative | | |
|------------|----------|----------|----------|----------|----------|
|            | Fun ($n = 27$) | Serious ($n = 24$) | Fun ($n = 26$) | Serious ($n = 28$) |
| Present    | $M = 10.92$ | $SD = 4.83$ | $M = 15.00$ | $SD = 8.61$ | $M = 13.69$ | $SD = 11.88$ |
| Absent     | $M = 10.53$ | $SD = 6.62$ | $M = 10.92$ | $SD = 4.85$ | $M = 8.69$ | $SD = 3.59$ | $M = 14.33$ | $SD = 6.77$ |

Table 1. Experiment 2: Fluency Indexed by Mood, Task Framing, and Source Cue
condition ($M = 14.33; SD = 6.77$) demonstrating higher fluency than those in the negative/fun condition ($M = 8.69; SD = 3.59$), $t(97) = 1.99$, $p = .05$. As predicted, this pattern of findings was not obtained in the cue condition. Here, if anything, positive mood engendered more fluency when the task was incompatibly framed as serious versus fun and negative mood engendered more fluency when the task was framed as fun versus serious. However, none of the planned comparisons within this group were reliable, $ts < 1.81$, suggesting that there was, at best, a trend toward a reversal of the effect found in the no cue condition (and in Experiment 1).

In line with our original predictions, and with the results of the first experiment, these findings suggest that individuals in negative affective states, who are presumably motivated to pursue serious objectives, invest less effort in fun and silly tasks, tasks that are incompatible with their these objectives. In contrast to our original predictions, yet in line with the results of Experiment 1, participants in positive affective states demonstrated roughly equivalent levels of fluency irrespective of the framing of the task. Most interesting, these effects were eradicated (and, if anything, slightly reversed) when participants were provided with a source cue rendering their mood states irrelevant to the task at hand. This finding offers support for the contention that the interactive effects of mood and task framing on processing effort are driven by a process of feelings-as-information. Again, in line with Schwarz (1990; 2001), it is proposed that positive moods signal no problem and spur the motivation to seek out incentives and have fun, whereas negative moods constitute problem signals that elicit the motivation to seek out and solve the problem(s) signaled. However, extrapolating from Schwarz’s reasoning, these motivational orientations should only influence behavior if the affective signals from which they arise are deemed relevant to the task at hand. Consistent with this logic, the results of Experiment 2 suggest that when the relevance of affective states are called into question by means of a source cue, participants discount the signal value of these states, thereby eliminating the effect of mood on processing effort found in the absence of a source cue.

Qualitative aspects of performance. As in Experiment 1, beyond testing our main hypotheses regarding the number of responses generated, we also assessed whether mood independently influenced the creativity of these responses. To this end, for each participant, the creativity ratings assigned by the coders to the modes of transportation he or she had generated were averaged. An ANOVA on the resultant mean creativity index revealed no significant effects of the experimental factors. As in Experiment 1, in order to probe more deeply for any creativity effects, the creativity of participants’ responses indexed by their order of entry was also analyzed. In contrast to the findings of Experiment 1, there was no main effect of mood on the first item listed by participants, $t < 1$. Interestingly however, in this data set, a mood difference in creativity did appear to emerge over time. Specifically, when modes generated in the first and second ordinal positions (out of a maximum of 38) were excluded from the analysis, a trend for positive ($M = 3.01; SD = 0.45$), relative to negative ($M = 2.86; SD = 0.46$), mood to enhance creativity, $t(102) = 1.72$, $p < .09$, was detected. This trend attained conventional levels of reliability when the third mode of transportation was additionally excluded ($M_{\text{positive}} = 3.04; SD_{\text{positive}} = 0.46$; $M_{\text{negative}} = 2.81; SD_{\text{negative}} = 0.50$), $t(100) = 2.40$, $p < .02$. These effects were unaffected by the inclusion of the number of modes generated as a statistical covariate.

Oddly enough, whereas the results of the first experiment suggested that a main effect of mood on creativity appears early in the generation process and then quickly disappears, the present results suggest that the effect only appears over time and, if anything, grows in reliability as generation progresses. Despite this inconsistency, taken together, these findings may be seen as at least tenuously supportive of Schwarz’s (e.g., 1990) general contention that positive, relative to negative moods, elicit a processing style that promotes creative thought, independent of processing effort. However, it should be noted that in the present experiment, this late blooming effect of mood on creativity was not moderated by the source cue manipulation. According to Schwarz’s account, it should have been eradicated when participants were cued as to the true source of their moods.
As such, these findings may not be seen as readily supporting Schwarz’s (e.g., 1990) specific contention that the facilitative influence of positive mood on creativity is driven by a process of feelings-as-information.

Supplemental measures. As in Experiment 1, the working assumption that individuals in positive affective states are motivated to engage in fun activities, whereas individuals in negative moods are motivated to engage in relatively somber activities, was again tested. Paralleling the findings of the first experiment, participants in the positive mood condition reported significantly more interest in a fun activity, hearing a good joke \(M_{\text{positive}} = 7.06; SD_{\text{positive}} = 1.88; M_{\text{negative}} = 6.17; SD_{\text{negative}} = 2.58\), \(t(103) = 2.01, p < .05\), whereas participants in the negative mood condition reported significantly more interest in a somber activity, listening to a sad song \(M_{\text{positive}} = 3.14; SD_{\text{positive}} = 2.12; M_{\text{negative}} = 4.35; SD_{\text{negative}} = 2.37\), \(t(103) = 2.76, p < .007\). Once again, these results are in accord with the proposal that positive and negative moods engender distinct motivational proclivities that may affect processing effort in a highly context-dependent manner.

Summary

In sum, Experiment 2 constructively replicated the findings of Experiment 1. In the absence of a source cue, participants in negative moods were more productive when the creative generation task was framed as serious rather than fun (and thereby compatible with their mood-elicited motives). Contrary to our original predictions, yet consistent with the findings of Experiment 1, participants in the positive mood condition generated an equal number of responses, irrespective of the framing of the task. Critically, in line with a feelings-as-information account, when participants were cued as to the source of their moods just before beginning the generation task, the latter pattern of effects was no longer obtained. (Again, the effect was to some extent inverted, perhaps indicating attempts at correction for perceived bias.) This implies that the interactive effects of mood and task framing on processing effort are driven by the use of feelings-as-information—when the information provided by an ongoing mood state is deemed irrelevant to the task at hand, its effects on processing effort are eliminated or otherwise “corrected for.”

With respect to mood effects on qualitative aspects of performance, our analyses did reveal a tendency for positive, relative to negative, mood to bolster creativity; however, this effect only approached conventional levels of statistical significance following the post hoc exclusion of modes of transportation listed in the first two ordinal positions. Notably, this recency effect was not eradicated by the presence of a source cue, suggesting that even if it does ultimately prove reliable, it may result from a process other than feelings-as-information (cf. Hirt et al., 1997).

Considering the no cue condition alone, Experiment 2 represented our second failed attempt to detect a compatibility effect among individuals in positive moods. Again, in both experiments, it was found that participants in positive moods were about equally productive, regardless of whether the task was framed as fun or serious (i.e., as compatible or incompatible with their presumed motivational orientation). Our replication of this null effect prompted us to reexamine the nature of our task framing manipulations. Upon reflection, it occurred to us that, for the sake of ensuring impact, we may have made our manipulation of task seriousness unduly forceful. As described earlier, participants in the serious task framing conditions were told that the creative generation tasks they were to complete would assess a number of important cognitive skills, skills that were strongly associated with general intelligence. Given such significant personal implications, it may have been well nigh irrational to divest effort from such a task, irrespective of any mood-elicited tendencies to the contrary. In everyday life, there are many tasks that are relatively staid and serious, that do not bear on concerns as weighty and all-encompassing as IQ. For instance, activities such as taking out the garbage, paying bills, or voting in an election, while still undeniably important (and not particularly fun), are not necessarily matters of life and death.

Based on these considerations, in Experiment 3, we substantially pared down our task framing...
manipulations. Most critically, in the serious framing condition, all references to cognitive skills and intelligence were extricated. As such, participants in this condition were no longer provided with a specific, and perhaps inexorably compelling, reason to maintain a high level of processing effort. It was hoped that this modification would increase variance in fluency and (finally) enable detection of the predicted reduction in processing effort among individuals in the positive/serious condition.

In addition, three other major changes were implemented in Experiment 3. First, and most importantly, both neutral mood and no task framing control conditions were added in order to assess the directionality of our effects. Second, for the sake of converging operations, a different generation task was administered in order to once again gauge quantitative and qualitative aspects of performance. Finally, for the sake of generalizability, Experiment 3 was conducted in another country (Germany), enabling assessment of our predictions in a different cultural context.

Experiment 3

Method

Participants. One hundred and thirty-five university undergraduates and high school students from the Bremen area, majoring in disciplines other than Psychology were recruited for a study described as consisting of a number of different projects, including one in which they would be evaluating TV shows. The experiment was conducted at the International University Bremen (IUB). Participants completed the study individually in sessions that lasted approximately 2 hr and received 14 Euro for participation. Ten participants indicated a lack of familiarity with the TV shows used in the procedure (see below) and thus were excluded from the analyses.

Procedure. Upon arrival, participants were randomly assigned to the positive, negative, or neutral mood conditions. Positive and negative moods were induced using the same procedure employed in Experiments 1 and 2, except that participants were only allowed 8, rather than 9, min to complete their written descriptions. In the newly appended neutral mood group, participants were given 8 min to vividly imagine and describe their route to the IUB campus, including the people, places, and things they saw along the way. As in Experiment 1, after time had elapsed, participants were administered a manipulation check on their current mood states (“How do you feel right now?”) on a scale anchored at 1 (very bad) and 9 (very good).

Afterwards, participants were asked to work on another, allegedly unrelated task, which was described as a media psychology study, in which the experimenters would be examining perceived similarities and differences between television programs. Here, in a procedure modeled after that originally developed by Hirt and his colleagues (Hirt et al., 1996; Murray et al., 1990), participants were asked to list as many similarities and differences between two pairs of TV shows as they could think of. The first pair represented two popular German news shows, Tagesschau and Heute, whereas the second pair represented two popular German talk shows, TV Total and The Harald Schmidt Show. (Selection of these shows was based on pretests indicating high familiarity with them among individuals in the same age group as our sample.) For each pair of shows, participants were given 2 min to generate either similarities or differences. The order in which pairs of TV shows were compared (or contrasted) and the order of the assignment to list similarities versus differences for each pair were counterbalanced.

Critically, before beginning the generation task(s), participants were given the task framing manipulation. Here, participants in the fun condition were simply informed that the generation task was a spontaneous, somewhat silly task, whereas those in the serious condition were told that the task had to be taken seriously in light of the growing influence of the media. For the neutral condition, no such information was given. In the newly appended no task framing condition, participants were told that they would work on the task without receiving any additional information. As alluded to above, this manipulation of task framing represented a streamlining of the manipulations utilized in the first two experiments, serving to eliminate extraneous contents.
and bolster equivalence between conditions. Unlike in Experiments 1 and 2, following these task instructions, yet before beginning the task, participants were also asked to indicate how much they believed they would like the generation task (“How much do you think you will like this task?”) on a scale anchored at 1 (not at all) and 9 (very much) and how motivated they were to work on the task (“How motivated are you to work on the task?”) on a scale anchored at 1 (not at all motivated) and 9 (highly motivated). These measures were designed to assess immediate inclinations to engage or disengage processing effort in advance of actual performance. After completing the procedure, participants were probed for suspicions, debriefed, and released. No suspicions regarding the connection between the mood induction and the generation task were voiced.

The design of the experiment was a 3 (Mood: positive vs. negative vs. neutral) × 3 (Task Framing: fun vs. serious vs. no task framing) × 2 (Comparison: similarities vs. differences) × 2 (Program Format: news vs. talk) mixed factorial, with the first two factors varied between-participants and the last two factors varied within-participants. The primary dependent measure was the number of similarities and differences generated (as an index of processing effort). As in Experiments 1 and 2, the creativity of responses tendered was also analyzed. To obtain an objective assessment, a pair of independent scorers were asked to separately rate the creativity of participant-generated similarities between news shows, differences between news shows, similarities between talk shows, and differences between talk shows on a Likert scale anchored at 1 (not at all creative) and 9 (very creative). These independent ratings were then averaged together and used to compute four mean creativity scores for each participant, one representing each combination of the two within-participants factors.

Results and Discussion

Manipulation check. In order to check whether the mood induction was successful, a one-way ANOVA was conducted on participants’ responses to the manipulation check, using Mood as a factor. This analysis revealed a significant main effect, $F(2, 122) = 58.67$, $p < .0001$. As predicted, planned comparisons revealed that participants in the positive mood condition felt significantly more positive ($M = 6.02; SD = 0.91$) than did participants in the neutral mood condition ($M = 4.93; SD = 1.13$), $t(122) = 5.86$, $p < .0001$, and that participants in the negative mood condition ($M = 3.63; SD = 1.00$) felt significantly more negative than those in the neutral group, $t(122) = 5.86$, $p < .0001$. A supplementary Mood × Task Framing ANOVA on responses to the manipulation check revealed no other significant effects.

Quantitative aspects of performance. In order to assess the effects of our experimental factors on processing effort, an overall 3 (Mood) × 3 (Task Framing) × 2 (Comparison) × 2 (Program Format) mixed model ANOVA on the number of entries generated was first computed. This analysis revealed two significant effects. First, there was a main effect of comparison, $F(2, 116) = 18.24$, $p < .0001$, reflecting that participants generated more similarities between TV shows ($M = 5.12; SD = 2.54$) than differences ($M = 4.37; SD = 1.95$). This was likely due to the fact that the shows within each pair were, indeed, quite similar. More importantly, the ANOVA revealed an interaction between Mood and Task Framing, $F(2, 116) = 15.58$, $p < .0001$. As shown in Table 2, and elucidated by planned comparisons, the pattern of means driving this interaction was in accord with our predictions. Specifically, participants in the positive mood condition generated marginally more similarities and differences when the task was framed as fun ($M = 6.88; SD = 2.31$) than when the task was unframed ($M = 5.68; SD = 1.58$), $t(116) = 1.87$, $p = .06$, and significantly fewer similarities and differences when the task was framed as serious ($M = 3.02; SD = 1.39$) as compared to when it was unframed, $t(116) = 4.20$, $p < .001$. In contrast, participants in the negative mood condition generated significantly more entries when the task was framed as serious ($M = 6.21; SD = 2.46$) than when the task was either unframed ($M = 3.61$), $t(116) = 4.11$, $p < .001$, or framed as fun ($M = 3.37; SD = 1.33$), $t(116) = 4.57$, $p < .001$. There was no significant difference between the negative/fun
and negative/no framing groups, t < 1. Planned comparisons also revealed no significant differences between task framing groups within the neutral mood condition, all ts < 1.

In line with our model, these findings suggest that individuals in positive moods intensify processing effort on fun tasks, tasks that are compatible with their mood-elicited motives, and withdraw effort from serious tasks, which are incompatible with these motives. Notably, this pattern was not detected in our first two experiments, in which the serious task framing manipulation was far more heavy-handed; therefore, as previously suggested, it may be the case that participants tended to construe the task as fun in the absence of explicit instructions to the contrary. (After all, the task involved comparing examples of popular television programs.) Indeed, a two-way ANOVA excluding the serious task framing group revealed that the interaction between Mood and Task Framing was not significant, p > .20, consistent with the notion that the unframed task may have been spontaneously construed in the same manner as the fun task. Given this possibility, additional testing using a task more amenable to neutral framing will be required to assess whether the interactive effects of negative mood on processing effort are uni- or bidirectional.

### Qualitative aspects of performance.

In order to assess the influence of our experimental factors on creativity, a 3 (Mood) × 3 (Task Framing) ANCOVA was computed on mean creativity ratings, including the number of entries listed as a covariate. This analysis revealed two significant effects. First, there was a main effect of the number of generated entries on creativity, F(1, 115) = 44.42, p < .0001, reflecting a strong correlation between creativity and sheer fluency, r = .52. More important, the analysis revealed a Mood × Task Framing interaction, controlling for variance shared with the number of entries generated, F(4, 115) = 2.49, p < .05. As indicated by the pattern of adjusted means (Table 2), the

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Table 2. Experiment 3: Fluency, Adjusted Mean Creativity, Task Motivation, and Expected Task Liking Indexed by Mood and Task Framing
statistically unique, interactive effect of mood and task framing on creativity was very much akin to the combined effect of these factors on fluency. Specifically, as revealed by ANCOVAs conducted separately within each mood group, participants in positive moods were most creative in the fun condition and in the no framing condition (in which the generation task may have spontaneously been construed as fun), and least creative in the serious condition, \( F(2, 37) = 17.35, p < .0001 \). In contrast, participants in negative moods were most creative in the serious framing condition and least creative in the fun and no framing conditions, \( F(2, 39) = 6.05, p < .006 \). There was no effect of task framing on creativity among those in neutral moods, \( F < 1 \).

Oddly, whereas the results of Experiments 1 and 2 revealed no effects of task framing on creativity, interactive or otherwise, the results of the present study suggested that task framing is capable of independently moderating the influence of mood on creativity, much as it moderates the impact of mood on sheer fluency. Theoretically speaking, these findings are, again, inconsistent with Schwarz’s (e.g., 1990) contention that positive mood engenders a qualitatively distinct processing style that uniformly bolsters creative thought. Rather, the present results suggest that both mood effects on task fluency and creativity may each be highly context-dependent, responsive to variations in processing effort associated with the (in)compatibility between mood-elicited motivational orientations and task framing.

**Supplementary measures.** Perhaps the central assumption of our motivational compatibility approach is that individuals will be more motivated to work on tasks that are compatible with their current affective states, and less motivated to work on tasks that are incompatible with these states. As alluded to above, in order to test this assumption, just prior to the generation task, participants were asked to indicate how motivated they thought they would like it. It was predicted that the effects of mood and task framing on these measures would parallel the effect of these factors on the number of responses generated. As shown in Table 2, these predictions were well borne out.

Mirroring our findings regarding fluency, participants in positive moods indicated the highest levels of task motivation and expected task liking when the task was framed as fun and the lowest levels of motivation and liking when it was framed as serious (\( F_{\text{motivation}}(2, 38) = 3.5, p < .04; F_{\text{liking}}(2, 38) = 3.16, p = .05 \)), whereas participants in negative moods demonstrated the obverse pattern (\( F_{\text{motivation}}(2, 40) = 5.18, p < .01; F_{\text{liking}}(2, 40) = 5.84, p < .006 \)). There was no effect of task framing on either measure among those in neutral moods, \( Fs < 1 \). These results support our contention that tasks framed as compatible with mood-elicited motivational orientations are more enticing than those framed as incompatible with these orientations.

In light of these findings, we next sought to explore whether self-reported task motivation and expected task liking statistically mediated the interactive influence of mood and task framing on the number of responses generated (our index of processing effort). To this end, we followed the recommendations of MacKinnon and his colleagues (MacKinnon, Lockwood, Chondra, Hoffman, West, and Sheets, 2002), to compute a Sobel (1982) test of mediated moderation.

Here, each of our two 3-level between-participants factors were first recoded into a pair of contrast-coded variables that would be amenable to the regression analyses forming the basis of the test. Specifically, for the Mood factor, one variable coded for the contrast between the positive and negative mood conditions (\( \lambda_1: \) positive = 1, negative = −1, neutral = 0) and, for the sake of orthogonality, the other coded for the contrast between the neutral control group and the other two groups combined (\( \lambda_2: \) neutral = −2; positive = 1; negative = 1). Likewise, for the Task Framing factor, one variable coded for the contrast between the fun and serious conditions (\( \lambda_3: \) fun = 1; serious = −1; no framing = 0) and again, to maintain orthogonality, the other coded for the contrast between the no framing control group and the other two conditions combined (\( \lambda_4: \) no framing = −2; fun = 1; serious = 1). The pairwise products of the aforementioned main-effect contrasts resulted in 4 interaction contrast variables, one of which (\( \lambda_c = \lambda_1 \times \lambda_3 \)) represented the theoretically critical interaction between mood and task framing.
After computing the aforementioned main-effect and interaction contrast variables (8 in all), they were entered into a simultaneous multiple regression analysis, using task motivation as a dependent variable. This enabled us to assess whether the critical interaction contrast \((\lambda_c \cdot \lambda_1 [\text{Mood}] \times \lambda_3 [\text{Task Framing}])\) significantly influenced self-reported motivation to engage in the task (the first of our two potential mediator variables). The analysis revealed that the causal path from the interaction contrast variable to the mediator (path \(a\), borrowing the notation of Kenny, Kashy, and Bolger, 1998), was highly reliable, \(b = .93\), \(r(124) = 3.96, p < .0001\). A second regression analysis was then conducted, simultaneously regressing the main effect and interaction contrast variables, as well as the measure of motivation on the number of similarities and differences generated by participants (our index of processing effort). This enabled estimation of the unique effect of the mediator variable on the outcome variable (path \(b\), after Kenny et al., 1998). This path was also highly reliable, \(b = .29\), \(r(124) = 3.46, p < .0008\). Finally, using Sobel’s (1982) formula\(^2\), we estimated the difference between the unmediated effect of the critical interaction contrast variable \((\lambda_c)\) on the number of responses generated (path \(c\)) and the mediated effect of this contrast variable on the number generated (i.e., the effect remaining after statistically controlling for the influence of motivation, path \(c')\). In line with predictions, this estimate (representing the difference between paths \(c\) and \(c')\) was statistically reliable, \(z = 2.605, p < .01\), suggesting that the interactive influence of mood and task framing on the number of responses generated was significantly mediated by self-reported task motivation. A parallel analysis suggested that expected task liking also statistically mediated the interactive relationship between the experimental factors and task fluency, \(z = 3.061, p < .003\).\(^3\)

\(^2\)\(z = ab\sqrt{a^2s_{a}^2 + b^2s_{b}^2}\), where \(a\) and \(b\) represent the unstandardized regression coefficients for paths \(a\) and \(b\) and \(s_{a}^2\) and \(s_{b}^2\) represent the standard errors of these coefficients

\(^3\)Unsurprisingly, measures of task motivation and expected task liking were strongly correlated, \(r = .65\); however, we deemed this correlation too low in magnitude to warrant collapsing the measures into a unitary index. Therefore, we conducted separate Sobel tests for each measure.

In sum, the results of our mediational analyses were consistent with the notion that affective states and task framing interactively influence processing effort by way of their proximal influence on task motivation and expected task liking.

**General Discussion**

In this study, a motivational compatibility account for the influence of affective experiences on creative generation was developed and tested. Extrapolating from the feelings-as-information framework put forth by Schwarz and his colleagues (e.g., Schwarz, 1990; Schwarz et al., 1991), it was proposed that positive affective states signal to individuals that they are safe, motivating them to take advantage of this presumed safety by seeking stimulation and pursuing incentives, that is, by having fun. Correspondingly, it was posited that negative affective states signal to individuals that there are problems at hand, motivating them to seek out and solve these problems. Based on these assumptions, it was further proposed that the processing effort invested in a generation task by individuals in positive and negative affective states should be influenced by the compatibility between their affect-elicited objectives and their construal of the task. Specifically, it was hypothesized that positive, relative to negative, affective states should enhance effort on tasks construed as fun and silly, inasmuch as such tasks are compatible with the goal of having fun and incompatible with the goal of solving problems. Likewise, it was hypothesized that negative, relative to positive, affective states should bolster effort on tasks construed as serious and important, inasmuch as such tasks are compatible with the desire to solve problems and incompatible with fun seeking.

This model was tested in three experiments in which mood was manipulated and participants completed creative generation tasks that were framed as either fun or “serious.” As predicted, in all three studies, participants in negative moods demonstrated greater effort (as indexed by increased fluency) when the task was compatibly framed as serious, than when it was incompatibly framed as “fun.” Contrary to predictions, in the first two experiments, participants in positive moods were
equally productive regardless of task framing. It was speculated that this inconsistency may have been due to our having employed an overly heavy-handed manipulation of seriousness in these initial experiments. Specifically, participants in the serious task framing conditions in these studies were told that the generation task assessed IQ, thereby suggesting that it had enormous personal implications. As such, positive mood participants in the serious framing groups may have felt compelled to invest effort in the task, despite its relative incompatibility with their mood-elicited motives. Accordingly, in Experiment 3, when all references to cognitive skills and intelligence were extricated and participants in the serious framing condition were simply told that they would be working on a serious task, those in positive affective states indeed demonstrated greater processing effort when the task was compatibly framed as “fun,” than when it was incompatibly framed as “serious.” Hence, consistent with our original predictions, these experimental findings suggest that individuals will invest more effort in tasks that are construed as compatible with their mood-elicited motivational inclinations than in tasks that are construed as incompatible with these motives; however, in line with the propositions of Isen (2000) and Schwarz (2001), the present data also suggests that individuals in positive affective states are relatively flexible, and will opt to invest equivalent amounts of effort in serious tasks when serious is understood as not merely useful or “important,” but “imperative.”

In our experiments, the opportunity was also taken to empirically assess two underlying assumptions of the model. First, in Experiment 2, we tested whether our effects indeed result from a process of “feelings-as-information.” Specifically, some participants were assigned to receive a source cue reminding them that the affective states they were experiencing constituted responses to the mood induction and were thereby irrelevant to decisions regarding the allocation of processing effort on the subsequent generation task. As predicted, the motivational compatibility effect found in Experiment 1 was eradicated when a source cue was provided, and was replicated in the absence of this cue. This suggests that the interactive influence of affect and task framing on processing effort results from the use of affective experiences as information—when the relevance of the information provided by these experiences is called into question, motivational compatibility effects are no longer obtained.

Second, in Experiment 3, the assumption that compatibility between moods and task framing enhances, and that incompatibility between moods and framing diminishes, task motivation was tested. More specifically, following administration of the experimental manipulations, yet prior to the generation task, participants were asked to indicate how motivated they were to work on the task and how much they expected to like it. In line with predictions, participants in positive moods indicated the highest levels of task motivation and expected task liking when the task was compatibly framed as fun, and the lowest levels of motivation and liking when it was incompatibly framed as “serious,” whereas participants in negative moods demonstrated the obverse pattern. In addition, consistent with our overarching process account, the results of supplementary path analyses suggested that both task motivation and expected task liking significantly mediated the interactive influence of mood and task framing on processing effort.

Beyond enabling us to test our main predictions regarding motivational compatibility and processing effort, the present study also provided us with an opportunity to (re)assess Schwarz’s (e.g., 1990; 2001) proposal that positive, relative to negative, moods elicit a processing style that bolsters creativity. In Experiments 1 and 2, there were no main effects of mood on our creativity measures (controlling for sheer fluency). Post hoc analyses of the results of Experiment 1 did reveal a tendency for positive mood to enhance the creativity of the first response generated by participants; however, post hoc analyses of the results of Experiment 2 failed to replicate this effect, and instead revealed a tendency for positive mood to enhance only the creativity of later responses (in the third ordinal position and onward). Finally, in contrast to both these sets of findings, our analyses of Experiment 3 revealed only a crossover interaction between mood and task framing on creativity, one that mirrored the pattern obtained with respect to the number of responses generated.
Given these starkly inconsistent findings, it can only be concluded that if positive mood does generally bolster creativity, it may do so rather unreliably. Moreover, as suggested by the results of Experiment 3, when mood does significantly influence creativity, it may operate interactively, with either positive or negative mood bolstering the generation of innovative responses depending upon how the task is construed. If the latter holds true, it might suggest that positive and negative affective states elicit different amounts of processing effort depending on whether the task is fun or “serious,” and that these variations in effort sometimes exert parallel influences on creativity, even when holding sheer fluency constant. Alternatively, yet less parsimoniously, it might suggest that positive and negative affective states elicit qualitatively different modes of thought (e.g., creative vs. conservative processing styles) depending on whether the task is fun or “serious.” By this account, positive and negative affective states would either increase or decrease creativity, depending upon whether the processing style they elicit in the context at hand facilitates or impairs creative thought. In sum, if our findings are any indication, a great deal of additional research will be required to elucidate the manner in which affect influences creativity and to determine the process or processes by which this influence is wrought.

Alternative Explanations

In recent years, a number of innovative theories have been developed to account for the influence of affect on processing effort (see Martin & Clore, 2001, for a review). Again, our motivational compatibility account represents a direct extension or corollary of the feelings-as-information framework devised by Schwarz and his colleagues. However, we have also considered in earnest how other theories distinct from this foundational framework may account for all or part of our findings.

Mood as input. According to Martin’s mood as input theory, the information conveyed by positive and negative affective experiences can lead to either increments or decrements in processing effort, depending upon which stop rule is adopted during task engagement. With respect to enjoyment-based stop rules (i.e., stop when you no longer feel like continuing), Martin and his colleagues (e.g., Hirt et al., 1997; Martin & Stoner, 1996) have found that participants in positive affective states misattribute their pleasant feelings to task enjoyment and exert more processing effort than participants in negative affective states, who misattribute their unpleasant feelings to a lack of task enjoyment. Correspondingly, with respect to performance-based stop rules (i.e., stop when you think it is a good time to stop), Martin and his colleagues have found that participants in positive affective states misattribute their pleasant feelings to having made adequate progress on the task and thereby withdraw processing effort sooner than participants in negative affective states, who misattribute their unpleasant feelings to having failed to make adequate progress.

Upon consideration, it is possible that this elegant model may account for our interactive effects of mood and task framing on processing effort. Specifically, it may be the case that our fun task framing manipulations inadvertently introduced an enjoyment-based stop rule, leading participants to infer that they should stop generating responses when the task was no longer fun. In corresponding fashion, our serious task framing manipulations may have inadvertently introduced a performance-based stop rule, leading participants to infer that they should stop generating responses when they had produced enough.

While this remains a viable possibility, there are a number of arguments to be made against this alternative account. First, in all three experiments, we attempted to mitigate the possibility of participants spontaneously adopting different stop rules by explicitly instructing them to stop when they had produced as many responses as possible (akin to our having assigned a performance-based stop rule across conditions). Second, this account can not explain why participants in the serious task framing conditions in our first two experiments performed similarly irrespective of mood—this should not have been the case if serious framing merely led to adoption of performance-based stop rules. Third, mood as input cannot readily explain our interactive effects of mood and task framing on measures of task motivation and expected task liking collected prior to task engagement.
(Experiment 3). By definition, stop rules should only operate after the task has started (thereby imposing the decision to stop or to continue). If our framing manipulations merely elicited different stop rules, the mood as input model, as it stands, offers no reason to believe that they should influence task motivation before the task has even begun; rather, they should only factor into decisions regarding the allocation of processing effort once task performance is already underway. This argument gains additional weight in light of our finding that pretask motivation statistically mediated the relationship between our experimental factors and processing effort. This, again, implies that the psychological forces ultimately engendering variation in processing effort were active prior to task engagement and thereby before stop rules had become relevant.

Beyond these methodological and empirical points, it may be argued that stop rules may, in actuality, have no direct influence on processing effort, but rather that enjoyment-based rules lead individuals to infer that the task is “fun,” whereas performance-based rules lead individuals to infer that the task is “serious,” and thereby exert their effects by dint of the very same motivational compatibility processes that have been proposed at present. Frankly, we by no means believe this is normally the case. Instead, as discussed earlier, we feel that Martin and his colleagues (see Martin, 2001, for a review) have compellingly demonstrated one way in which affective states, by means of the information they provide, may interactively influence task engagement and performance (cf. Gasper, 2003). Our objective has solely been to suggest another way in which feelings (as information) may influence processing effort in a context-dependent manner. Additional research is much needed to determine the conditions that lead individuals to adopt different stop rules, and whether, at least under some circumstances, these conditions may include task instructions implying that a given activity is fun or “serious.”

The hedonic contingency model. Another major conceptual framework that predicts interactive effects of mood and task construal on processing effort is the hedonic contingency model (HCM) proposed by Wegener and his colleagues (Wegener & Petty, 1994; Wegener, Petty, & Smith, 1995). According to this learning-theoretical model, positive and negative affective states serve as discriminative stimuli that signal which reinforcement contingencies are currently in force. For individuals in positive affective states, it is presumed that the majority of available activities will make them feel worse. Therefore, positive moods are hypothesized to signal that reinforcement will follow only when the activity engaged in is hedonically quite positive. As such, individuals in positive moods will invest effort only in affectively uplifting tasks and withdraw effort from all other tasks, particularly those that are construed as depressing. In contrast, for individuals in negative affective states, it is presumed that virtually any available activity will make them feel better. Based on this logic, negative moods are hypothesized to signal that reinforcement will likely follow, regardless of whether the activity engaged in is hedonically positive or negative. Individuals in negative moods are therefore predicted to invest processing effort in both relatively uplifting and depressing tasks.

The hedonic contingency model may be applicable to our findings if it is assumed that tasks framed as fun were construed by participants as uplifting and that tasks framed as serious were construed by participants as depressing. While labeling a task as fun, by definition, suggests that it will be affectively uplifting, it may be argued that labeling a task serious does not necessarily imply that it will be depressing. In fact, participants in the present experiments may have viewed tasks framed as serious as potentially rewarding, inasmuch as they were helping psychologists learn about presumably important cognitive processes (as explicitly suggested in Experiments 1 and 2) and the impact of the media on society (as implied in Experiment 3).

Still, a plausible case may certainly be made that tasks framed as fun were expected by participants to be more affectively uplifting than those framed as “serious.” Assuming that fun condition may indeed be treated as uplifting and the serious condition as depressing, the HCM would therefore predict that participants in positive moods would invest more processing effort in tasks framed as fun than those framed as serious,
whereas participants in negative moods would invest equivalent amounts of processing effort in both fun and serious tasks. However, the findings at hand were largely inconsistent with these predictions. To review, in Experiments 1 and 2, participants in negative moods invested more processing effort in tasks framed as serious than those framed as un” and participants in positive moods demonstrated equivalent amounts of effort between conditions. In Experiment 3, participants in positive moods indeed invested more processing effort in fun (presumably uplifting) than in serious (presumably depressing) tasks, yet once again, inconsistent with an HCM analysis, participants in negative moods invested differential amounts of effort in the fun and serious conditions. Notably, if our serious framing condition were indeed construed by participants as depressing, rather than merely “important,” it would suggest that individuals in negative moods reliably prefer to engage in tasks that will make them feel worse rather than better, a clear violation of the hedonic principle (i.e., the overarching imperative to seek pleasure and avoid pain). This principle is a core assumption of the hedonic contingency model (as well as most other social psychological theories relating affect and cognition; but see Martin, 2001). Based largely upon these considerations, it is unlikely that the hedonic contingency model, as it stands, can account for the present findings.

Future Directions

While the present study focused on creative generation, the motivational compatibility account advanced at present may also have important implications for behavior in various and sundry other domains. Chief among these in our minds is the domain of persuasion. As discussed earlier, a great deal of evidence has been adduced to support the notion that negative, relative to positive moods, increase the effort invested in processing persuasive messages (see Schwarz et al., 1991, for a review). However, examination of the procedures used in these studies suggests that the persuasive messages administered to participants have almost invariably pertain to relatively serious issues, for instance, the issue of whether student services fees should be changed (e.g., Bless et al., 1990), or whether buildings should be made more accessible via wheelchair ramps (Bohner, Crow, Erb, & Schwarz, 1993). As such, from our perspective, these studies may have only tested the effect of mood on processing effort on serious tasks. It is therefore predicted that if the communications provided to participants pertained to, or were framed as pertaining to, fun or silly issues, participants in negative moods would exert less, rather than more, processing effort than those in positive moods (cf. Wegener et al., 1995). Additionally, in line with the feelings-as-information framework from which our model is derived, it is also predicted that these interactive effects of mood and message framing should be eradicated (or overcorrectively inverted) when the positive and negative affective states driving them are rendered irrelevant by the provision of source cues (Sinclair, Mark, & Clore, 1994).

However, regardless of whether these predictions regarding mood effects on persuasion are empirically borne out, an important caveat must be expressed regarding the generalizability of the present motivational compatibility account to other behavioral domains. There is a prodigious and growing body of evidence that mood influences task performance through mechanisms other than sheer processing effort. For instance, in one provocative study, Bless, Clore, Schwarz, Golisano, Rabe, and Wölk (1996) found that positive, relative to negative, mood led to increased use of cognitive scripts. Critically, this effect was not mediated by differences in processing effort. Based on this, and other evidence, Bless and Fiedler (Bless, 2001; Bless & Fiedler, 1995) have suggested that positive moods promote the use of general knowledge structures (e.g., scripts and heuristics), whereas negative moods promote attention to the data at hand. Simply stated, our account, which solely predicts differences in processing effort, is silent on these findings, which resoundingly support the general proposition that positive and negative moods elicit qualitatively different processing styles (cf. Schwarz, 1990). In light of these compelling findings, and consistent with Schwarz’s (1990) original reasoning, it is likely that mood substantively influences both processing effort and processing style; yet, the manner in which these
quantitative and qualitative processes operate and interact is still very poorly understood.

In conclusion, we hope that the present findings will help elucidate the multifarious influence of affect on task performance. At the very least, we hope that in tandem with the pivotal work of Martin (2001) and others, the present findings will help spur additional research aimed at demonstrating the context-dependent nature of mood effects on cognitive processing. If our account weathers the crucible of empirical scrutiny, it will serve as yet another testament to the flexibility and predictive utility of the feelings-as-information framework.

References


