# The Epistemic Benefits of Trait-Consistent Mood States: An Analysis of Extraversion and Mood

Maya Tamir
University of Illinois at Urbana–Champaign

Michael D. Robinson
North Dakota State University

Gerald L. Clore
University of Virginia

One must consider both trait and state affect to predict individual differences in emotional processing. The present results document a novel trait–state interaction that is consistent with proposals concerning the epistemic functions of affect (A. R. Damasio, 1994). Four studies tested the effects of extraversion and mood on motivation-relevant processing. Study 1 measured naturally occurring mood, whereas Studies 2–4 manipulated mood. Extraverts were faster to link events to their personal motivations when in a positive mood state, whereas introverts were faster to do so in a neutral or negative mood state. Further findings indicate that this interaction affects attitude accessibility rather than event elaboration. Overall, the authors suggest that there are pragmatic benefits to trait-consistent moods, particularly for processing motivation-relevant stimuli.

Psychologists know a good deal about the effects of personality traits (Derryberry, 1987) and mood states (Niedenthal & Setterlund, 1994) on emotional processing but comparably little about how traits and states interact. In the present article, we provide support for a new cognitive model of Trait × State interactions, one that is based on the information provided to individuals from both their enduring dispositions (Damasio, 1994) and their momentary mood states (Schwarz & Clore, 1996). In brief, we propose that both personality traits and mood states convey information about the self in the world. When traits and states mismatch, epistemic uncertainty results. This causes a delay when a person is asked to encode new events with reference to his or her feelings or motivations.

## Epistemic Certainty

Affect signals one's state within the environment. According to Shweder (1994), people consider emotional experience when assessing whether the world is beneficial with regard to their identity concerns. Like affective states, personality can also provide people with important information about themselves. Robinson and colleagues (Robinson & Clore, 2002; Robinson, Robertson, & Syty, 2002) have suggested that self-report measures of emotional traits tap a set of beliefs about one's emotions in general and in response to particular kinds of situations. According to their arguments, a useful approach to understanding Person × Situation interactions is to view self-reported personality as a set of beliefs about the self that may or may not be activated by any particular situation.

Thus, both momentary affective reactions and stable emotional traits can yield information that is relevant to the self. But how do these separate sources of information interact? A possible answer can be derived from theories of the self-concept. In this respect, Epstein (1973) defined the self-concept as a self-theory that includes major postulate systems about the nature of the world, the nature of the self, and their interaction. He suggested that people strive to validate their self-theories, as a good self-theory enables people to understand, predict, and control the nature of their social reality.

Following this logic (self-concept = self-theory), personality might be viewed as a hypothesis about the self, whereas momentary experience might be viewed as a potential test of that hypothesis. Beliefs, as suggested by Olson, Roese, and Zanna (1996), always lead to expectations. When expectations are met, one gains confidence in them, and information processing flows smoothly. When expectations are not met, by contrast, one is forced, at least temporarily, to reevaluate them. During this time, information

Maya Tamir, Department of Psychology, University of Illinois at Urbana–Champaign; Michael D. Robinson, Department of Psychology, North Dakota State University; Gerald L. Clore, Department of Psychology, University of Virginia.

We acknowledge support from National Science Foundation Grant BCS-9817649 to Michael D. Robinson and National Science Foundation Grant SBR 96-01298 and National Institute of Mental Health Grant MH 50074 to Gerald L. Clore.

Correspondence concerning this article should be addressed to Maya Tamir, Department of Psychology, University of Illinois at Urbana–Champaign, 603 East Daniel Street, Champaign, Illinois 61820. E-mail: tamir@s.psych.uiuc.edu

Journal of Personality and Social Psychology, 2002, Vol. 83, No. 3, 663–677
 0022-3514/02/$5.00 DOI: 10.1037//0022-3514.83.3.663

processing, especially with respect to new events, does not flow smoothly. In the current context, we propose that when trait and state affect match, one's self-theory is validated, and the world becomes subjectively more predictable.

Some support for this hypothesis has already been provided in research focusing on self-esteem (Swann, 1987; Swann, Griffin, Predmore, & Gaines, 1987; Swann, Stein-Seroussi, & Giesler, 1992). This research has examined the interaction between stable self-esteem and social feedback. When people with high self-esteem receive positive feedback, they find it to be more reliable and therefore assess the evaluator as more trustworthy; by contrast, people with low self-esteem find negative feedback to be more reliable. As concluded by Swann (1987), a match between social feedback and chronic self-views is beneficial in the sense that self-confirmatory evidence fosters a sense of existential security. Apart from these epistemic concerns, self-verifying feedback also has pragmatic implications. When it matches chronic self-views, social interactions proceed more smoothly (Swann & Schroeder, 1995).

## Extraversion, Mood States, and Performance

Swann's (1987) research focused on social feedback rather than on affect, the focus of our investigation. We concentrate on the personality trait of extraversion because it is the trait that has most consistently been linked to both emotional experience and cognitive performance (Matthews & Gilliland, 1999). On the basis of Gray's (1970, 1981) theory, several authors have proposed that extraversion is the manifestation of individual differences in the behavioral activation system, which is sensitive to signals of reward (Carver, Sutton, & Scheier, 2000; Larsen & Ketelaar, 1991; Zelenski & Larsen, 1999). From this theoretical view of extraversion, one might predict that extraverts would be generally efficient at encoding rewarding stimuli (Rusting & Larsen, 1998). Eysenck (1967), on the other hand, did not view extraversion in terms of reward sensitivity but rather in terms of individual differences in cortical arousal. According to Eysenck, extraverts have a lower level of cortical arousal relative to introverts. Furthermore, on the basis of curvilinear views of the relation between arousal and performance (Duffy, 1951; Martin, 1973), introverts outperform extraverts under low-arousal conditions, whereas the reverse is true under high-arousal conditions.

One of the important differences between Gray (1970, 1981) and Eysenck (1967) involves their different views of Extraversion $\times$ State interactions, which is of particular interest in the present context. For Eysenck, extraversion interacts with environmental arousal. For Gray, on the other hand, extraversion interacts with the reward contingencies of the environment. Although there have been many attempts to test predictions of these two important theories, the support that they have received is far from being conclusive (Matthews & Gilliland, 1999). Nevertheless, it is clear that extraversion and state factors often do interact in predicting performance (Revelle, 1993).

The present studies, in addition to testing our affective certainty model, also test a recent elaboration of Gray's (1970, 1981) theory proposed by Rusting (1998, 1999). Rusting was concerned with the following question: If extraversion is related to reward sensitivity (Gray, 1981) and happy mood states sensitize individuals to positive information (Bower, 1981; Forgas, 1995), what happens when both extraversion and mood states vary? Rather than proposing that extraversion and happiness additively influence reward sensitivity, Rusting proposed that they do so interactively. Specifically, although extraverts tend to be more sensitive to environmental rewards than introverts are, this differential sensitivity is enhanced by positive mood states. Thus, happy extraverts should be particularly good at encoding positive stimuli (Rusting, 1999).

With regard to one's ability to encode environmental rewards, Rusting's (1999) model and our affective certainty model make similar predictions: Happy extraverts should be faster than happy introverts. However, the affective certainty model makes two additional predictions that Rusting's (1999) model does not. First, the interaction should be crossover in nature. That is, unhappy introverts should be faster at encoding rewards than unhappy extraverts are. This is because trait and state match in the former case and mismatch in the latter. Second, the affective certainty model predicts that motivation-related processing in general is facilitated by a trait–state match. That is, happy extraverts should not just be faster to encode rewards; they should also be faster to encode punishments as well as motivationally insignificant stimuli (i.e., something that is neither wanted nor unwanted). This is because a match between trait and state engenders affective certainty, leading to efficiency in linking new events to one's desires.

In short, when trait and state match, it is easier to assign motivational significance to new events. When trait and state mismatch, by contrast, affective uncertainty results. It then becomes more difficult to assign motivational significance to new events, precisely because the affect system is conflicted.

## Testing the Affective Certainty Model

The current studies offer a way of empirically testing the existing theories of extraversion and emotional processing mentioned above. Our studies also suggest a new framework for the interpretation of Extraversion $\times$ State interactions that is based on the affective certainty model. According to the model, happy mood states signal different things to extraverts and introverts. Considering the strong relation between extraversion and positive affect (Argyle & Lu, 1990; Costa & McCrae, 1980; Lucas & Fujita, 1999; Watson, 2000; Watson & Clark, 1997), it is reasonable to assume that extraverts believe that they are happy individuals, whereas introverts do not. A happy mood state therefore represents a confirmation of trait expectations for extraverts but disconfirmation for introverts. Thus, we suggest that there are epistemic benefits to happy mood states for extraverts and unhappy mood states for introverts.

Following Swann's (1987) lead, we believe that our affective certainty model has particular applications to self-relevant affective judgments. This is because a simultaneous focus on both the self and one's affective reactions increases the salience of discrepancies between trait and state affect. Such a proposal also fits with the literature on objective self-awareness (Duval & Wicklund, 1972): When people are focused on themselves, they are more likely to note discrepancies between self-beliefs and momentary behaviors or experiences. To test both the robustness and the specificity of our affective certainty model, we conducted a series of four studies.

We hypothesized that happy introverts and unhappy extraverts (vs. unhappy introverts and happy extraverts) would have trouble

deciding how they feel about events in their environment. In both of these cases, trait and state affect should give conflicting signals, rendering the person less confident in his or her ability to indicate personal preferences. To assess this prediction, we created a computer program to measure the latency of making self-relevant preferences. Participants were asked to identify desirable and undesirable words within different blocks. We specifically focused participants on their personal desires by asking them to think about things that they want and don't want in life. As should be clear, we expected extraversion and mood states to interact, such that happy extraverts and unhappy introverts would be faster.

In the first study, we tested our hypothesis within the context of normally occurring mood states. In Studies 2, 3 and 4, we attempted to replicate the interaction by manipulating mood state. In the latter studies, we also included other computer tasks to more precisely focus on the stages of processing that are vulnerable to affective uncertainty. For example, we did not expect extraversion and mood states to interact in tasks that were not self-relevant, precisely because one's affective reactions are irrelevant to such tasks.

## Study 1

In Study 1, a large sample of participants performed a reaction time (RT) task (described below), then reported on their mood states over the past week as well as their level of extraversion.

### *Method*

#### *Participants*

Participants were 102 undergraduates at the University of Illinois at Urbana–Champaign who participated in return for partial credit toward a course requirement. All participants were fluent English speakers.

#### *Materials*

*Want/don't want task.* After a short practice block, participants completed the want/don't want task. The task involved hitting the spacebar of a computer keyboard if a single word presented on the computer screen belonged to a certain category (e.g., if the word was neutral). The task included three parts (referred to as *blocks*). In the first block, participants were asked to respond to words representing things they would typically want or desire (i.e., *want*). In the second block, they were asked to respond to words representing things they would typically not want or, rather, would want to avoid (i.e., *don't want*). In the final block, they were asked to respond to neutral words, words representing things that were neither wanted nor unwanted.

Three categories of words were included in all blocks: The want category included words such as *love* and *happiness*. The don't want category included words such as *failure* and *pain*. The neutral category included words such as *afternoon* and *definition*. Each category included seven words. Appendix A includes the list of all words used in each category.

Each block in the task included 63 trials, in which all neutral, want, and don't want words were presented in random order, subject to the constraint that each word was presented three times. Each word disappeared once a participant made a response or after 0.7 s in the case of no response.

*Mood measures.* Mood was measured by the 10 positive and 10 negative affect items from the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). Participants were asked to rate how they felt "during the last week including today" on a scale from 1 (*very slightly or not at all*) to 5 (*extremely*).

*Extraversion scale.* Extraversion was measured by Goldberg's (1997) Big Five International Personality Item Pool (IPIP) scales (short form). The scales involve agreeing or disagreeing with statements indicative of high or low extraversion (e.g., "talk to a lot of different people at parties"). For evidence on the reliability and validity of the scales, see Goldberg (1997).[1]

#### *Procedure*

The study was conducted in groups of 4–8 participants in each session. After filling out an informed consent form, each participant was seated in front of a personal computer. Participants first completed the want/don't want task. The instructions for the task appeared on the screen, and participants were asked to hit any key to begin. Following this task, they filled out the PANAS (Watson et al., 1988) and then the extraversion scale (Goldberg, 1997). Finally, participants were debriefed and thanked for their participation.

### *Results*

#### *Want/Don't Want Scores*

As indicated above, words were presented for only 700 ms each. Although participants clearly performed above chance at this presentation rate (percentages of correct endorsement were 79%, 82%, and 60% for want, don't want, and neutral blocks, respectively), it was also apparent that both RT and accuracy were of interest. Furthermore, an analysis revealed that more accurate participants were faster than were less accurate participants ($r = -.48$). This correlation indicates that participants primarily fell into two groups, those who were good at the task (i.e., high accuracy and fast RT) versus those who were bad at the task (i.e., low accuracy and slow RT).

To take advantage of the strong inverse correlation between speed and accuracy, we created modified RT scores. Within each block—want, don't want, and neutral—there were 21 opportunities for making a correct endorsement. If a participant failed to recognize a word in time, we gave that trial the word disappearance latency (i.e., 700 ms). We then replaced times that were two standard deviations above or below the mean, as outliers can be a substantial problem in RT research (Ratcliff, 1993). Finally, RT scores were log transformed to normalize the distribution and then averaged within each block (i.e., each mean was composed of 21 observations).

#### *Correlations Among Variables*

We computed a hedonic balance mood score by subtracting negative affect over the last week from positive affect. Most people had a positive score ($M = 0.85$), indicating more positive than negative affect (Diener & Diener, 1996). As has often been found, extraverts reported a more positive hedonic balance ($r = .22$, $p < .05$). However, in a series of bivariate correlations, there were no significant correlations between extraversion and hedonic balance, on the one hand, and want, don't want, or neutral RT scores, on the other.

[1] The reliability of the scale was also measured in each of the studies reported. Cronbach's alphas ranged from .82 to .90.

### *Interactive Effects on Performance*

We expected happy extraverts and unhappy introverts to be fast on the want/don't want task (relative to unhappy extraverts and happy introverts). To assess this interaction hypothesis, we first centered extraversion and hedonic balance scores (Aiken & West, 1991). We then used the general linear model procedures of SAS 8.1 to test the full 2 (extraversion) × 2 (mood state) × 3 (block speed: want vs. don't want vs. neutral) design. In this design, the first two variables were continuous between-subjects variables, whereas the third was a three-level, within-subject variable. All two-way and three-way interactions were simultaneously tested.

As suggested by the correlations above, there were no main effects for extraversion or mood state. However, there was a significant two-way interaction involving these variables, $F(1, 102) = 4.45$, $p < .05$. Collapsing across blocks of the want/don't want task, we found that introverts (one standard deviation below the extraversion mean) were faster when in a relatively negative mood (one standard deviation below the mood state mean) than a relatively positive mood (one standard deviation above the mood state mean). By contrast, mood state had the opposite effect among extraverts (one standard deviation above the extraversion mean). These means are reported in Figure 1. For the sake of interpretability, all means are reported in terms of milliseconds rather than log-transformed values.

The three-way Extraversion × Mood State × Block Speed interaction was not significant ($F < 1.00$). The lack of a three-way interaction runs counter to priming notions of Trait × State interactions (Rusting, 1998, 1999). For example, being happy did not just make extraverts faster at the want task; it also made them faster at the don't want and neutral tasks.

Overall, the results offer strong initial support for the idea that trait and state mismatches produce affective uncertainty. It should be noted that gender was initially included in all the analyses reported above. However, it did not lead to any significant effects. Because we also did not anticipate such effects on the basis of any theoretical considerations, we did not include gender in further analyses.

### *Discussion*

The results of Study 1 provide support for the affective certainty model that we propose. Extraverts who reported being in a more positive (vs. less positive) mood state were faster to categorize desirable, undesirable, and motivationally insignificant words. The opposite pattern was found for introverts.

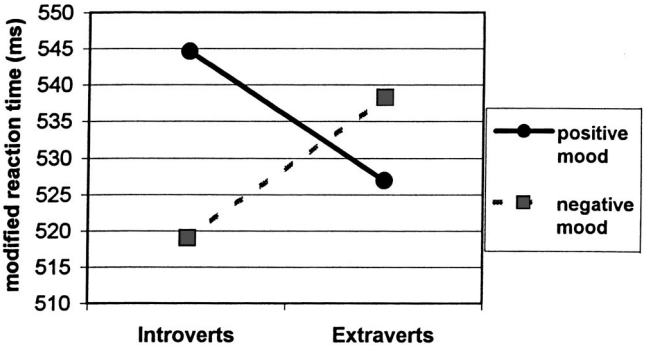


*Figure 1.* Modified reaction time on the want/don't want task as a function of extraversion and self-reported mood (Study 1).

These results, in addition to being compatible with the affective certainty model, are also incompatible with other models. First, on the basis of the idea that extraverts are impulsive (Cooper & Brebner, 1987), one might expect extraverts to be faster than introverts regardless of mood state. Because there was no main effect for extraversion, such a model cannot account for the present findings. Alternatively, on the basis of the idea that extraverts are particularly sensitive to rewards (Gray, 1970, 1981; Zelenski & Larsen, 1999), one might expect extraverts to be faster than introverts on the want block but perhaps equal in speed on the other blocks. Because there was no Extraversion × Block interaction, such a model also cannot account for the present findings. Finally, on the basis of a network model of affect (Bower, 1981; Forgas, 1995), one might expect happy extraverts to be particularly fast at the want block but not at the don't want or neutral blocks. Because there was no three-way interaction of Extraversion × Mood State × Block, the present findings cannot be interpreted as a case of mood-congruent priming. Indeed, only the affective certainty model appears capable of explaining the interaction.

A strength of Study 1 is that it was based on naturalistic self-reports of mood. As suggested by Rusting (2001), mood studies in which mood states are merely measured, as opposed to being manipulated, may offer a more realistic portrayal of the typical relations involving personality, mood, and cognition. However, because extraversion and mood were significantly correlated in our sample and because we did not manipulate mood, it is still not completely clear that mood states are playing a significant role. An additional study that uses a mood manipulation might help clarify the contributions of mood state to the obtained interaction.

Another important assumption of the affective certainty model is that a match between trait and state affect should facilitate self-relevant affective processing but not speed of processing per se. The results of Study 1 are certainly consistent with this hypothesis. However, because no control task was included, at this stage it is also plausible to assume that a match between trait and state leads to general cognitive efficiency. In this regard, a parallel interaction on neutral cognitive performance might suggest that arousal, not affect, is responsible for our interaction (Eysenck & Eysenck, 1985). To test whether our interaction is unique to tasks in which affect plays an important role, it is desirable to include a nonaffective task as well.

Finally, the task in Study 1 was less than ideal in one respect. The short exposure time of the words led to relatively low accuracy rates. Although speed and accuracy were negatively correlated, which ruled out any type of speed–accuracy trade-off, it seems desirable to replicate the interaction using unmodified RTs as the dependent measure. In Study 2, therefore, we increased word presentation time.

## Study 2

Study 2 was designed to replicate Study 1 while ruling out some of its ambiguities. First, unlike Study 1, which was based on naturalistic self-reports of mood, Study 2 involved a mood induction. Specifically, we asked participants to listen to music prior to performing the want/don't want task (Eich & Metcalfe, 1989;

Niedenthal & Setterlund, 1994; Parrott & Sabini, 1990). Unbeknownst to them, they were randomly assigned to a condition in which the music was light and upbeat (happy) or heavy and morose (sad). In the present context, the music induction procedure had several advantages. First, by using a relatively subtle induction, we were unlikely to wipe out preexisting personality differences (Rusting, 2001). Second, by manipulating mood states in the absence of obvious self-relevance, we can provide support for the key idea that mood states rather than thoughts about the current situation are key to the affective certainty model.

Also, to overcome the ambiguity concerning the modified RTs examined in Study 1, we changed the exposure time of the words in the processing task. This allows us to safely distinguish between slow RTs and nonresponses. In addition, decreasing the variation in accuracy rates allows us to focus on RTs exclusively.

Finally, we included a neutral control task in which participants were asked to recognize animal words as well as nonanimal words. Performance on this task should be helpful in revealing the locus of the interaction reported in Study 1—either affective certainty or more general cognitive efficiency.

## Method

### Participants

Thirty-four undergraduate students at the University of Illinois at Urbana–Champaign participated in return for partial credit toward an introductory psychology course requirement. All participants were native English speakers.

### Materials

*Mood induction.* We induced mood by having participants listen to pieces of classical music. To induce happy feelings, we used recordings of *Ein Kliene Nacht Musik* by Mozart. To induce sad feelings, we used recordings of *Adagietto* by Mahler. These musical pieces have been successfully used to induce positive and negative mood in prior research (Eich & Metcalfe, 1989; Niedenthal, Halberstadt, & Setterlund, 1997; Niedenthal & Setterlund, 1994).

*Want/don't want task.* The task was identical to the one used in Study 1, with one exception. Each word trial was now terminated when participants hit the keyboard spacebar or after 1,500 ms, whichever occurred first.

*Neutral control task.* The control task was a choice RT task that required participants to press the *9* key if a word represented an animal (e.g., *cat*) and the *1* key if the word did not represent an animal (e.g., *chair*). The task included eight animal words and eight nonanimal words that were presented in random order for a total of 30 trials. Each trial ended once the participant made a response. Participants first completed 15 practice trials and then completed the 30 target trials. Short beeps were presented for mistaken classifications.

*Extraversion scale.* As in Study 1, extraversion was measured by Goldberg's (1997) Big Five IPIP scales (short form).

### Procedure

Participants were tested in groups of 4–6, with each participant seated at a private cubicle. Participants first completed an informed consent form, and then they were randomly assigned to either the positive mood condition or the negative mood condition. To disguise the mood induction, we gave all participants the following cover story, on the basis of the procedure used in Niedenthal et al. (1997): "This study investigates how different people judge different types of music and how the music affects cognitive tasks. We would like you to listen to some music for some time and then perform a task on the computer."

Participants were then given headphones and listened to either sad or happy music for 12 min. After the music, participants completed the computer tasks. Participants first completed the neutral (i.e., animal) control task and then completed the want/don't want task. As in Study 1, the instructions for the tasks appeared on the screen, and participants were asked to hit any key to begin.

After the computer tasks, participants completed the extraversion scale. Finally, to evaluate the effectiveness of the mood manipulation at the end of the experiment, we asked participants to retrospectively rate how they felt when listening to the music (1 = *sad,* 5 = *happy*). We asked participants to rate their feelings at the end of the experiment and not immediately after the mood induction to avoid demand characteristics (Bower & Forgas, 2000). In this connection, asking people to label their mood states (vs. not) prior to the collection of data often changes the nature of the mood effects (Wyer, Clore, & Isbell, 1999). Because we were most interested in the implicit effects of mood, we decided not to perform the manipulation check until after the primary data were collected.

## Results

### Mood Manipulation Check

The manipulation used in this study has been repeatedly found to influence mood in previous research. However, as a manipulation check, we asked participants at the end of the study to retrospectively rate how the music made them feel during the experiment. To test whether the manipulation influenced the retrospective mood report, we ran a univariate analysis of variance (ANOVA), with mood condition (positive vs. negative) as the independent variable and mood ratings as the dependent variable. The effect was significant, $F(1, 32) = 9.13$, $p < .01$, such that individuals in the positive music condition rated their mood more positively than did those in the negative condition.

### Want/Don't Want Task

As in Study 1, a separate RT score was computed for each of the blocks: want, don't want, and neutral. The practice block was discarded along with error trials. Unlike in Study 1, nonresponses were not included in the computation of RT scores. We computed cutoff scores using two standard deviations above and below the mean. We then log transformed the scores and averaged them within each block. This resulted in three separate RT scores, one for each of the three blocks. As expected, correct endorsement rates were much higher than in Study 1 (98%, 95%, and 92% for the want, don't want, and neutral blocks, respectively).

To test the affective certainty hypothesis, we used the same regression procedure described in Study 1. In this case, extraversion was a continuous between-subjects variable, mood condition (−1 = sad, 1 = happy) was a two-level, between-subjects variable, and block was a three-level, within-subject variable. As in Study 1, no significant main effects were found for either mood condition, $F(1, 32) = 2.61$, $p > .10$, or extraversion ($F < 1.00$). However, as predicted, there was a significant Mood Condition × Extraversion interaction, $F(1, 32) = 6.15$, $p < .05$. To plot the nature of the interaction, we used the same procedure described in Study 1 (with 1 and −1 representing the mood conditions, −1 standard deviation for introverts and 1 standard deviation for extraverts).

Figure 2 plots the resulting interaction. As in Study 1, extraverts were faster on all blocks of the want/don't want task when in the happy (vs. sad) mood condition, whereas the opposite pattern emerged for introverts. This interaction provides further support for our hypothesis that individuals are more efficient in processing motivationally significant information when trait and state affect match.

We also examined the three-way interaction to test the personality-as-moderator approach (Rusting, 1998) of Trait × State interactions. However, as predicted, the three-way interaction was not significant ($F < 1.00$), indicating that valence-specific priming did not occur.

Finally, we tested for a possible speed–accuracy trade-off. As in Study 1, we found a significant negative correlation between RTs and accuracy rates ($r = -.38$, $p < .05$), meaning that faster RTs were associated with higher accuracy rates. In addition, we repeated the regression analyses conducted with RT scores using accuracy scores. No main effects were found for mood condition or extraversion ($F$s $< 1.00$), and the two-way interaction was also not significant ($F < 1.00$). Thus, the affective certainty interaction relates to RT facilitation rather than to bias in responding.

### *Neutral Categorization Task*

Mean accuracy on the animal categorization task was 94.5% and did not vary by extraversion, mood condition, or their interaction ($p$s $> .10$). In the computation of mean RT scores (mean RT = 620 ms), error trials were removed, outliers (plus or minus two standard deviations) were replaced, and values were log transformed before being averaged. Again, with RT scores as the dependent measure, there were no main effects, and there was no Extraversion × Mood Condition interaction ($p$s $> .10$). These results support the idea that a Trait × State match facilitates motivation-relevant cognitive processing specifically rather than cognitive processing more generally.

### *Discussion*

Replicating the results of Study 1, Study 2 found that extraverts were faster to categorize self-relevant affective words when in a positive (vs. negative) mood state. By contrast, introverts were faster to categorize motivation-relevant events when in a negative (vs. positive) mood state. In addition, Study 2 confirms that mood states play a significant role in affective certainty. Because participants were randomly assigned to mood conditions, the interaction cannot be ascribed to the fact that extraverts are often in a more positive mood state than are introverts.

Study 2 also provides support for the prediction that a trait–state match should facilitate affective but not nonaffective processing (as might be predicted by theories of extraversion and arousal; Matthews & Gilliland, 1999). Whereas the Extraversion × Mood Condition interaction on affective processing was replicated for the second time, there was no such interaction on the nonaffective task RTs. Other potential effects, such as those involving trait or mood congruence (Rusting, 1998), were similarly not supported.

Finally, Study 2, unlike Study 1, shows that affective certainty speeds affective decisions. By increasing word presentation time in Study 2, we were able to examine pure RT scores. Thus, the current version of the processing task provides a better test of the idea that affective certainty facilitates self-relevant affective processing.

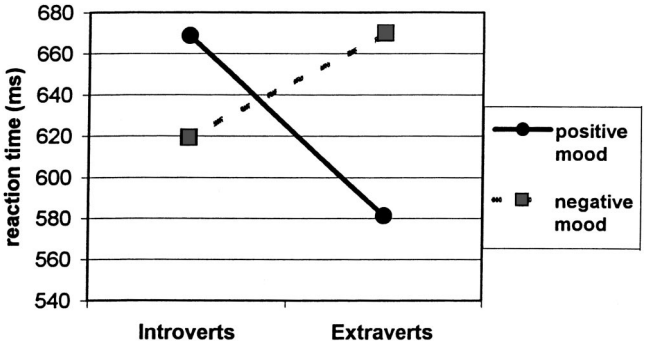


*Figure 2.* Reaction time on the want/don't want task as a function of extraversion and mood condition (Study 2).

## Study 3

Studies 1 and 2 have shown that when extraverts are in a more positive mood and when introverts are in a less positive mood, they are better at categorizing motivationally significant information. We account for this interaction by proposing that one accesses both mood states and chronic beliefs about one's emotions when making self-relevant choices. When the two sources of information mismatch, as in the case of happy introverts or unhappy extraverts, affective uncertainty is created, leading to slower decision times.

In Studies 1 and 2, mood states were treated as bipolar (see Green & Salovey, 1999, for arguments in favor of this operationalization). Treating mood states as bipolar, however, creates some ambiguity concerning whether positive or negative mood states or both are driving the interaction. Study 3 was designed to speak to this issue. Specifically, we randomly assigned participants to sad, neutral, or happy conditions. Because extraversion typically correlates more strongly with positive than with negative mood states (Watson, 2000; Watson & Clark, 1997), we expected the neutral versus happy comparison to replicate the pattern found in Studies 1 and 2.

### *Method*

### *Participants*

Sixty-three undergraduates at the University of Illinois at Urbana–Champaign participated in return for partial credit toward an introductory psychology course requirement. All participants were native English speakers.

### *Materials*

*Mood induction.* The procedure was identical to the one used in Study 2, except that a neutral control group was included. Participants in the neutral mood group did not listen to any music but instead completed a neutral version of the Sentence Completion Task (Srull & Wyer, 1979). The task lasted about 5 min and was expected to attenuate preexisting happy or sad mood states (Erber & Erber, 2000).

*Processing tasks.* Two processing tasks were included, the want/don't

want task and the neutral categorization task. Both tasks were identical to those used in Study 2.

### *Procedure*

Participants were randomly assigned to positive, negative, or neutral mood groups. Participants completed the experiment in groups of 2–4, with each person seated at a private cubicle. Participants assigned to the mood induction groups were given the cover story described in Study 2. Participants in the neutral mood group were simply told that the experiment involved different cognitive tasks. Depending on condition, participants either listened to sad or happy music or performed the neutral Sentence Completion Task (Srull & Wyer, 1979). Participants first completed the neutral (i.e., animal) categorization task described in Study 2 and then the want/don't want task. Finally, participants completed the short version of the extraversion scale used previously.

## *Results*

### *Want/Don't Want Task*

The scoring procedure was identical to the one used in Study 2 (e.g., removing errors, replacing outliers). Three separate analyses were conducted. First, to test whether the results of Studies 1 and 2 have been replicated, we compared the positive and negative mood groups. A multiple linear regression was conducted with extraversion, mood condition (positive vs. negative), and the interaction term as the predictors and RT scores on the want, don't want, and neutral blocks as a three-level, within-subject variable. As in the previous studies, the Extraversion × Mood Condition interaction was significant, $F(1, 37) = 4.29$, $p < .05$, such that extraverts were faster when in a positive mood state, whereas the opposite was true for introverts. No other effect was significant.

After replicating the previous findings, we conducted additional analyses that compared positive versus neutral conditions as well as negative versus neutral conditions. In the analysis contrasting neutral versus happy mood conditions, the Extraversion × Mood Condition interaction was significant, $F(1, 38) = 4.59$, $p < .05$. As is evident in Figure 3, which plots the resulting interaction, extraverts were faster at categorizing words as motivationally significant or insignificant when in a positive, as compared with a neutral, mood state. On the other hand, introverts were actually slower on making affective categorizations when in a positive, as compared with a neutral, mood state.

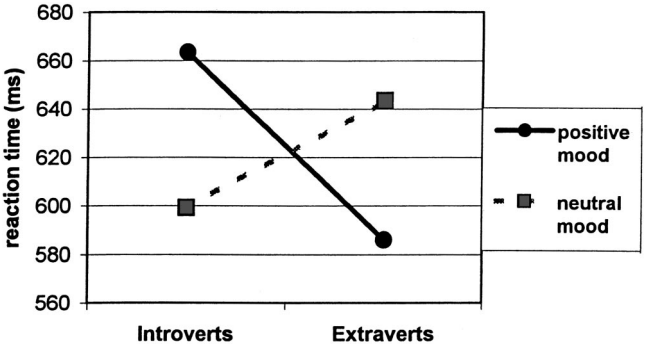


*Figure 3.* Reaction time on the want/don't want task as a function of extraversion and mood condition (Study 3).

Finally, to compare the neutral and negative mood conditions, we conducted a similar regression analysis with extraversion, mood condition (negative vs. neutral), and the interaction term, with block (want vs. don't want vs. neutral) as a three-level, within-subject variable. As predicted, in this comparison the Extraversion × Mood Condition interaction was not significant ($F < 1.00$). No other significant effects were obtained.

In sum, these analyses suggest that positive rather than negative mood states drive our affective certainty interaction. Introverts are faster when in a neutral mood state, whereas extraverts are faster when in a positive mood state.

### *Neutral Categorization Task*

The scores were obtained using the same procedure described in Study 2, resulting in an RT score for each participant. Regardless of the specific comparison of mood conditions (positive vs. negative, positive vs. neutral, or negative vs. neutral), there were no main effects or interactions ($ps > .20$).

## *Discussion*

Because extraverts experience more positive affect but not necessarily less negative affect (Watson, 2000; Watson & Clark, 1997), we might propose that positive mood states are more relevant to the affective certainty hypothesis than are negative mood states. However, because Studies 1 and 2 were based on a bipolar conception of affect (Green & Salovey, 1999), we really could not be sure whether positive mood states, negative mood states, or both were driving our Trait × State interaction. A main goal of Study 3 was to disambiguate these possibilities. As predicted, the neutral versus positive comparison of conditions replicated the Extraversion × Mood interaction, whereas the neutral versus negative comparison did not. This makes a lot of sense from a matching principle of Trait × State interactions (Robinson & Clore, 2002; Robinson et al., 2002).

In addition, by including a nonaffective control task, Studies 2 and 3 rule out any hypothesis based on cognitive efficiency per se. In this connection, we can safely conclude that affective certainty plays a larger role in self-relevant (vs. nonself-relevant) decision making. This pattern of findings makes sense from an affect-as-information (Schwarz & Clore, 1996) perspective: People consult their affect when the self is involved but not when making routine discriminations (see also Forgas, 1995).

In Study 4, however, we wanted to make even more specific conclusions about the locus of our Trait × State interaction. In generating predictions, we decided to look more closely at the cognitive processes involved in the want/don't want task. One important feature of this task is that the judgments are relatively easy and should require little elaboration of one's preferences. After all, almost all people want love and success but do not want pain and failure (see Appendix A). In this case, there should be a close match between the attitude object and a preexisting preference. However, preferences are not always so simple. Oftentimes, one is asked to evaluate objects that are not associated with strong, preexisting preferences (e.g., carpets). In such cases, there is more elaboration of the attributes of objects before an evaluation can be made. Study 4 examines this distinction between relatively unambiguous and relatively ambiguous attitude objects.

## Study 4

As already discussed, affective certainty is likely to play a larger role to the extent that one is making self-relevant choices. Study 4 builds on this self-reference theme in several ways. First, we attempted to replicate our previous findings using a mood induction that was more self-relevant. Specifically, participants were asked to write about happy or sad events from their personal past. To maximize cell sizes and because in Study 3 we obtained identical results regardless of whether the comparison was between positive and negative or positive and neutral mood induction conditions, we decided to include only positive and negative induction conditions in Study 4.

Second, to further stress the issue of self-relevance, we also included a new self-relevant evaluation task as well as a new neutral task. Of additional relevance, we included both ambiguous and unambiguous stimuli in the self-relevant task in an effort to determine whether affective certainty influences the elaboration of object attributes to the same extent that it influences the accessibility of one's preferences.

The distinction between ambiguous and unambiguous stimuli has played a large role in the social cognition literature on accessibility (Fazio, 1995; Higgins, 1996). When one is confronted with an unambiguous stimulus (e.g., "Do you like suffering?"), the object itself is likely to prime a preexisting evaluation from memory (Fazio, 1995). In this case, one spends little time elaborating on object attributes. When one is confronted with an ambiguous stimulus (e.g., "Do you like carpets?"), on the other hand, the object itself is not likely to prime a preexisting evaluation from memory (Fazio, Sanbonmatsu, Powell, & Kardes, 1986). Instead, one must spend more time elaborating on or thinking about the object's features (Fazio, 1995).

Thus, there are distinct evaluation processes for ambiguous versus unambiguous objects. Elaboration plays a relatively larger role in evaluations of ambiguous objects, whereas attitude accessibility plays a relatively larger role in evaluations of unambiguous objects. Because we have been using only unambiguous objects in the want/don't want task, it is not entirely clear whether the same affective certainty interaction also occurs when one is judging ambiguous objects. Study 4 assesses this within the context of a new liking task. Specifically, participants were asked to decide, as quickly as possible, how much they liked a series of attitude objects. Some were unambiguous (e.g., friendship), as in the want/don't want task, whereas some were ambiguous (e.g., carpets).

Another goal of Study 4 was to offer further evidence against an arousal (Eysenck & Eysenck, 1985) interpretation of our findings. To this end, we included a new control task involving simple (as well as more complex; see below) numerical discriminations. Again, if we obtain our interaction with the affective tasks but not with the control task, we will have offered further support for the idea that our interaction is unique to conditions under which people are likely to consult their affect (both trait and state) as information. Additionally, we included a comprehensive mood scale in Study 4. Mood terms varied systematically in both valence and arousal. Thus, we were able to determine whether the mood manipulation influenced valence, arousal, or both. We were hopeful that only mood valence, and not mood arousal, would be affected by the mood manipulation.

### *Method*

#### *Participants*

Fifty-nine undergraduates at the University of Illinois at Urbana–Champaign volunteered to participate in the experiment. All participants were native English speakers. Participants were awarded $7 for their participation.

#### *Materials*

*Mood induction.* Following the procedure described by Gasper and Clore (1998) and by Schwarz and Clore (1983), participants were asked to report a happy or a sad event from their life. Specifically, they were told,

> Please think about your own life. Try to think about an event that made you feel really happy [sad] in the past few years. Please take time to imagine what this event was like that made you feel truly happy [sad] and try to relive it again in your mind's eye. Then describe what made you feel happy [sad] as vividly and in as much detail as you can.

Participants were then given 10 min to write about the recalled event.

*Mood scale.* Participants were asked to rate their current mood state (1 = *very slightly to not at all* to 5 = *extremely*) after completing the computer tasks. Adjectives were chosen on the basis of Larsen and Diener's (1992) analysis of the circumplex model of emotion. The list of adjectives included items related to positive feelings (e.g., *happy*, *pleased*), negative feelings (e.g., *grouchy*, *sad*), and neutral arousal items (e.g., *alert*, *active*).

*Affective processing tasks.* The same want/don't want task used in Studies 2 and 3 was also used in Study 4. However, an additional task was included, which we refer to as the *liking task*. The liking task involved two parts. In the first part, participants were presented with single words on the screen and were asked to rate how much they liked the object in question (1= *dislike a lot*, 4 = *like a lot*). In the second part of the task, participants viewed the same list of words, but this time they were asked to rate how common the object is (1= *very uncommon*, 4 = *very common*). The second part of the task was designed to serve as a within-task control for general speed of responding (Fazio, 1990). Two types of words were included in the task: Twenty words that have unambiguous motivational significance (e.g., *happiness* and *pain*), and 40 words that are relatively ambiguous in terms of their motivational significance (e.g., *green* and *carpets*). The lists of words are given in Appendix B. In both liking and commonness blocks, each trial ended once the participant made a rating. RT in making the rating was recorded.

We pilot tested the words with a group of eight raters. They were shown all of the words in a single random order and asked two questions. First, they were asked to rate their degree of liking for the word (−5 = *extreme disliking*, 5 = *extreme liking*). Second and more important, they were asked to rate the immediacy of their evaluative reactions (−5 = *no immediate response*, 5 = *immediate response*). As anticipated, compared with ambiguous words, unambiguous words led to a more immediate evaluative reaction (*M*s = 1.92 vs. 3.13, respectively), $F(1, 7) = 122.82$, $p = .00$. Also as expected, liking ratings were more polarized for unambiguous (vs. ambiguous) words, as determined by absolute value discrepancies from the midpoint of the liking scale (*M*s = 2.66 vs. 4.25 for ambiguous and unambiguous words, respectively), $F(1, 7) = 3{,}571.30$, $p = .00$.

*Control task.* In every trial of the control task, participants saw either the number *1* or the number *9* on the screen. On normal trials, participants were asked to hit the *1* key if the *1* appeared and the *9* key if the *9* appeared. On reversed trials, participants were asked to hit the *1* key if the *9* appeared and the *9* key if the *1* appeared. The word *normal* or *reverse* was presented before each trial to indicate the type of response required. There were 80 normal trials and 40 reversed trials overall. However, the first 5 trials were considered practice trials and excluded from further analysis.

The two levels of difficulty (normal vs. reverse) were included because some researchers have found that the extraversion–performance relationship interacts with the difficulty of the task (Eysenck, 1973). Because we believe our interaction is unrelated to arousal, we expected no relevant interactions.

### *Procedure*

Participants were run in groups of 4–6. After entering the lab, they were seated in private cubicles in front of personal computers and filled out a consent form. To disguise the mood induction, we then told participants the following:

> This is a study about memory and the ability to recall life events. We will ask you to recall an event from your past and write about it in as much detail as possible. Previous research has shown that people can recall emotional events more easily than neutral events—therefore, to facilitate recall, you will be asked to recall a specific type of event, for example, an event in which you were very surprised, scared, or proud.

At this point, participants were given separate instructions that were dependent on mood condition. Some were randomly assigned to write about a positive event from their past, whereas others were assigned to write about a negative event.

After the mood induction, participants were instructed to complete the computer tasks. They completed the liking task, the *1/9* control task, and then the want/don't want task, in that order. After completing all three processing tasks, participants filled out the mood and extraversion scales.

## *Results*

### *Mood Manipulation Check*

We averaged the negative items to create a negative affect scale and the positive items to create a positive affect scale. Mood condition influenced both positive ($p < .05$) and negative ($p < .05$) mood states in this study. Thus, the manipulation was successful in influencing the valence of mood states.[2]

To test whether the mood manipulation also influenced momentary arousal, we created an arousal scale by reverse scoring items that referred to low arousal (e.g., *still*, *quiet*) and averaging them with items that referred to high arousal (e.g., *active*, *alert*). We then ran an ANOVA with mood group as the independent variable and arousal as the dependent variable. The effect was not significant ($F < 1.00$).

### *Want/Don't Want Task*

The scoring procedure was identical to the one used in Studies 2 and 3. Again, we used two standard deviations as the cutoff for replacing outliers. To determine whether we had replicated the interaction reported in our earlier findings, we used a regression analysis with mood condition (positive vs. negative), extraversion, and the interaction term entered as the predictors and mean RT score within each of the three blocks as the dependent variable. As in the prior studies, no significant main effects were found for either mood condition or extraversion ($F$s $< 1.00$). However, as predicted, there was a significant Extraversion × Mood Condition interaction, $F(1, 77) = 4.15$, $p < .05$. To plot the nature of the interaction, we used the same procedure described in Studies 2 and 3 (i.e., we computed expected values for each mood condition for those one standard deviation below vs. above the mean on the extraversion scale). Figure 4 plots the resulting interaction. It is exactly parallel to the interaction reported in Studies 1 through 3.

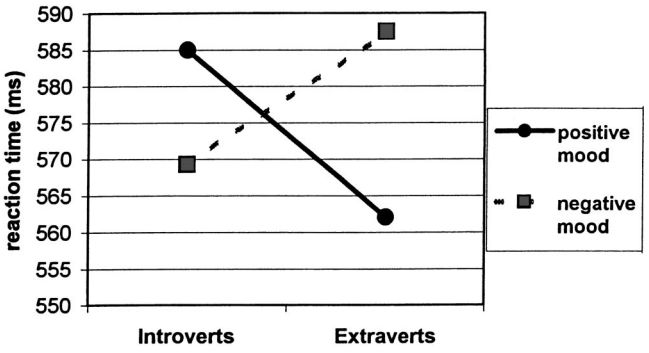


*Figure 4.* Reaction time on the want/don't want task as a function of extraversion and mood condition (Study 4).

We also examined the three-way interaction to test the personality-as-moderator approach. As mentioned earlier, according to this approach, extraverts in the happy condition should be faster for want words but not for other types of words. Unlike in Studies 1–3, there was a significant three-way interaction, $F(2, 154) = 3.17$, $p < .05$, involving extraversion, mood condition, and block (want vs. don't want vs. neutral). To understand the nature of the three-way interaction, we obtained predicted means for each of the cells of the three-way design.

As shown in Table 1, the three-way interaction was not consistent with a priming approach to Trait × State interactions (Rusting, 1998, 1999). Such an approach predicts a particularly pronounced Trait × State interaction on want RTs. Instead, this was the only block that was not associated with a crossover interaction. Given that the two-way Extraversion × Mood Condition interaction replicated across all four studies, whereas a three-way interaction involving block appeared only in one of the four studies, the three-way interaction in Study 4 should be viewed as an anomaly.

To test for a possible speed–accuracy trade-off, we looked at the correlation between average speed and average accuracy. The correlation was not significant ($r = -.102$, $p > .10$). Thus, as in all of the other studies, there was no trade-off.

### *Neutral 1/9 Control Task*

RTs were log transformed, and all errors were excluded. To deal with outliers, we replaced RTs more extreme than two standard deviations from the mean. We then averaged scores across the normal versus reversed trials to obtain normal versus reversed RT scores.

To examine whether extraversion and mood condition influenced performance on the neutral task, we conducted a multiple regression analysis in which extraversion, mood condition, and the interaction term were entered simultaneously as the predictors and RT on the normal versus reversed blocks was a two-level, within-subject variable. No main effects were found for either extraversion or mood condition, and there were also no two-way or

[2] The mean ratings on a scale of 1–5 for the happy and sad conditions were, respectively, 2.85 and 2.59 for positive affect and 1.82 and 2.17 for negative affect. These means suggest that strong positive feelings (and not strong negative feelings) led to the obtained effect.

Table 1
*Mean Reaction Time for Want, Don't Want, and Neutral Words as a Function of Extraversion and Mood Condition (Study 4)*

| | | Mood | |
|---|---|---|---|
| Block | Personality | Positive | Negative |
| Want | Introvert | 561.05 | 547.02 |
| | Extravert | 559.76 | 549.54 |
| Don't want | Introvert | 572.80 | 550.81 |
| | Extravert | 548.28 | 571.48 |
| Neutral | Introvert | 622.30 | 610.94 |
| | Extravert | 578.10 | 644.17 |

three-way interactions ($F$s $> 1.00$). These null findings support the claim that the affective certainty interaction appears only on self-relevant tasks.

### *Liking Task*

First, RTs were log transformed, and cutoff scores were set at two standard deviations above or below the mean. Then we computed RT scores by averaging speed on trials that involved liking ratings versus trials that involved commonality ratings, separately for ambiguous and unambiguous words. This resulted in four different RT scores: time to rate liking of unambiguous words (unambiguous RT), time to rate liking of ambiguous words (ambiguous RT), time to rate the commonality of unambiguous words (unambiguous control), and time to rate the commonality of ambiguous words (ambiguous control).

We used the liking RT means to examine the ambiguous versus unambiguous object manipulation. We expected people to take longer to evaluate ambiguous targets relative to unambiguous targets because they would have to elaborate on object attributes more extensively to determine their liking. This prediction was confirmed by the mean RTs for evaluations of ambiguous ($M$ = 1,400 ms) versus unambiguous ($M$ = 1,225 ms) objects ($p < .01$).

Before examining the effects of personality and mood, we first used the commonality RTs to control for baseline speed of responding (Fazio, 1990). Specifically, we regressed the control block on the target block for each object type—ambiguous and unambiguous—separately. These regression equations were used to obtain residual speed scores for each participant for each of the two object types.

To test whether personality and mood influenced the speed with which participants evaluated ambiguous versus unambiguous objects, we used the same linear regression procedure described in Studies 1–3 (on the basis of Aiken & West, 1991) but allowed for within-subject variables as well. Extraversion, mood condition, and the interaction term were entered as the predictors, and residualized liking RTs to ambiguous versus unambiguous objects were a two-level, within-subject variable.

The only significant effect that was found was an Extraversion × Mood Condition × Object Type interaction, $F(1, 59) = 5.50$, $p < .05$. The procedure described earlier was used to plot the residualized RT means for ambiguous versus unambiguous objects, as a function of extraversion and mood condition. Figure 5 displays these mean RTs.

For unambiguous objects, extraverts were faster to make liking ratings when happy, whereas the opposite was true for introverts. For ambiguous objects, however, there was no Extraversion × Mood Condition interaction (see Figure 5). Thus, affective certainty seems to affect attitude accessibility but not object elaboration.

### *Discussion*

Study 4 replicates the Extraversion × Mood Condition interaction observed in each of the three prior studies. Happy extraverts and unhappy introverts (relative to unhappy extraverts and happy introverts) were faster to make self-relevant endorsements in the want/don't want task. Thus, there can be little doubt that the finding is quite reliable. Consistent with our affective certainty model, such results demonstrate that a match of trait beliefs and state affect makes it easier to access one's motivational orientation (i.e., wanting and not wanting) to new objects in the environment.

Because the words used in the want/don't want task were relatively clear in their normative implications (e.g., pain is something that is not wanted), there was some ambiguity concerning whether mismatched individuals (a) deliberate on object attributes longer or (b) have trouble retrieving preexisting affective associations. Study 4 therefore included a new task (i.e., the liking task) to disambiguate these two possibilities. The results not only replicate the want/don't want task with respect to unambiguous objects but also extend these results in an important way. Specifically, we included ambiguous objects within the liking task because, in comparison with unambiguous objects, such objects should require the person to elaborate more on attributes before indicating a preference (an assumption supported by liking RTs). If the Extraversion × Mood Condition interaction disappeared for ambiguous objects, the strong implication would be that affective certainty does not alter the extent to which one is willing to elaborate on object attributes before making an evaluation. These points are considered further in the General Discussion.

Finally, Study 4 offers further evidence against an arousal interpretation (Eysenck & Eysenck, 1985; Matthews & Gilliland,

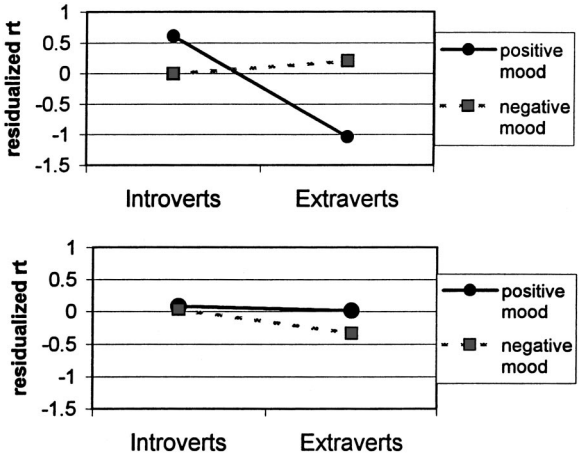


*Figure 5.* Speed of evaluating unambiguous (top panel) and ambiguous (bottom panel) words as a function of extraversion and mood condition. rt = reaction time.

1999) of our Trait × State interaction. The mood manipulation, which interacted with extraversion, changed the valence of temporary mood states but not their arousal level. This is strong evidence that affect rather than arousal is the key to our Trait × State interaction. Additionally, we included a new, nonmotivational task (the 1/9 task) with two levels of difficulty. There was no Extraversion × Mood Condition interaction on this task. This suggests that affective processes are key to our interaction.

## General Discussion

When can one efficiently identify the motivational significance of objects in one's environment? The efficiency with which people recognize positive information cannot simply be equated with extraversion or positive mood states. Rather, an implication of our findings is that one must consider traits and states in combination (Rusting, 1998). The reported studies suggest that when extraverts are happy they are faster to recognize things that they want as well as things they do not want. However, introverts are faster to recognize what they want as well as what they do not want when they are not happy.

This novel effect cannot be explained by existing research on personality and mood, most of which focuses on valence-congruent effects on cognition (Rusting, 2001). In contrast to that explanation, our interaction was not valence dependent but involved one's ability to process both positive and negative stimuli. To explain such an intriguing effect, we must first understand the multiple roles that affect plays in processing and judgment.

### *Trait and State Affect as Information*

Emotions provide information about the valence of objects in the world. When one suddenly feels good, one can often infer that one is encountering pleasant objects or circumstances (Forgas, 1995). However, as conceptualized by Lazarus (1991) and others (e.g., Clore et al., 2001; Robinson, 2000), emotions also tell one about oneself. Specifically, every emotion, according to Lazarus (1991), reflects a transaction between the self and the world. Thus, people consult their affective states when assessing both the self and the social environment (see Clore, Schwarz, & Conway, 1994, and Forgas, 1995, for reviews).

In the mood and cognition literature, the topic of individual differences has often been neglected. However, it stands to reason that trait affect, like state affect, is also an important source of information about the self and the world. For example, Damasio (1994) suggested that without dispositional affect people would make particularly poor behavioral choices. He and his colleagues have provided dramatic support for this idea by highlighting the plight of patients with damage to their prefrontal cortex. These patients are capable of thinking rationally about their decisions, but they do not care about them. Without the somatic feedback that normally accompanies motivated decisions, they make particularly poor choices and also fail to learn effectively from experience.

Our concept of trait affect is different than Damasio's (1994), but we also believe that trait affect plays an important role in motivated decisions. In our view, emotional traits, at least as measured by self-report, can be viewed as a set of relatively enduring beliefs about the self and the world (Robinson & Clore, 2002). This conception shares some similarity with Epstein's (1973) idea that the self is a theory and also fits with a number of clinical models that posit the centrality of self-related beliefs to disorders of motivation and affect (Beck, 1967; Ellis, 1973; Kelly, 1963).

Within this context, extraverts believe that they are particularly happy, and introverts believe that they are not particularly happy. What happens, then, when an introvert feels momentary happiness or an extravert feels momentary unhappiness? According to our view, this creates affective uncertainty because the two sources of affective information—trait and state—are sending different signals to the individual. This view of affective certainty is compatible with Swann's (1987; Swann & Schroeder, 1995) research, showing that, at some level, people seek out and trust social feedback that confirms rather than disconfirms their preexisting self-conceptions. In brief, there appear to be pragmatic and epistemic benefits to receiving social feedback that confirms preexisting self-conceptions (Swann, Stein-Seroussi, & Giesler, 1992).

### *Extraversion, Mood States, and Affective Certainty*

Whereas Swann's (1987) interest was primarily in social feedback and self-verification behavior, our interest is in affective processes. Thus, we focus on an emotional trait—extraversion—that has well-established and consistent associations with mood states. Also, we both measured (Study 1) and manipulated (Studies 2–4) mood states and did so both in a surreptitious (Studies 2 and 3) and in a more obvious manner (Study 4). This was done to ensure that what we took to be mood effects were not, in reality, cognitive priming effects (Niedenthal, Rohmann, & Dalle, in press). Finally, we sought to show that trait–state conflict can result in slower affective decisions. In this section, we discuss the implications of some of the findings.

In considering the results of our studies, we believe that the null results are highly informative. In none of our analyses did we find main effects for mood condition or for a Mood Condition × Block interaction. Obviously, this runs counter to frameworks that propose that mood states alter the accessibility of like-valenced information (Bower, 1981). In this respect, it is interesting to note that Bower himself concluded that mood states do not seem to influence encoding operations (Bower, 1987). Similarly, in none of the studies did we find main effects for extraversion or Extraversion × Block interactions. This runs counter to the idea that extraverts are more sensitive to environmental rewards (Gray, 1970, 1981), at least as far as RTs for identifying words referring to desired and undesired objects are concerned. In connection with these null results (see also Robinson, Vargas, & Crawford, in press), we are in agreement with Rusting (1998), who concluded that main effect models of affective processing are, in many respects, too simplistic to capture reality. Thus, our article is part of a small but growing trend to systematically examine Trait × State interactions (see also Gasper & Clore, 1998).

In considering our Extraversion × Mood Condition interactions, we were able to rule out a number of alternative theoretical models. The fact that our interaction pertained only to affective decisions, combined with the fact that our strongest mood manipulation did not influence arousal (Study 4), argues against the idea that our findings are another example of an Extraversion × Arousal State (Eysenck & Eysenck, 1985; Matthews & Gilliland, 1999) interaction. Also, the fact that the Extraversion × Mood

Condition interactions did not interact with block in the want/don't want task (in all studies except Study 4) argues against a priming interpretation of the findings (Rusting, 1998, 1999). That is, happy extraverts were not just faster to recognize want words, they were faster to recognize don't want and neutral words as well.

In the present series of studies we have documented a novel interaction in the literature, but one that is quite consistent with models that emphasize the informational value of both states (e.g., Clore et al., 1994) and traits (e.g., Damasio, 1994). What is especially notable is that happy extraverts and unhappy introverts (relative to unhappy extraverts and happy introverts) were faster to recognize both desirable and undesirable stimuli. Thus, the effects on affective processing were valence independent. Given that most of the previous work in this area (e.g., Rusting, 1999) has been concerned with valence-dependent processing, it is not entirely clear how to integrate these two types of interactions. However, we can offer some relevant suggestions.

Rusting (2001) suggested that open-ended, ambiguous tasks offer more room for idiosyncratic interpretations and thus more room for valence-congruent personality effects. Also, in his affect infusion model, Forgas (1995, 2001) modified the basic spreading activation position by suggesting that valence-congruent effects of mood on cognition should be found only when the situation calls for an elaboration or constructive processing. In contrast, when the situation calls for the simple reproduction of a preexisting association, valence-congruent effects of mood on cognition seem to be infrequent. An elaboration of the affect-as-information model similarly suggests that not all evaluations are made in the same manner (Clore & Ketelaar, 1997).

In Study 4, we designed a liking task that contained both ambiguous and unambiguous stimuli. We expected that this task might reveal the specific cognitive operations—related to either elaboration or accessibility—that are influenced by affective certainty. The results clearly suggest that affective certainty influences attitude accessibility, defined as the speed with which preexisting evaluations can be attached to attitude objects (Fazio, 1995). By contrast, affective certainty appears not to influence the more open-ended, constructive processes associated with elaboration. Thus, it is plausible that the phenomenon captured in our research is limited to the accessibility of prior attitudes, whereas valence-congruent effects are more likely to occur when elaboration is involved (Forgas, 1995; Rusting, 1998). This may be a fruitful avenue for future research.

It should be noted that accessible attitudes are often highly adaptive (e.g., Fazio & Powell, 1997). However, as Bruner (1957) noted, accessibility might sometimes lead to inappropriate responses when used indiscriminately. The adaptive cognitive system should use accessible responses when appropriate but delay those responses when their relevance to the stimulus is unclear (Bruner, 1957). In this sense, affective certainty must be considered beneficial because it enhances responses to clearly appropriate stimuli but not to stimuli of ambiguous motivational relevance.

### *Extraversion, Regulation, and Performance*

According to the pleasure principle, the fundamental principle to affective regulation is that people seek to maximize pleasure and minimize pain. Such a principle assumes that affect itself, regardless of its contextual meaning, is sought for its own sake. Recently, Erber and Erber (2000) presented a fairly compelling attack on this view of affect regulation. They proposed that people often regulate their mood states to optimize performance in everyday life, even at risk of spoiling their momentary happiness (see also Clore & Robinson, 2000). Such an alternative conception of affect regulation might be dubbed the *pragmatic principle*. According to the latter principle, people are sensitive to the dictates of the situation and try to regulate their mood accordingly. In support of this approach, Erber and Erber (2000) have shown that, in anticipation of a challenging intellectual task or unknown social situation, people engage in behaviors that seem intentionally (although not consciously) focused on neutralizing prevailing mood states.

A logical extension of the pragmatic principle of mood regulation is the idea that individuals differ in the mood states that they tend to associate with affective performance in everyday life (Larsen, 2001). In particular, it seems likely that extraverts seek to be in positive mood states precisely because they feel that they are more effective in such mood states. By contrast, introverts might seek more neutral (rather than positive) mood states precisely because they feel that they are more effective in those mood states.

These considerations, along with the present data, suggest that it would be useful to use Erber and Erber's (2000) methods within the context of a personality study. Specifically, it seems likely that extraverts and introverts would not react similarly to the same positive mood induction. Instead, on the basis of the Larsen (2001) framework, we might expect extraverts to try to maintain, and introverts to try to neutralize, their positive mood states in preparation for an upcoming task. The present results give a further impetus for this prediction, as happy introverts and unhappy extraverts had difficulties deciding how they felt about motivation-relevant stimuli.

In sum, these studies raise the counterintuitive possibility that, at some level, positive mood states can make introverts uncomfortable or uncertain. Our affective certainty model explains why this might be the case and also presents some interesting directions for future research.

### *Implications, Limitations, and Future Research*

The ability to know what one wants or does not want is clearly advantageous from a functional perspective. The faster one is to recognize things that one wants, the sooner one can attempt to obtain the desired objects and, in turn, the better are one's chances of enjoyment. Similarly, the faster one is to recognize things that one does not want, the sooner one can avoid such objects or situations, thus saving oneself from unnecessary danger or displeasure. Indeed, research by Fazio and colleagues has confirmed the functional benefits of having highly accessible attitudes. Accessible (i.e., fast, automatic) attitudes guide people to important rather than unimportant objects within the environment (Fazio, Roskos-Ewoldsen, & Powell, 1994). Accessible attitudes free people from stress under conditions of high information load (Fazio, Blascovich, & Driscoll, 1992). Finally, individuals with highly accessible attitudes are protected to some extent from distress and depression (Fazio & Powell, 1997).

The study by Fazio and Powell (1997) deserves further comment within the present context. Like us, these authors operation-

alized accessible attitudes by measuring the speed with which participants could make personal evaluations. Like us, furthermore, the primary focus in this study was on individual differences. Fazio and Powell asked college freshmen to evaluate attitude objects that would (in the upcoming months) be highly relevant to their lives (e.g., dorm food, English classes). Entering freshmen who were faster in making these evaluative decisions subsequently reported less depression and negative affect during the semester, particularly if their lives included a large number of stressful events. Why was this so? First, people with highly accessible attitudes should be less likely to enter into situations (e.g., English classes) that are counter to their preferences. Second, people with accessible attitudes should act more consistently across situations and over time (Fazio, 1995), a pattern of behavior that is more conducive to positive well-being (Campbell et al., 1996). And third, people with accessible attitudes are freed from some of the aversive consequences of effortful decision making (Bargh, 1997; Baumeister, 2001).

In our context, we propose that happy extraverts and unhappy introverts accrue some of the same functional benefits as described above. Quick access to preferences might allow such individuals (vs. unhappy extraverts and happy introverts) to cope more quickly and more effectively with new situations that present themselves. These individuals should vacillate less, be less likely to find themselves in personality-inconsistent situations, and be less likely to regret their behaviors after their occurrence. In this respect, it may be that unhappy extraverts and happy introverts are more likely to make ill-informed decisions, a speculation consistent with prior evidence on the role of affect in decision making (Damasio, 1994). Obviously, such hypotheses are a matter for future research. However, we hope that we have convinced the reader that there are functional benefits to highly accessible attitudes (Bargh, 1997; Fazio, 1995). If so, we would expect a number of functional benefits to follow from trait-consistent mood states.

In the current studies, we were able to replicate the same Extraversion $\times$ Mood Condition interaction across four studies while ruling out alternative explanations of the results. However, it would be desirable to explore similar dynamics within the context of other personality traits, such as neuroticism. Might neurotics benefit from worry and stress? The literature on defensive pessimism suggests that this might indeed be a possibility (Norem & Cantor, 1986; Sanna, 1998). Also, as suggested earlier, locating the cognitive subprocesses that are influenced by affective certainty is an important topic for future research, in addition to testing the applicability of the model to more complex behaviors and judgment processes. Progress on this front might deepen our understanding of affective processes and how they are affected by trait–state interactions (Rusting, 1998; van Reekum & Scherer, 1997).

## References


Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions.* CA: Sage.

Argyle, M., & Lu, L. (1990). The happiness of extraverts. *Personality and Individual Differences, 11,* 1011–1017.

Bargh, J. A. (1997). The automaticity of everyday life. In R. S. Wyer (Ed.), *Advances in social cognition* (Vol. 10, pp. 1–61). Mahwah, NJ: Erlbaum.

Baumeister, R. F. (2001). Ego depletion, the executive function, and self-control: An energy model of the self in personality. In B. W. Roberts & R. Hogan (Eds.), *Personality psychology in the workplace: Decade of behavior* (pp. 299–316). Washington, DC: American Psychological Association.

Beck, A. T. (1967). *Depression: Clinical, experimental and theoretical aspects.* New York: Harper & Row.

Bower, G. H. (1981). Mood and memory. *American Psychologist, 36,* 129–148.

Bower, G. H. (1987). Commentary on mood and memory. *Behaviour Research and Therapy, 25,* 443–455.

Bower, G. H., & Forgas, J. P. (2000). Affect, memory, and social cognition. In E. Eich, J. F. Kihlstrom, G. H. Bower, J. P. Forgas, & P. M. Niedenthal (Eds.), *Cognition and emotion* (pp. 87–168). New York: Oxford University Press.

Bruner, J. S. (1957). On perceptual readiness. *Psychological Review, 64,* 123–152.

Campbell, J. D., Trapnell, P. D., Heine, S. J., Katz, I. M., Lavallee, L. F., & Lehman, D. R. (1996). Self-concept clarity: Measurement, personality correlates, and cultural boundaries. *Journal of Personality and Social Psychology, 70,* 141–156.

Carver, C. S., Sutton, S. K., & Scheier, M. F. (2000). Action, emotion, and personality: Emerging conceptual integration. *Personality and Social Psychology Bulletin, 26,* 741–751.

Clore, G. L., & Ketelaar, T. (1997). Minding our emotions: On the role of automatic, unconscious affect. In R. S. Wyer, Jr. (Ed.), *The automaticity of everyday life: Advances in social cognition* (Vol. 10, pp. 105–120). Hillsdale, NJ: Erlbaum.

Clore, G. L., & Robinson, M. D. (2000). What is emotion regulation? In search of a phenomenon. *Psychological Inquiry, 11*(3), 163–166.

Clore, G. L., Schwarz, N., & Conway, M. (1994). Affective causes and consequences of social information processing. In R. S. Wyer, Jr., & T. K. Srull (Eds.), *Handbook of social cognition, Vol. 1: Basic processes; Vol. 2: Applications* (2nd ed., pp. 323–417). Mahwah, NJ: Erlbaum.

Clore, G. L., Wyer, R. S. J., Dienes, B., Gasper, K., Gohm, C., & Isbell, L. (2001). Affective feelings as feedback: Some cognitive consequences. In L. L. Martin & G. L. Clore (Eds.), *Theories of mood and cognition: A user's guidebook* (pp. 27–62). Hillsdale, NJ: Erlbaum.

Cooper, C., & Brebner, J. (1987). Excitation-inhibition and arousal as explanatory concepts for extraversion. In J. Strelau & H. J. Eysenck (Eds.), *Personality dimensions and arousal: Perspectives on individual differences* (pp. 37–55). New York: Plenum Press.

Costa, P. T., & McCrae, R. R. (1980). Influence of extraversion and neuroticism on subjective well-being: Happy and unhappy people. *Journal of Personality and Social Psychology, 38,* 668–678.

Damasio, A. R. (1994). *Descartes' error: Emotion, reason, and the human brain.* New York: Grosset/Putman.

Derryberry, D. (1987). Incentive and feedback effects on target detection: A chronometric analysis of Gray's model of temperament. *Personality and Individual Differences, 8,* 855–865.

Diener, E., & Diener, C. (1996). Most people are happy. *Psychological Science, 7,* 181–185.

Duffy, E. (1951). The concept of energy mobilization. *Psychological Review, 58,* 30–40

Duval, S., & Wicklund, R. A. (1972). *A theory of objective self awareness.* New York: Academic Press.

Eich, E., & Metcalfe, J. (1989). Mood dependent memory for internal versus external events. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 15,* 443–355.

Ellis, A. (1973). *Humanistic psychotherapy: The rational-emotive approach.* New York: McGraw-Hill.

Epstein, S. (1973). The self-concept revisited, or a theory of a theory. *American Psychologist, 28,* 404–416.

Erber, R., & Erber, M. W. (2000). The self-regulation of moods: Second thoughts on the importance of happiness in everyday life. *Psychological Inquiry, 11*(3), 142–148.

Eysenck, H. J. (1967). *The biological basis of personality*. Springfield, IL: Thomas.

Eysenck, H. J. (1973). Personality, learning, and "anxiety." In H. J. Eysenck (Ed.), *Handbook of abnormal psychology* (pp. 390–419). San Diego, CA: EdITS.

Eysenck, H. J., & Eysenck, M. W. (1985). *Personality and individual differences.* New York: Plenum.

Fazio, R. H. (1990). A practical guide to the use of response latency in social psychological research. In C. Hendrick & M. S. Clark (Eds.), *Research methods in personality and social psychology: Review of personality and social psychology* (Vol. 11, pp. 74–97). Thousand Oaks, CA: Sage.

Fazio, R. H. (1995). Attitudes as object-evaluation associations: Determinants, consequences, and correlates of attitude accessibility. In R. E. Petty & J. A. Krosnick (Eds.), *Attitude strength: Antecedents and consequences. Ohio State University series on attitudes and persuasion* (Vol. 4, pp. 247–282). Hillsdale, NJ: Erlbaum.

Fazio, R. H., Blascovich, J., & Driscoll, D. M. (1992). On the functional value of attitudes: The influence of accessible attitudes on the ease and quality of decision making. *Personality and Social Psychology Bulletin, 18,* 388–401.

Fazio, R. H., & Powell, M. C. (1997). On the value of knowing one's likes and dislikes: Attitude accessibility, stress, and health in college. *Psychological Science, 8,* 430–436.

Fazio, R. H., Roskos-Ewoldsen, D. R., & Powell, M. C. (1994). Attitudes, perception, and attention. In P. M. Niedenthal & S. Kitayama (Eds.), *The heart's eye: Emotional influences in perception and attention* (pp. 197–216). San Diego, CA: Academic Press.

Fazio, R. H., Sanbonmatsu, D. M., Powell, M. C., & Kardes, F. R. (1986). On the automatic activation of attitudes. *Journal of Personality and Social Psychology, 50,* 229–238.

Forgas, J. P. (1995). Mood and judgment: The affect infusion model (AIM). *Psychological Bulletin, 117,* 39–66.

Forgas, J. P. (2001). Introduction: Affect and social cognition. In J. P. Forgas (Ed.), *Handbook of affect and social cognition* (pp. 1–26). Hillsdale, NJ: Erlbaum.

Gasper, K., & Clore, G. L. (1998). The persistent use of negative affect by anxious individuals to estimate risk. *Journal of Personality and Social Psychology, 74,* 1350–1363.

Goldberg, L. R. (1997). *A broad-bandwidth, public-domain, personality inventory measuring the lower-level facets of several five-factor models.* Retrieved May 20, 2002, from http://ipip.ori.org/ipip/

Gray, J. A. (1970). The psychophysiological basis of introversion-extraversion. *Behavior Research and Therapy, 8,* 249–266.

Gray, J. A. (1981). A critique of Eysenck's theory of personality. In H. J. Eysenck (Ed.), *A model for personality* (pp. 246–276). Berlin: Springer-Verlag.

Green, D. P., & Salovey, P. (1999). In what sense are positive and negative affect independent? A reply to Tellegen, Watson, and Clark. *Psychological Science, 10,* 304–306.

Higgins, E. T. (1996). Knowledge activation: Accessibility, applicability, and salience. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 133–168). New York: Guilford Press.

Kelly, G. A. (1963). *A theory of personality: The psychology of personal constructs.* New York: Norton.

Larsen, R. J. (2001). Toward a science of mood regulation. *Psychological Inquiry, 11(3),* 129–141.

Larsen, R. J., & Diener, E. (1992). Promises and problems with the circumplex model of emotion. In M. S. Clark (Ed.), *Emotion: Review of personality and social psychology* (Vol. 13, pp. 25–59). Thousand Oaks, CA: Sage.

Larsen, R. J., & Ketelaar, T. (1991). Personality and susceptibility to positive and negative emotional states. *Journal of Personality and Social Psychology, 61,* 132–140.

Lazarus, R. S. (1991). Progress on a cognitive–motivational–relational theory of emotion. *American Psychologist, 46,* 819–834.

Lucas, R. E., & Fujita, F. (1999). *Factors influencing the extraversion/pleasant affect relation: Evidence from confirmatory factor analyses and a meta-analysis.* Manuscript submitted for publication.

Martin, I. (1973). Somatic reactivity: Interpretation. In H. J. Eysenck (Ed.), *Handbook of abnormal psychology* (pp. 333–361). San Diego, CA: EdITS.

Matthews, G., & Gilliland, K. (1999). The personality theories of H. J. Eysenck and J. A. Gray: A comparative view. *Personality and Individual Differences, 26,* 583–626.

Niedenthal, P. M., Halberstadt, J. B., & Setterlund, M. B. (1997). Being happy and seeing "happy": Emotional state mediates visual word recognition. *Cognition and Emotion, 11,* 403–432.

Niedenthal, P. M., Rohmann, A., & Dalle, N. (in press). What is primed by emotion concepts and emotion words? In J. Musch & K. C. Klauer (Eds.), *The psychology of evaluation: Affective processes in cognition and emotion.* Hillsdale, NJ: Erlbaum.

Niedenthal, P. M., & Setterlund, M. B. (1994). Emotion congruence in perception. *Personality and Social Psychology Bulletin, 20,* 401–411.

Norem, J. K., & Cantor, C. (1986). Defensive pessimism: Harnessing anxiety as motivation. *Journal of Personality and Social Psychology, 51,* 1208–1217.

Olson, J. M., Roese, N. J., & Zanna, M. P. (1996). Expectancies. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 211–238). New York: Guilford Press.

Parrott, G. W., & Sabini, J. (1990). Mood and memory under natural conditions: Evidence for mood incongruent recall. *Journal of Personality and Social Psychology, 59,* 321–336.

Ratcliff, R. (1993). Methods for dealing with reaction time outliers. *Psychological Bulletin, 114,* 510–532.

Revelle, W. (1993). Individual differences in personality and motivation: "Non-cognitive" determinants of cognitive performance. In A. Baddeley & L. Weiskrantz (Eds.), *Attention: Selection, awareness and control. A tribute to Donald Broadbent* (pp. 346–373). Oxford, England: Clarendon Press.

Robinson, M. D. (2000). The reactive and prospective functions of mood: Its role in linking daily experiences and cognitive well-being. *Cognition and Emotion, 14,* 145–176.

Robinson, M. D., & Clore, G. L. (2002). *Belief and feeling: Evidence for an accessibility model of emotional self-report.* Manuscript submitted for publication.

Robinson, M. D., Robertson, D. A., & Syty, N. A. (2002). *Personality as belief: Evidence for situation-contingent activation.* Unpublished manuscript, North Dakota State University.

Robinson, M. D., Vargas, P. T., & Crawford, E. G. (in press). Putting process into personality, appraisal, and emotion: Evaluative processing as a missing link. In J. Musch & C. Klauer (Eds.), *The psychology of evaluation: Affective processes in cognition and emotion.* Hillsdale, NJ: Erlbaum.

Rusting, C. L. (1998). Personality, mood, and cognitive processing of emotional information: Three conceptual frameworks. *Psychological Bulletin, 124,* 165–196.

Rusting, C. L. (1999). Interactive effects of personality and mood of emotion-congruent memory and judgment. *Journal of Personality and Social Psychology, 77,* 1073–1086.

Rusting, C. L. (2001). Personality as a moderator of affective influences on cognition. In J. P. Forgas (Ed.), *Handbook of affect and social cognition* (pp. 371–391). Hillsdale, NJ: Erlbaum.

Rusting, C. L., & Larsen, R. J. (1998). Personality and cognitive processing of affective information. *Personality and Social Psychology Bulletin, 24,* 200–213.

Sanna, L. J. (1998). Defensive pessimism and optimism: The bitter-sweet influence of mood on performance and prefactual and counterfactual thinking. *Cognition and Emotion, 12,* 635–665.

Schwarz, N., & Clore, G. L. (1983). Mood, misattribution, and judgment of well-being: Informative and directive functions of affective states. *Journal of Personality and Social Psychology, 45,* 513–523.

Schwarz, N., & Clore, G. L. (1996). Feelings and phenomenal experience. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 433–465). New York: Guilford Press.

Shweder, R. A. (1994). "You're not sick, you're just in love": Emotion as an interpretive system. In P. Ekman & R. J. Davidson (Eds.), *The nature of emotion: Fundamental questions* (pp. 32–44). Oxford, England: Oxford University Press.

Srull, T. K., & Wyer, R. S. (1979). The role of category accessibility in the interpretation of information about persons: Some determinants and implications. *Journal of Personality and Social Psychology, 37,* 1660–1672.

Swann, W. B. (1987). Identity negotiation: Where two roads meet. *Journal of Personality and Social Psychology, 53,* 1038–1051.

Swann, W. B., Griffin, J. J., Predmore, S. C., & Gaines, B. (1987). The cognitive–affective crossfire: When self-consistency confronts self-enhancement. *Journal of Personality and Social Psychology, 52,* 881–889.

Swann, W. B., & Schroeder, D. G. (1995). The search for beauty and truth: A framework for understanding reactions to evaluations. *Personality and Social Psychology Bulletin, 21,* 1307–1318.

Swann, W. B., Stein-Seroussi, A., & Giesler, R. B. (1992). Why people self-verify. *Journal of Personality and Social Psychology, 62,* 392–401.

van Reekum, C. M., & Scherer, K. R. (1997). Levels of processing in emotion-antecedent appraisal. In G. Matthews (Ed.), *Cognitive science perspectives on personality and emotion* (pp. 259–300). New York: Elsevier.

Watson, D. (2000). *Mood and temperament.* New York: Guilford Press.

Watson, D., & Clark, L. A. (1997). Extraversion and its positive emotions core. In R. Hogan, J. Johnson, & S. Briggs (Eds.), *Handbook of personality psychology* (pp. 767–793). San Diego, CA: Academic Press.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54,* 1063–1070.

Wyer, R. S., Jr., Clore, G. L., & Isbell, L. M. (1999). Affect and information processing. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 31, pp. 1–77). San Diego, CA: Academic Press.

Zelenski, J. M., & Larsen, R. J. (1999). Susceptibility to affect: A comparison of three personality taxonomies. *Journal of Personality, 67,* 761–791.

## Appendix A

### Words Used in Each Block of the Want/Don't Want Task (Studies 1–4)

| Neutral words | Don't want words | Want words |
|---|---|---|
| afternoon | pain | gifts |
| collection | failure | praise |
| geology | punishment | reward |
| sound | criticism | love |
| window | insult | success |
| situation | ridicule | happiness |
| definition | conflict | friendship |

## Appendix B

### The List of Unambiguous and Ambiguous Words Used in the Liking Task (Study 4)

| Ambiguous | | Unambiguous |
|---|---|---|
| green | singing | pain |
| shower | exercising | love |
| dogs | driving | failure |
| ice cream | typing | comfort |
| sushi | grass | freedom |
| traveling | balloons | loneliness |
| snow | plants | hatred |
| summer | fishing | friendship |
| wine | alcohol | smiles |
| meat | babies | deceit |
| swimming | chicken | success |
| reading | computers | torture |
| music | professors | illness |
| carrots | politics | safety |
| fruits | sports | fear |
| dancing | running | presents |
| homework | carpets | winning |
| sleep | cars | murder |
| coffee | animals | happiness |
| roommates | mail | guilt |

Received September 14, 2001
Revision received January 30, 2002
Accepted February 19, 2002 ■