

Self-Consistency, Self-Enhancement, and Accuracy in Reactions to Feedback

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An experiment tested predictions generated by a model of the role of self-consistency, self-enhancement, and accuracy in reactions to feedback. The model proposed that affective reactions would be dominated by self-enhancement, that attributions and perceptions of feedback accuracy would be dominated by self-consistency, and that self-evaluations and expectations for future performance would reflect both self-consistency and accuracy. One hundred seventy-two subjects received either positive or negative feedback regarding their performance on an anagrams test. Results generally supported the model. Self-enhancement dominated affective responses: Subjects felt better after receiving positive feedback than after receiving negative feedback. Self-consistency effects emerged for attributions and perceptions of feedback accuracy: (1) Those high in self-esteem accepted more responsibility for receiving positive feedback than negative feedback, and they viewed positive feedback as more accurate; (2) Those low in self-esteem accepted more responsibility for negative feedback than positive feedback, and perceived negative feedback as more accurate. Reflecting both accuracy and self-consistency, there were main effects for both feedback and self-esteem on self-evaluations and expectations. Discussion focuses on how this study supports the model, the value of distinguishing among different types of cognitive reactions, and the need to explicitly incorporate accuracy concerns in perspectives on reactions to feedback. © 1995 Academic Press, Inc.

People receive evaluations in many aspects of daily life, including home, school, work, and even leisure and play. People, however, do not necessarily respond passively to feedback. The self-concept often may play

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an active role in reactions to evaluations. Previous research on the role of the self in reactions to feedback has primarily focused on two motives: Self-consistency and self-enhancement (Arkin & Appelman, 1983; Lake & Arkin, 1985; McFarlin & Blascovich, 1981; Moreland & Sweeney, 1984; Swann, Griffin, Predmore, & Gaines, 1987; Sweeney & Wells, 1990; see reviews by Jones, 1973; Shrauger, 1975). In this paper, we first develop a model of the role of the self in reactions to feedback that includes ideas from self-consistency and self-enhancement, but which also implicates another motive: A desire to accurately evaluate one's performances and competencies. We then test predictions generated by this model in a study that examined the interplay of feedback and self-esteem in determining people's affective, cognitive, and self-evaluative reactions.

When people receive performance feedback (scores on a test, winning or losing a game, positive or negative evaluations from one's teacher, coach, employer, etc.), they may have many different types of reactions. For example, people often evaluate the accuracy or credibility of the feedback they receive; they may make attributions for their performance; they may make inferences regarding the quality of their performance and ability; they may use the feedback as a basis for expectations for future performance; the feedback may make them feel good or bad, etc. What might govern these types of reactions to feedback? Previous research has focused on two motives underlying reactions to feedback: Self-consistency and self-enhancement.

SELF-CONSISTENCY

Self-consistency theory proposes that people assimilate ideas consistent with their past experiences, and avoid or reject inconsistent ideas in order to maintain their self-concepts (Lecky, 1945; Secord & Backman, 1965; Swann, 1987). For example, the theory predicts that people high in self-esteem should perceive positive feedback as more accurate than negative feedback; and they should be more willing to take more responsibility for positive feedback. They should feel better (i.e., experience more positive affect) after receiving positive feedback.

Self-consistency theory predicts an opposite pattern for people low in self-esteem. They should view negative feedback as more accurate than positive feedback, and they should be more willing to take responsibility for negative feedback. A strong version of self-consistency even predicts that people low in self-esteem would actually feel better after receiving negative feedback than after receiving positive feedback (Shrauger, 1975).

SELF-ENHANCEMENT

Self-enhancement theory proposes that people are motivated to view themselves as favorably as possible (Epstein, 1973; Jones, 1973; Shrauger, 1975). This may manifest in many ways, including overly optimistic biases

(Weinstein, 1980), preferences for downward social comparisons (Wills, 1981), and a wide variety of self-serving attributional and information processing patterns (Bradley, 1978; Pyszczynski & Greenberg, 1987; Taylor & Brown, 1988). People will also go to considerable lengths to affirm or bolster their self-conceptions when they are threatened (Steele, 1988; Tesser & Campbell, 1985).

The theory predicts that people react favorably to evaluations that enhance their feelings of personal worth. A strong version of the theory predicts that because people low in self-esteem are essentially "starving" for favorable evaluations, they will respond even more favorably to positive feedback than people high in self-esteem. Because research on reactions to feedback has not supported this strong version (e.g., McFarlin & Blascovich, 1981; Moreland & Sweeney, 1984; Swann et al., 1987; see reviews by Jones, 1973; Shrauger, 1975), it is not discussed further.

A more moderate version of self-enhancement theory suggests that initial self-esteem is irrelevant to reactions to feedback (Shrauger, 1975; Swann et al., 1987). Regardless of their self-esteem: (1) people will view positive feedback as more accurate than negative feedback; (2) they will take more responsibility for positive feedback; and (3) they will feel better after receiving positive feedback.

ACCURATE SELF-PERCEPTION

The idea that people often desire to develop accurate impressions of themselves is a central component of social comparison theory (Festinger, 1954) and self-assessment theory (Strube & Roemmele, 1985; Trope, 1986). Other perspectives argue that accuracy is one of several motivations that people may have when seeking self-understanding (Fiske & Taylor, 1991; Kunda, 1990; Pyszczynski & Greenberg, 1987; Vallacher & Wegner, 1987). Although accuracy has received considerable attention in both the social and self-perception areas (e.g., Jussim, 1991; Kunda, 1990; Trope, 1986), it has not been explicitly addressed in previous research on the role of the self in reactions to feedback (e.g., Arkin & Appelman, 1983; Lake & Arkin, 1985; McFarlin & Blascovich, 1981; Moreland & Sweeney, 1984; Swann et al., 1987; Sweeney & Wells, 1990) or in broad reviews (Jones, 1973; Shrauger, 1975; Swann, 1987).

How might this motive influence reactions to feedback? To the extent that people desire to accurately evaluate their performance and abilities, and to the extent that they perceive the feedback as accurate, they would utilize the evaluative information provided by feedback. This is because feedback often provides useful information regarding one's performance and competence. If people are motivated to use that information, they will view their performances and competencies more favorably after receiving positive feedback than after receiving negative feedback.

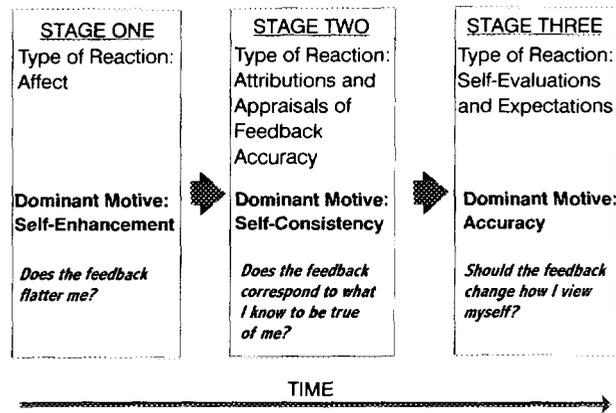


FIG. 1. Stages in reactions to feedback.

DO THESE MOTIVES CONFLICT?

If people were only influenced by a single motive, self-consistency, self-enhancement, and accuracy would lead to conflicting predictions regarding people's reactions to feedback. For example, self-consistency and self-enhancement motives seem to conflict for people low in self-esteem. For them, accepting greater responsibility for success, expecting future success, and feeling better after success may be self-enhancing, but accepting greater responsibility for failure, expecting failure in the future, and even feeling better after failure are self-consistent.

An accuracy motive may seem to conflict with both self-consistency and self-enhancement. This is because if people were motivated only by self-consistency or only by self-enhancement, feedback would have little or no influence on self-evaluations. From a self-enhancement perspective, if people only accepted approval and rejected disapproval, feedback would have little opportunity to influence self-perceptions. From a self-consistency perspective, if feedback that confirms with one's prior self-perceptions is accepted, and if feedback that disconfirms one's self-perceptions is rejected, those self-perceptions will not change.

AN INTEGRATIVE MODEL AND PROPOSED RESOLUTION

Overview

However, most perspectives acknowledge, explicitly or implicitly, that people's reactions to feedback may be influenced by more than one motive (e.g., Jones, 1973; Shrauger, 1975; Swann, 1992). Therefore, these motives may not conflict with one another quite as much as it seems. Figure 1 presents an overview of a model that builds upon and extends previous attempts to resolve the apparently conflicting influences of these self-

motives. It proposes that there are at least three sequential stages in reactions to feedback: (1) People's initial reactions to feedback are primarily affective, and these are dominated by self-enhancement; (2) Their next set of reactions, attributions and appraisals of feedback accuracy, are more cognitive, and are dominated by self-consistency; and (3) A third set of reactions, self-evaluations and expectations, are dominated by accuracy. Next, therefore, we first show how this model incorporates and extends existing theory on the role of the self in reactions to feedback; and then we show how this model incorporates classic predictions and generates unique predictions regarding how people react to feedback.

Stage 1: Affective Reactions

First, the model draws heavily on Shrauger's (1975) suggestion that self-enhancement dominates affective responses and self-consistency dominates cognitive responses. In addition, abundant research suggests that affect is partially independent of cognition, and, further, that many affective reactions to stimuli occur very quickly (Swann et al., 1987, 1990; Swann, 1992; Zajonc, 1980). Affective reactions require only a single operation—characterizing feedback as positive or negative. If it is positive, one feels good; if it is negative one feels bad (Swann, 1992). Thus, the first stage involves affective reactions to feedback, and these should be dominated by self-enhancement. Consistent with this perspective, most studies show that, regardless of their self-esteem, people feel better after receiving positive feedback than after receiving negative feedback (Arkin & Appleman, 1983; Lake & Arkin, 1985; Moreland & Sweeney, 1984; Swann et al., 1987; Sweeney & Wells, 1990). Operationally, therefore, this analysis proposes that feedback should have main effects on affective responses. It makes no predictions regarding self-esteem main effects or a feedback by self-esteem interaction.

Stage 2: Cognitive Reactions

Second, the model draws on Swann's (1992; Swann et al. 1987) suggestion that initial cognitive reactions, such as appraisals of feedback accuracy, involve: (1) Characterizing the feedback as positive or negative; and (2) Comparing the feedback to one's initial self-conceptions. Because cognitive reactions require two operations, whereas affective reactions require only one, cognitive reactions occur more slowly and after more consideration than do affective reactions. Thus, the second stage involves these types of cognitive reactions.

The main prediction is an interaction between feedback and self-esteem. Positive feedback "fits" for people high in self-esteem, so that they accept responsibility for it, and perceive it as accurate. In contrast, positive feedback does not fit well for people low in self-esteem, so that they reject responsibility for it and perceive it as inaccurate. Just the opposite

pattern should emerge for negative feedback. It does not fit well for people high in self-esteem, so they reject responsibility for it, and see it as inaccurate. In contrast, it fits well for people low in self-esteem, so they accept responsibility for it, and see it as accurate. Research has generally confirmed these predictions (Arkin & Appleman, 1983; Lake & Arkin, 1985; Swann et al., 1987; Sweeney & Wells, 1990). This perspective provides no basis for predicting main effects for feedback or self-esteem on these types of reactions.

Stage 3: Self-Evaluations and Expectations

The first two stages of this model correspond closely to a model recently developed by Swann (1992), and incorporate the ideas of considerable past theory (Shrauger, 1987; Swann, 1987) and empirical research (e.g., Arkin & Appleman, 1983; Moreland & Sweeney, 1984; Swann et al., 1987; Sweeney & Wells, 1990). However, our model proposes that there is also a third stage in reactions to feedback—one that is primarily dominated by accuracy concerns but which shows after-effects of self-consistency.

If, as many perspectives propose (Festinger, 1954; Fiske & Taylor, 1991; Kunda, 1990; Pyszczynski & Greenberg, 1987; Trope, 1986; Vallacher & Wegner, 1987), people are interested in perceiving themselves accurately (in addition to, rather than instead of, being interested in perceiving themselves positively and self-consistently), they will consider the implications of feedback for revising or maintaining their self-perceptions. Those implications should depend upon one's attributions of responsibility and perceptions of feedback accuracy. When a target believes that the feedback is accurate and feels responsible for it, that target would also probably feel that the feedback provides a more sound basis for altering self-perceptions than will feedback that is judged inaccurate and for which the target feels little responsibility.

This analysis leads to unique predictions that are not derivable from any of the existing perspectives (e.g., Fiske & Taylor, 1991; Jones, 1973; Shrauger, 1975; Swann, 1987, 1992) on the role of the self in reactions to feedback. First, regardless of targets' self-esteem, feedback should have main effects such that self-evaluations are higher after receiving positive feedback than after receiving negative feedback. Second, regardless of the feedback, targets high in self-esteem should evaluate themselves more favorably than targets low in self-esteem.

Because this is the newest aspect of our model, we next describe the rationale for these predictions in detail. Especially because feedback by self-esteem interactions are often predicted for cognitive reactions, and because for many purposes self-evaluations and expectations have often been considered cognitive reactions, it is important to show why this

perspective provides no basis for predicting an interaction between feedback and self-esteem.

Feedback Main Effects

If people high in self-esteem receive positive feedback, they perceive it as accurate and accept responsibility for it, so it should boost their self-evaluations. Negative feedback will be viewed as less accurate, and they will accept less responsibility for it. Therefore, negative feedback might reduce their self-evaluations slightly, or not at all. Considering only people high in self-esteem, there should be a feedback main effect such that people have higher self-evaluations after positive feedback.

If people low in self-esteem receive positive feedback, they consider it to be largely inaccurate and they accept little responsibility for it. Therefore, it should have little influence on their self-evaluations. If they receive negative feedback, they consider it to be accurate and they accept responsibility for it. Therefore, it should reduce their self-evaluations. Considering only people low in self-esteem, therefore, there should be a feedback main effect, such that people receiving positive feedback have higher self-evaluations than people receiving negative feedback.

Note that a feedback main effect is predicted for both high and low self-esteem individuals, such that self-evaluations should be higher after positive feedback than after negative feedback. Next we will show why this perspective predicts a self-esteem main effect for self-evaluations.

Self-Esteem Main Effects

According to the accuracy perspective, negative feedback reduces self-evaluations of people low in self-esteem more than it reduces self-evaluations of people high in self-esteem. Thus, after negative feedback, there should be a self-esteem main effect, such that people high in self-esteem should have higher self-evaluations than those held by people low in self-esteem. Similarly, positive feedback should increase self-evaluations of people high in self-esteem more than it increases self-evaluations of people low in self-esteem. Thus, after positive feedback, there should be a self-esteem main effect such that people high in self-esteem should have higher self-evaluations than those held by people low in self-esteem.

If people use feedback they perceive to be more accurate and for which they feel more responsible as a basis for their own evaluations and expectations, regardless of whether they received positive or negative feedback, there should be a self-esteem main effect, such that highs have higher evaluations and expectations than lows. Nothing in this perspective predicts a self-esteem by feedback interaction for self-evaluations and expectations.

The model suggests that there is an interplay of self-consistency and accuracy for self-evaluations and expectations. Even though the main

TABLE 1
SUMMARY OF PREDICTIONS

| Reactions to feedback | Self-consistency | Self-enhancement | Accuracy |
|---|--|-----------------------------------|--|
| Attributions and perceptions of feedback accuracy | SELF-ESTEEM BY FEEDBACK INTERACTION | Feedback main effect | — |
| Self-evaluations and expectations | SELF-ESTEEM MAIN EFFECT | Grand mean exceeds scale midpoint | FEEDBACK & SELF-ESTEEM MAIN EFFECTS |
| Affect | Self-esteem by feedback interaction | FEEDBACK MAIN EFFECT | — |

Note. This table shows what type of reaction to feedback should result from each of the three motives. We hypothesized the pattern indicated by predictions appearing in bold-faced capital letters (see text for explanation).

motivation may be to arrive at accurate self-evaluations and expectations, self-consistency influences the perceived credibility of the feedback and how responsible one feels for receiving it. Thus, self-consistency “filters” the information which one uses in one’s attempt to arrive at accurate self-perceptions. Because these types of self-evaluative reactions may depend upon attributions and perceptions of feedback accuracy, this model assumes that they occur third, after affective reactions and cognitive reactions.

MAIN PREDICTIONS

First, self-enhancement should influence affective responses, yielding feedback main effects. Second, self-consistency should influence cognitive responses, yielding an interaction between feedback and self-esteem. If this second prediction is confirmed, and if people also desire to perceive themselves accurately, both self-esteem and feedback should have main effects on self-evaluations and expectations. These predictions are summarized in bold-faced capital letters in Table 1.

OTHER PREDICTIONS

Other predictions are also presented in Table 1. These predictions were generated on the basis of “strong” versions of self-enhancement and self-consistency (see reviews by Jones, 1973; Shrauger, 1975). These predictions (those not presented in upper-case letters and bold-faced type) *are not* part of our attempt to resolve the apparent discrepancies among the theories and we did not expect to support them. Although supporting

these other predictions would provide greater support for each individual theory, it would not support our new model; *failing* to support these other predictions would provide further support for our perspective suggesting that different motivations influence different types of reactions to feedback.

The strong version of self-enhancement theory predicts that people prefer to view themselves "as favorably as possible." For evaluations and expectations, this may be operationalized as predicting that scores on measures assessing self-evaluations, perceptions of how the evaluator views oneself, and expectations would exceed the scale's midpoint (i.e., scores would be on the more positive side of the scales). Self-enhancement also predicts feedback main effects for attributions and perceptions of the accuracy of the feedback (regardless of their self-esteem, people should accept greater responsibility for positive feedback and see it as more accurate). A strong version of self-consistency can be construed as predicting a self-esteem by feedback interaction for affective reactions. People high in self-esteem should feel better after receiving positive feedback than after receiving negative feedback; people low in self-esteem should feel better after receiving negative feedback than after receiving positive feedback. As indicated in Table 1, although each theory may predict these patterns, we did not expect to confirm them.

METHOD

Procedure

When the subjects arrived, the experimenter greeted them and had them sign a consent form, which assured them that their responses would remain confidential. The experimenter then presented the following cover story:

You are about to participate in a program that was designed for the training of future teachers. You and a graduate student in education will comprise one of several teacher-student teams involved in performing a series of tasks. You will be the student and she will be the teacher. Your team's test scores will be compared to those of other teacher-student teams. Also, your teacher will evaluate your results and discuss them with me. After each task you will be asked to complete a questionnaire concerning your experiences as a student in this program. Do you have any questions?

The experimenter then introduced the teacher (*confederate*) to the subjects, and the teacher then gave the subjects a brief lesson on solving anagrams. This lesson entailed describing anagrams, providing some strategies for solving anagrams and some illustrative examples. At the end of the lesson, the teacher informed the subjects that they would have 10 min to solve 15 anagrams.

Following the lesson, the experimenter led the subjects to their own small room and administered the anagrams test. The teacher returned to each subject at the end of the time limit, graded the anagrams test, and wrote the number correct at the top of the test sheet. The teacher then conveyed to the subject positive or negative feedback, which was selected randomly, immediately before the teacher returned to each subject. The teacher gave the

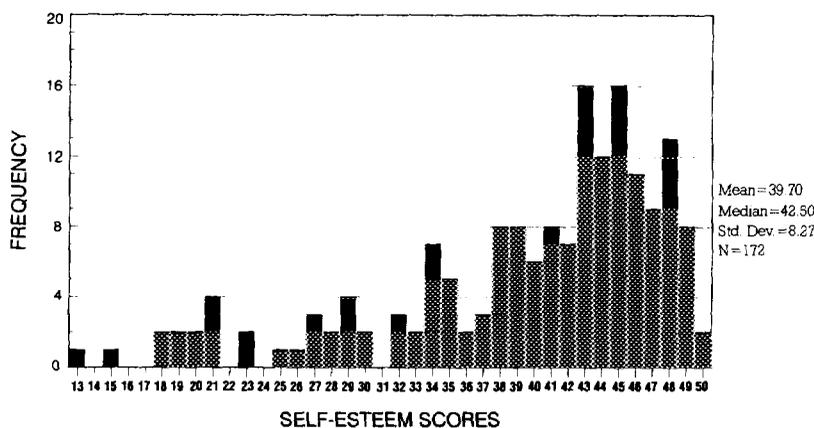


FIG. 2. Distribution of scores on the Rosenberg self-esteem scale.

subject the answer sheet (so that the subject would realize that all the anagrams are solvable), and left the room.

The experimenter then returned and explained to the subject that she was going to prepare the materials needed for the next anagram test. In the alleged interim (there really was no "next test"), subjects were given the questionnaires assessing self-esteem, and affective, cognitive, and self-evaluative reactions. The experimenter then left the room and each subject completed the questionnaires in privacy. After completing the questionnaires, subjects were told that the experiment was over, and they were debriefed.

Subjects

One hundred eighty-six female students enrolled in introductory psychology courses participated in the study as one way to fulfill a course requirement. Fourteen subjects were not included in the analyses because they became suspicious regarding the true purpose of the study, or regarding one or more of the deceptions used in the procedures. The final sample included 172 subjects.

We focused on female subjects for several reasons. First, previous research using very similar procedures and assessing similar dependent variables has found very few sex differences (Coleman, Jussim, & Abraham, 1987; Jussim, Soffin, Brown, Ley, & Kohlhepp, 1992). Second, other research assessing Shrauger's (1975) predictions have reported very few sex differences (McFarlin & Blascovich, 1981; Moreland & Sweeney, 1984; Swann et al., 1987). Third, we did not want to complicate this study unnecessarily by assessing the effects of male and female teachers on male and female students. This would have quadrupled the number of cells in our design and decreased power. Last, there are typically more women than men attending Rutgers introductory psychology classes, so that it was more practical to focus exclusively on women.

Anagrams Test

All subjects took a 15-item anagrams test, which had been pretested to produce intermediate scores. The mean score was 8.31 and the range was 5 to 11.

Assessment of Global Self-Esteem

The 10-item Rosenberg Self-Esteem scale (Rosenberg, 1965) assessed subjects' global self-esteem. Figure 2, which depicts the distribution of self-esteem scores, shows that there

is a long tail at the low end of the scale, and that most subjects scored between 38 and 49 ($n = 123$). The lowest third scored 13–38; the middle third scored 39–44; and the top third scored 45–50. This distribution has several implications. First, the large number of people with scores in the teens, twenties, and thirties means that we have a substantial number of subjects with genuinely low self-esteem. Second, the mode occurs around 44, 45, and 46 ($n_s = 16, 12, \text{ and } 16$, respectively) and the frequency clearly drops off at 48, 49, and 50 ($n_s = 14, 14, 8, \text{ and } 2$, respectively). Thus, scores at the high end dropped off before they reached a ceiling.

Dependent Variables

Affect. The Anxiety-State Scale was one measure of affect. This 20-item scale is one of the subscales in The State-Trait Anxiety Inventory, and is highly reliable (Spielberger, Gorsuch, & Lushene, 1969). There were also two single-item measures of affect. Subjects were asked to describe their “feelings as a student in this relationship” by indicating how positive or negative they felt, and how warm or cold they felt. Both were assessed using 7-point scales. These latter two affective questions were imbedded in a longer questionnaire portrayed as assessing reactions to and opinions regarding the “experimental program for the training of future teachers.”¹

Attributions and perceived feedback accuracy. Questions assessed the perceived accuracy of the teacher's evaluation (“How accurate was the teacher's evaluation of your test performance?”); responsibility for performance (“How responsible do you feel for the score you received on the anagrams test?”); responsibility for the teachers' evaluation (“How responsible do you feel for the evaluation/feedback you received from your teacher?”). These variables were all assessed on seven-point scales.

Self-evaluations. One pair of questions assessed how well subjects evaluated their own performance: (1) one question asked how well subjects felt they performed; and (2) another question asked them to rate how good they felt their score was. Another pair of questions assessed subjects' perceptions of their ability: (1) one question assessed how much ability they thought they had to solve anagrams; and (2) another question assessed how good they were at solving anagrams. All these questions were on 1- to 7-point scales, with higher scores indicating a more favorable evaluation.

Expectations. Two questions assessed subjects' expectancies for future performance. On one, subjects indicated how well they expected to perform on the next anagrams test (also on a 7-point scale). On another, subjects indicated the number (out of 15) of anagrams they expected to solve on the next test.

Confederates

Four female undergraduate research assistants were trained to play the role of the teacher, and to convincingly convey the evaluative feedback. The feedback consisted of the following statements:

Positive feedback: You have (5 to 11) right. That's a good score.

¹ The questionnaires were presented in either of two orders: 1) The two single-item affect questions, the questionnaire including cognitive reactions and evaluative judgments, the Anxiety-State Scale, and the Rosenberg Self-Esteem Scale; or 2) Anxiety-State Scale, Rosenberg Self-Esteem Scale, the two single-item affect questions, and the questionnaire including cognitive reactions and evaluative judgments. Initial analyses showed that out of a possible 48 main effects and interactions involving questionnaire order, only 8 were significant and these showed no discernible pattern. They are, therefore, not further discussed.

Negative feedback: You have (5 to 11) right. That's not a good score.²

The confederates were not aware of the feedback condition until immediately prior to conveying it. Consequently, any effects produced by their knowledge of the feedback on their initial interactions with the subjects were avoided.

RESULTS

Initial Analyses

Manipulation checks. Subjects indicated which of two categories (positive vs negative evaluation) best described the teacher's evaluation of their performance. Of the subjects in the positive feedback condition, 96.4% reported that they received a positive evaluation from the teacher, and 95.5% of the subjects in the negative feedback condition reported that they received a negative evaluation from the teacher.

Self-esteem. Our procedures involved assessing self-esteem after the manipulation. For both theoretical and empirical reasons, however, we were confident that our measure of self-esteem was independent of the feedback. Previous research using nearly identical procedures has consistently shown no relation between the type of feedback manipulated in this study and global self-esteem (Jussim, et al., 1992). In general, global self-esteem is extremely stable over short periods of time (Fleming & Watts, 1980), and experimental research generally fails to find influences of feedback on global self-esteem (e.g., McFarlin & Blascovich, 1981). In addition, a *t* test showed no relation between feedback and self-esteem ($t = 1.01$, ns).

Confirmatory Factor Analyses

Our first objective was to: (1) Replicate the classic distinction between cognitive and affective responses first identified by Shrauger (1975) and confirmed in subsequent research (e.g., Lake & Arkin, 1985; Swann et al., 1987); and (2) assess the viability of distinguishing attributions and perceptions of feedback accuracy from self-evaluations and expectations. Therefore, we performed a series of confirmatory factor analyses using the LISREL VII program.

Our main question here is: "Is it more reasonable to assume reactions to feedback fall into two broad factors (affect and cognition), or is it more

² In addition, this feedback was conveyed in a warm, neutral, or cold nonverbal style. The nonverbal behaviors were displayed only during the time period in which the confederate conveyed the feedback (5–10 s). Initial analyses showed few relations between these very briefly displayed nonverbal styles and the dependent variables. There were only three significant main effects and one significant interaction out of a possible 48 main effects and interactions.

Initial analyses also showed that out of a possible 48 main effects and interactions involving confederates, only 6 were significant, and these showed no discernible pattern. Therefore, neither the nonverbal manipulation nor confederate effects are discussed further.

reasonable to assume that attributions and perceptions of feedback accuracy constitute one factor and self-evaluations and expectations constitute another?" We are not seeking the "perfect" model. We are seeking one that is simply better than existing models. One test of superiority is the χ^2 difference test (Bentler & Bonnett, 1980). This involves computing the difference between the two χ^2 's obtained for two nested models (which is itself distributed as a χ^2 with degrees of freedom equal to the difference in degrees of freedom for the two models). If this χ^2 difference test is significant, it means that one model accounts for more of the covariances among the variables than does the other. Thus, although the χ^2 difference test provides no information about the absolute fit of each model, it is perfectly suited for identifying whether one model is superior to another (our main question). Below, whenever we report a χ^2 for the *improvement* of one model over another, it is this χ^2 difference test.

We also report two measures of absolute fit of each model: The χ^2 (which assesses whether the model deviates from perfection), and the *comparative fit index* (*CFI*), which is an index of how much information the model does provide (Bentler, 1990). Values of .9 or higher indicate good fit.³

To compute *CFI*, we first needed to assess a "null" model to serve as a baseline for comparing the improvement obtained from predicted models. As is most common (Bentler & Bonnett, 1980), our null model assumed complete independence among the 12 variables. The χ^2 for our null model was 766.05, $df = 66$, $p < .001$. Table 2 summarizes the fit assessment of the models we tested.

One-factor model. For comparison purposes, we first assessed a model that assumed all 12 of our variables represented a single underlying factor. In addition, we assumed no correlations among the measurement errors for any of the dependent variables (except where otherwise noted, we also make this assumption for all LISREL models reported below). Not surprisingly, the one-factor model was a significant improvement over the null model ($\chi^2 = 430.25$, $df = 12$, $p < .001$). Equally unsurprising, its absolute fit was not very good ($\chi^2 = 335.12$, $df = 54$, $p < .001$, *CFI* = .598).

Two-factor model. Do our data replicate the viability of distinguishing between affective and cognitive reactions to feedback? To answer this question, we assessed a two-factor model that assumed that: (1) how

³ Based upon theoretical arguments, mathematical analysis, and a monte carlo simulation, Bentler (1990) documented the superiority of the *CFI* over the more commonly used *normed fit index* (*NFI*, Bentler & Bonnett, 1980). The *NFI* tends to substantially underestimate fit in small samples, and there is often greater variability in *NFI* estimates of fit than of *CFI* estimates (Bentler, 1990). The *CFI*, too, tends to underestimate fit in small samples, but to a lesser extent than the *NFI*.

TABLE 2
FIT ASSESSMENT OF ALTERNATIVE MODELS

| Model | χ^2 | df | CFI |
|--|----------|----|------|
| Null | 766.05 | 66 | — |
| One-factor | 335.80 | 54 | .598 |
| Two-factor | 231.81 | 53 | .745 |
| Three-factor | 213.92 | 51 | .767 |
| Three-factor with correlated errors ^a | 95.85 | 48 | .932 |

Note. All χ^2 s are significant at $p < .001$. *CFI* refers to Bentler's (1990) comparative fit index. The two-factor model includes separate factors for affect and cognition. The three-factor model includes separate factors for: 1) affect, 2) attributions and perceptions of feedback accuracy, and 3) self-evaluations and expectations. Moving down the table, each model represents a significant improvement in fit over the previous model (see text for explanation).

^a See text for explanation.

anxious, warm/cold, and positive/negative subjects felt all loaded on one (affective) factor; and (2) all other variables loaded on one (cognitive) factor. In addition, none of the variables loading on the cognitive factor were allowed to load on the affective factor and none of the variables loading on the affective factor were allowed to load on the cognitive factor.

Confirming the importance of the distinction, the χ^2 difference test showed that the two-factor model represented a significant improvement over the one-factor model, $\chi^2 = 103.99$, $df = 1$, $p < .001$. This analysis provided clear support for the importance of distinguishing affective reactions from cognitive reactions. However, its absolute fit was not particularly good ($\chi^2 = 231.81$, $df = 53$, $p < .001$, *CFI* = .745).

Three-factor model. Next, therefore, we assessed a three-factor model that separated self-evaluations and expectations from attributions and perceptions of feedback accuracy. This model assumed that: (1) The three affective variables (anxiety, warm/cold and positive negative) all loaded on a single factor; (2) Perceptions of feedback accuracy and attributions of responsibility for test score and teacher feedback loaded on a second factor; and (3) The two measures of subjects' self-evaluations of performance, the two measures of self-perceptions of ability, and the two measures of expected performance on the next test all loaded on a third factor. Although the three-factor model significantly improved the fit over the two-factor model ($\chi^2 = 17.89$, $df = 2$, $p < .001$), it significantly deviated from a perfect model ($\chi^2 = 213.92$, $df = 51$, $p < .001$). The *CFI*, too, indicated less than optimal fit (*CFI* = .767).

In an effort to further improve the fit, we allowed three correlations among measurement error terms. Within the self-evaluations and expect-

TABLE 3
FACTOR LOADINGS: THREE-FACTOR MODEL

| Measures | Expectation and self-evaluation factor | Attributions and perceptions of feedback accuracy factor | Affective factor |
|---|--|--|------------------|
| Self-rating of performance | .60 | | |
| How well did you do on the test? | .53 | | |
| Self-perceptions of ability | .69 | | |
| How good are you at anagrams? | .67 | | |
| Expected performance on the next test | .81 | | |
| Expected score on the next test | .47 | | |
| Accuracy | | .34 | |
| Responsibility for performance | | .23 | |
| Responsibility for teacher's evaluation | | .75 | |
| Anxiety | | | .43 |
| Warm | | | .75 |
| Positive | | | .85 |

Note. All coefficients are standardized. Scales have been reversed to render all coefficients positive. These coefficients are for the three-factor model that included correlated errors (see text for explanation).

tations factor were three pairs of related variables. We allowed the measurement error among the two measures of subjects' self-evaluations of performance to correlate with one another; we allowed the measurement error among the two measures of self-perceptions of ability to correlate with one another; and we allowed the measurement errors among the two measures of expected performance on the next test to correlate with one another. All three correlations among measurement error terms were statistically significant ($p < .05$). Although the model still significantly deviated from a perfect model ($\chi^2 = 95.85$, $df = 48$, $p < .001$), its absolute fit was quite good ($CFI = .932$), and it significantly improved over the three-factor model without correlated errors ($\chi^2 = 118.07$, $df = 3$, $p < .001$). Table 3 presents the factor loadings for this model. Table 4 shows that the self-evaluation and expectation factor was nearly orthogonal to the other cognitive factor, providing further evidence in support of the appropriateness of distinguishing among these types of reactions.

TABLE 4
CORRELATIONS AMONG FACTORS: THREE-FACTOR MODEL

| | Self-evaluations expectations | Attributions and perceptions of feedback accuracy |
|--|----------------------------------|--|
| Attributions and perceptions of feedback accuracy | .11 | |
| Affect | .36 | .32 |

Note. These coefficients are for the three-factor model that included correlated errors (see text for explanation).

Scale Formation

The following sets of questions were combined into scales: (1) Perceptions of feedback accuracy and both attribution questions; (2) Both self-evaluation of performance questions (hereafter referred to as the "self-evaluations"); (3) The two self-perception of ability questions (hereafter referred to as "self-perceptions of ability"); and (4) The two single-item affect questions (hereafter referred to as the "affect scale"). All measures were standardized before being added together to form scales. The means, standard deviations, and ranges of all variables are presented in Table 5. The reliabilities (α) for all scales were above .75, except for the perception of feedback accuracy and attribution scale. That scale was not very reliable ($\alpha = .36$). However, because preliminary analyses showed the same pattern of main effects and interactions on each of the three components of that scale, we continued to use this scale as a dependent variable in the analyses reported below (this, of course, biases our analyses *against* finding significant effects of feedback or self-esteem).

Main Analyses: Tests of the Integrative Model

Overview. A series of regression models tested the main hypotheses. For each dependent variable, two models were assessed. The first model tested for main effects by employing feedback, self-esteem, and test scores as predictors. Feedback was effect coded (1 for positive feedback, -1 for negative feedback). Raw self-esteem scores were used. A second model added to this equation a term representing the interaction of feedback and self-esteem (the product of the feedback and self-esteem variables). For all results, we present the unstandardized coefficients (bs) and standardized coefficients (βs).

The main predictions are summarized in Table 1. The predictions in that table for "Attributions and Perceptions of Feedback Accuracy" apply to the scale combining attributions and perceptions of feedback accuracy. The predictions for "Self-Evaluations and Expectations" apply to: (1) The self-evaluation scale; (2) The self-perception of ability scale; and (3) Both

TABLE 5
DESCRIPTIVE STATISTICS

| | Mean | Standard deviation | Minimum | Maximum |
|---|-------|--------------------|---------|---------|
| Anxiety | 40.12 | 10.38 | 20.00 | 75.00 |
| Affect scale ^a | .00 | 1.80 | -3.03 | 5.03 |
| Attributions and feedback accuracy scale ^b | .00 | 1.98 | -4.87 | 4.19 |
| Self-evaluation scale ^c | .00 | 1.82 | -3.20 | 4.05 |
| Self-perception of ability scale ^d | .00 | 1.93 | -3.16 | 4.60 |
| Expected performance | 4.19 | 1.30 | 1.00 | 7.00 |
| Expected score | 9.51 | 1.75 | 4.00 | 15.00 |

Note. Higher scores indicate greater perceived accuracy of and responsibility for feedback, higher self-evaluations, higher self-perceptions of ability and higher expectations, greater anxiety, and more *negative* affect.

^a The Affect Scale was computed by summing the standardized scores for two variables: ratings of how positive/negative and how warm/cold subjects felt in the experiment.

^b The Attribution and Feedback Accuracy Scale was computed by summing standardized scores for three variables: perceptions of feedback accuracy, perceptions of responsibility for the feedback, and perceptions of responsibility of the test score.

^c The Self-Evaluation Scale was created by summing the standardized scores for the two self-evaluation of test performance questions.

^d The Self-Perception of Ability Scale was computed by summing the standardized scores for two variables: self-perceptions of anagrams ability and self-perceptions of how good they are at solving anagrams.

expectation variables. The predictions for "Affect" apply to: (1) The Anxiety scale; and (2) The Affect scale. Table 6 summarizes these results.

Stage One: Affective Reactions

The prediction generated by our model was that self-enhancement would dominate affective reactions. Therefore, we expected a feedback main effect, such that people would experience greater positive affect after receiving positive feedback than after receiving negative feedback. Because both of our affect measures were scaled so that a higher score indicated more *negative* affect, the operational prediction is that we would obtain significant negative regression coefficients for feedback. This is precisely what we found. For both the anxiety scale ($b = -2.07$, $\beta = -.20$, $p < .01$) and the affect scale ($b = -.58$, $\beta = -.33$, $p < .001$), positive feedback led to less negative affect (more positive affect) than did negative feedback.

Stage 2: Attributions and Perceptions of Feedback Accuracy

As indicated in Table 1, we expected to support the self-consistency prediction of a self-esteem by feedback interaction for attributions and

TABLE 6
MAIN EFFECTS AND INTERACTIONS

| Dependent variables | Feedback main effects | | | Self-esteem main effects | | | Feedback by self-esteem interaction | | | Test score | | | Multiple R |
|---|-----------------------|-------------|---------------|--------------------------|------------|---------------|-------------------------------------|-------------|---------------|------------|---------|----------|------------|
| | <i>b</i> | β | <i>t</i> | <i>b</i> | β | <i>t</i> | <i>b</i> | β | <i>t</i> | <i>b</i> | β | <i>t</i> | |
| Anxiety | -2.07 | -.20 | 2.89* | -.48 | -.38 | 5.49** | .03 | .10 | .29 | -.53 | -.05 | .78 | .45 |
| Affect scale | -.58 | -.33 | 4.59** | -.04 | -.20 | 2.86* | .00 | -.05 | .15 | -.06 | -.03 | .49 | .40 |
| Attributions and perceptions of feedback accuracy scale | .14 | .07 | .92 | -.03 | -.11 | 1.45 | .07 | 1.56 | 4.24** | .03 | .07 | .23 | .33 |
| Self-perceptions of performance | .65 | .36 | 5.82** | .07 | .31 | 4.96** | .01 | .20 | .65 | .57 | .33 | 5.39** | .61 |
| Self-evaluations of ability | .23 | .12 | 1.74* | .06 | .25 | 3.60** | -.01 | -.22 | .63 | .58 | .31 | 4.54** | .44 |
| Expected performance on the next test | .31 | .24 | 3.40** | .05 | .29 | 4.18** | .00 | -.15 | .42 | .21 | .17 | 2.39* | .44 |
| Expected score | -.33 | -.19 | 2.95* | .05 | .22 | 3.40** | .00 | -.02 | .07 | .80 | .48 | 7.41** | .56 |

Note. Error degrees of freedom ranged from 165 to 168, due to missing data. Effects predicted to be significant (see Table 1) are shown here in bold-faced type.

^a $p < .10$.

* $p < .01$.

** $p < .001$.

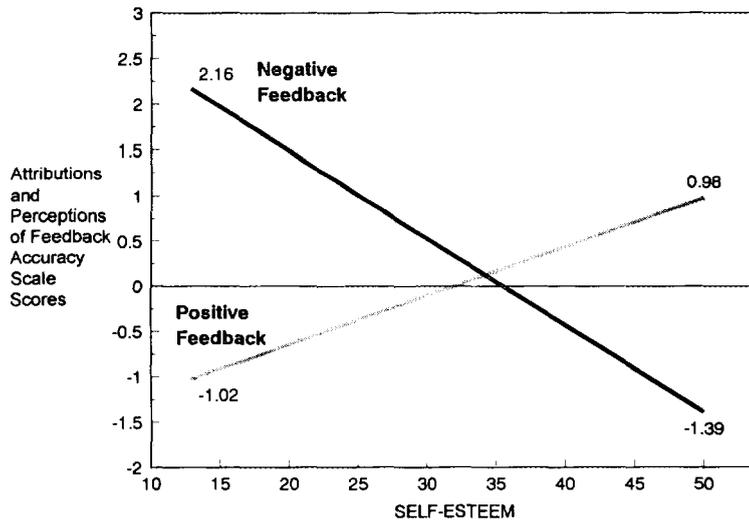


FIG. 3. Feedback by self-esteem interaction. *Note.* Higher scores indicate subjects feeling more responsible for their performance and feedback and perceiving the feedback as more accurate.

perceptions of the accuracy of the feedback. The regression analysis confirmed this prediction—the self-esteem by feedback interaction was significant ($b = .07$, $\beta = 1.56$, $p < .001$). The regression equation including the interaction was $\text{Scale scores} = .43 - 2.85(F) - .011(\text{esteem.}) - .01(\text{score}) + .075(F*\text{esteem.})$, where Scale scores refer to scores on the Attribution and Perceptions of Feedback Accuracy Scale; F refers to feedback (negative coded as -1 and positive coded as $+1$); esteem refers to scores on the Rosenberg Self-esteem scale; score refers to anagrams test score; and $F*\text{esteem.}$ refers to the interaction of feedback with self-esteem (obtained by multiplying the two variables together).⁴ Figure 3, which displays this interaction, shows that people high in self-esteem had higher Scale scores after receiving positive feedback than after receiving negative feedback. In contrast, people low in self-esteem had lower scores after receiving positive feedback than after receiving negative feedback.

Stage 3: Self-Evaluations and Expectations

As indicated in Table 1, our integrative model predicted that accuracy concerns would lead to feedback main effects and self-esteem main effects

⁴ Of course, the main effects for this equation do not correspond to those indicated in Table 6. This is because the main effects were obtained in a model that did not include the interaction term (see, e.g., Judd & McClelland, 1989).

for self-evaluations and expectations. Results generally confirmed these predictions (see Table 6).

Feedback main effects. There were significant feedback main effects on self-evaluations of performance ($b = .65, \beta = .36, p < .001$) and expected performance on the next test ($b = .31, \beta = .24, p < .001$). There was a marginal effect of feedback on self-perceptions of ability ($b = .23, \beta = .12, p < .10$). The positive coefficients mean that subjects held more favorable self-perceptions and expectations after receiving positive feedback than after receiving negative feedback. Although the effect of feedback on expected score on the next test was significant, the relation was in the opposite direction—subjects expected to obtain higher scores on the next test after receiving negative feedback than after receiving positive feedback ($b = -.33, \beta = -.19, p < .05$).

Did accuracy concerns moderate the feedback main effects? If people are motivated to view themselves accurately, they should alter their self-perceptions and expectations much more after receiving feedback that they consider valid and for which they feel responsible than after receiving feedback that they consider invalid and for which they feel little responsibility. Operationally, this suggests that feedback should interact with perceived accuracy and attributions in influencing self-evaluations and expectations. Effects of feedback should be larger when perceived accuracy and attributions are high than when they are low.

To test this hypothesis, we performed another regression analysis. First, we computed three interaction terms by multiplying feedback (coded as -1 for negative and $+1$ for positive) by: (1) perceived feedback accuracy; (2) responsibility for the feedback; and (3) responsibility for the test score. Before computing these terms, we subtracted the mean from each cognitive variable—this renders the results easier to interpret (see Judd & McClelland, 1989). We computed separate interaction terms because the low reliability of the scale meant that these three variables were partially independent, and therefore might have somewhat independent relations to self-evaluations and expectations.

Next, we estimated a new set of regression equations. We first regressed each self-evaluation and expectation variable on feedback, self-esteem, and the three perceived accuracy and attribution questions. Next, we added the three interaction terms, as a block, to the equations predicting self-evaluations and expectations.

This block significantly predicted self-evaluations of performance ($F(3, 164) = 5.54, p < .01$). The full equation was

$$\begin{aligned} \text{Self-perceptions of performance} &= -2.16 + .67(\text{feedback}) \\ &+ .05(\text{esteem}) + 0(\text{test responsibility}) \\ &+ .03(\text{feedback responsibility}) - .13(\text{perceived accuracy}) \\ &+ .04(\text{feedback} * \text{test responsibility}) \end{aligned}$$

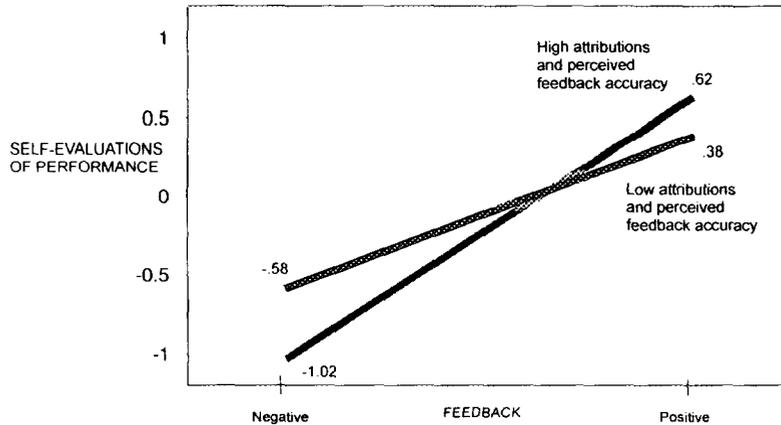


FIG. 4. Interaction of feedback and cognitive variables for self-evaluations.

$$+ .04(\text{feedback} * \text{feedback responsibility})$$

$$+ .26(\text{feedback} * \text{feedback accuracy}).$$

However, the only significant individual interaction term was Feedback*Perceived Accuracy ($t = 3.69$, $p < .001$; the other t s < 1). We are primarily concerned with whether, when all three are taken together, feedback has more influence when it is viewed as more accurate and when subjects accepted greater responsibility for it and for their performance. Therefore, in displaying this interaction, we used all three cognitive variables. Figure 4 displays the slope of the effects of feedback separately for those who scored high versus low on the perceived accuracy question and the two responsibility questions. The means for those variables were 4.62, 3.58, and 5.25, respectively, for perceived accuracy, feedback responsibility, and test responsibility. We operationalized high scores as the first scale point above the mean on each scale; and we operationalized low scores as the first scale point below the mean on each scale. Thus, high refers to scores of 5, 4, and 6, and low refers to scores of 4, 3, and 5, respectively, on the perceived accuracy, feedback responsibility, and test responsibility questions. We also assumed self-esteem scores of 40 (the mean was 39.70) for Fig. 4.

Figure 4 shows that the interaction confirmed the hypothesis that feedback more strongly influenced self-evaluations of performance when people had higher scores on perceived accuracy and the two responsibility questions. That is, the difference between positive and negative feedback is greater for people with higher perceived accuracy and responsibility scores than for people with lower scores.

Essentially the same pattern emerged for self-perceptions of ability. The effects of the three interactions, when entered as a block, were

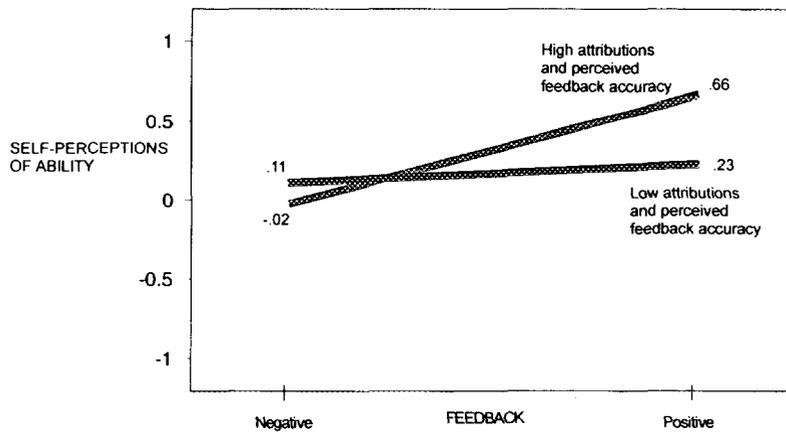


FIG. 5. Interaction of feedback and cognitive variables for self-perceptions of ability.

marginally significant ($F(3, 164) = 2.25, p = .084$). The full equation was

$$\begin{aligned}
 \text{Self-perceptions of ability} = & -2.22 + .18(\text{feedback}) \\
 & + .06(\text{esteem}) + .22(\text{test responsibility}) \\
 & - .03(\text{feedback responsibility}) - .06(\text{feedback accuracy}) \\
 & + .16(\text{feedback} * \text{test responsibility}) \\
 & - .05(\text{feedback} * \text{feedback responsibility}) \\
 & + .17(\text{feedback} * \text{feedback accuracy}).
 \end{aligned}$$

The .16 coefficient for the feedback by test responsibility interaction was marginally significant ($t = 1.76, p < .09$) and the .17 coefficient for the feedback by accuracy interaction was significant ($t = 2.07, p < .04$). Figure 5, which used the same assumptions as Fig. 4, shows that these interactions confirmed the hypothesis that feedback would be more influential when perceptions of feedback accuracy and responsibility were high than when they were low. The difference between positive and negative feedback was greater when the feedback was believed and accepted than when it was disbelieved and rejected.

Expected performance on the next test showed a similar pattern. The effects of the three interactions, when entered as a block, were significant ($F(3, 164) = 3.25, p < .03$). The full equation was

$$\begin{aligned}
 \text{Expected performance} = & 2.30 + .28(\text{feedback}) + .05(\text{esteem}) \\
 & + .14(\text{test responsibility}) + .10(\text{feedback responsibility}) \\
 & - .03(\text{feedback accuracy}) + .14(\text{feedback} * \text{test responsibility}) \\
 & - .10(\text{feedback} * \text{feedback responsibility}) \\
 & + .09(\text{feedback} * \text{feedback accuracy}).
 \end{aligned}$$

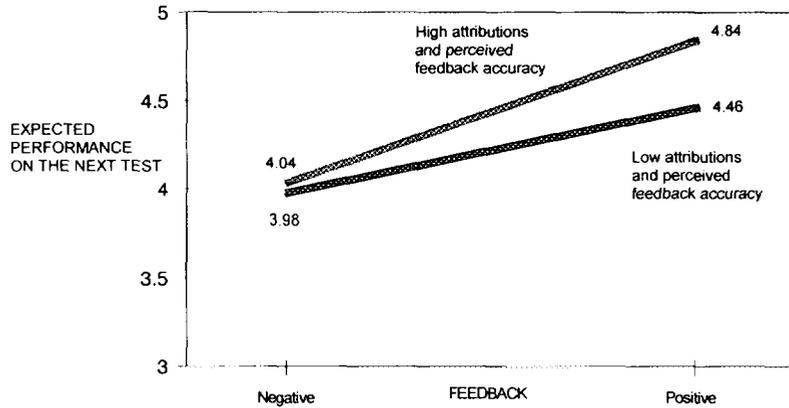


FIG. 6. Interaction of feedback and cognitive variables for expected performance.

The .14 coefficient for the feedback by test responsibility interaction was significant ($t = 2.38, p < .02$), as was the $-.10$ coefficient for the feedback by feedback responsibility interaction ($t = 2.14, p < .04$). The .09 coefficient for the feedback by feedback accuracy interaction was marginally significant ($t = 1.72, p < .09$). Figure 6, which used the same assumptions as Figs. 4 and 5, and which displays this interaction, shows that the accuracy motivation prediction was again confirmed. Feedback had more influence on expectations when scores on the three cognitive variables were high than when they were low.

The accuracy hypotheses were not confirmed for expected scores on the next test. For this variable, the three interactions, entered as a block, were not significant ($F < 1$), and none of the individual interaction terms approached significance (all t s < 1).

Self-esteem main effects. Results confirmed predictions regarding self-esteem. Self-esteem significantly predicted self-evaluations, self-perceptions of ability, expected performance, and expected scores (b s = .05 to .07, all β s $> .2$, all t s > 3 , all p s $< .001$, see Table 6). In comparison to subjects low in self-esteem, those high in self-esteem evaluated their performance and ability more favorably and had higher expectations for performance on the next test.

Did accuracy concerns mediate the self-esteem main effects? According to our conceptual analysis, the self-esteem main effects occurred because of an interplay of self-consistency and accuracy. Self-consistency influenced which type of feedback was more likely to be accepted. Highs accepted positive feedback more readily than negative feedback, whereas lows accepted negative feedback more readily than positive feedback. Thus, feedback acceptance should have mediated the main effects of self-esteem on self-evaluations and expectations.

Mediation hypotheses require confirmation of several subhypotheses

TABLE 7
 β S RELATING SELF-ESTEEM TO SELF-EVALUATIONS AND EXPECTATIONS

| Dependent variable | Regression equation without the interactions | Regression equation with the interactions |
|---------------------------------|--|---|
| Self-evaluations of performance | .32 | .25 |
| Self-perceptions of ability | .28 | .24 |
| Expected performance | .32 | .30 |

(Baron & Kenny, 1986). First, does the initial causal variable predict the outcome? We have already documented self-esteem main effects, thereby confirming this hypothesis. Second, does the initial causal variable predict the mediator? The mediators, in this case, are the interactions of feedback with perceived feedback accuracy and attributions of responsibility. This is easiest to see when feedback is coded as -1 and 1 (for positive and negative feedback, respectively), and the mean is subtracted from the feedback accuracy and attribution variables. The three interaction terms are created simply by multiplying feedback by each of the accuracy and attribution variables. In this case, self-esteem should be positively correlated with those interactions. High self-esteem should lead to positive scores on the interaction variables either because positive feedback leads to high accuracy and attribution scores (which, when multiplied by $+1$ for positive feedback, produces a positive interaction variable score) or because negative feedback leads to low (below zero) accuracy and attribution scores (which, when multiplied by -1 for negative feedback produces high accuracy and attribution scores). Low self-esteem should yield negative scores on the interaction variables, either because positive feedback leads to low accuracy and attribution scores or because negative feedback leads to high accuracy and attribution scores.

This second mediational hypothesis was confirmed. Self-esteem significantly correlated with the three interaction terms (r s = .20, .21, .19, for interactions of feedback with perceived accuracy, feedback responsibility, and score responsibility, respectively; all p s < .02).

Third, do the mediators predict the outcomes, even when controlling for the initial causal variable? Our previous analyses showed that the interactions with feedback did indeed predict self-evaluations of performance, self-perceptions of ability, and expected performance (although they did not significantly predict expected scores), when controlling for self-esteem.

Fourth, does controlling for the mediators reduce the effects of the independent variable on the outcome? Table 7 displays the β s relating self-esteem to self-evaluations of performance, self-perceptions of ability, and expected performance in the equations with and without the three interaction terms. In each case, controlling for the interactions did reduce

the β s, but only by a modest amount. Because the three interactions did not significantly predict expected scores, controlling for them did not reduce the effect of self-esteem on expected scores. Overall, therefore, these analyses provide some evidence that an interplay between self-consistency and accuracy led to the self-esteem main effects. Each of the links specified by this mediational hypothesis was supported. However, the results also did not show that this process accounts for most of the self-esteem main effects.

Other Results

Are self-evaluations and expectations just context-specific self-esteem? Further analyses explored the possibility that self-esteem main effects occurred because self-evaluations are little more than a context-specific form of self-esteem. Such a perspective argues that a single self-esteem factor underlies scores on the Rosenberg Self-Esteem scale and scores on our six measures of self-evaluations and expectation (there are six items for these analyses, because we used the original measures, rather than the scales that combined measures). In contrast, if they represent distinct constructs, a two-factor model should more adequately account for covariances among the items. Although measurement differences could also lead to a two-factor structure, failure of a two-factor model to improve fit over a one-factor model would provide preemptive evidence against the viability of our claim that self-evaluations and expectations are more than context-specific self-esteem.

These alternatives were assessed through confirmatory factor analyses performed using the LISREL VII program. The χ^2 difference test provided the basis for comparing the one- and two-factor models. For the one-factor model, $\chi^2 = 615.51$, $df = 103$, $p < .001$. The two-factor model assumed that all the Rosenberg items loaded on one factor and the self-evaluation and expectations items all loaded on a second factor. Although this model deviated from a perfect model ($\chi^2 = 307.99$, $df = 103$, $p < .001$), the χ^2 difference test showed that the two-factor model led to a dramatic improvement in fit ($\chi^2 = 307.52$, $df = 1$, $p < .0001$).

Especially when considered along with results showing that feedback influenced self-evaluations and expectations, but not global self-esteem, our analyses provide little basis for assuming that these variables all reflect a single underlying dimension. However, our claim that global self-esteem is a construct different from self-evaluations and expectations also rests on a theoretical basis. First, many self researchers today argue that global self-esteem is not as important or as influential as more specific self-cognitions (e.g., Marsh, 1993; Sedikides, 1993). This is an empirical question—for some purposes specific self-perceptions may be more influential than global self-esteem and for others global self-esteem may be more influential. In the “reactions to feedback” literature, the only study that explicitly compared global self-esteem to specific self-perceptions found

that global self-esteem was considerably more influential (Moreland & Sweeney, 1984). Regardless, even those arguing for the primacy of specific self-perceptions implicitly acknowledge that they are not the same construct as global self-esteem. Second, we doubt that most college students have particularly salient beliefs about their anagrams-solving performance and ability. It seems likely that these beliefs are far more transient than one's global feelings of self-worth.

Strong self-enhancement predictions. A strong version of self-consistency predicts a self-esteem by feedback interaction for affective responses to feedback (people high in self-esteem should feel better after receiving positive feedback than after receiving negative feedback; but people low in self-esteem should feel better after receiving negative feedback than after receiving positive feedback). As indicated in Table 1, we did not expect to support this prediction. The regressions (see Table 6) showed that the self-esteem by feedback interaction was not significant for either the Anxiety scale or the Affect scale.

A strong version of self-enhancement suggests that people are motivated to view themselves as favorably as possible. At minimum, this seems likely to lead people to evaluate themselves above the scale midpoint. Regardless of both self-esteem and feedback, the grand means for the self-evaluations, self-perceptions of ability, and expectations should exceed the scale midpoint, showing that, overall, people rate themselves toward the positive end of the scale. As indicated in Table 1, we did not expect to confirm this prediction. In contrast to the self-enhancement prediction, the grand mean for the self-evaluation scale was significantly lower than the scale midpoint (6.40 vs 8.00, *one sample t* = 8.42, $p < .001$). The grand mean for the self-perception of ability scale was also significantly lower than the scale midpoint (6.88 vs 8.00), *one sample t* = 4.87, $p < .001$.

Ambiguous evidence of self-enhancement was found for the expectation variables. The grand mean of the expected performance variable was marginally significantly higher than the scale midpoint (4.19 vs 4.00, *one sample t* = 1.90, $p < .1$). For expected scores on the next test, rather than the scale midpoint as the criteria, we used subjects' actual scores on the first test as the criteria. If people are motivated by self-enhancement, they should expect some improvement. This self-enhancement prediction was confirmed. Predicted scores on the second test were significantly higher than actual scores on the first test (9.52 vs 8.31, *one sample t* = 9.06, $p < .001$). These results for the expectation variables, although consistent with the self-enhancement perspective, may also reflect subjects making the reasonable assumption that they will improve with practice.

The covariate. Test score, which was a covariate for all analyses, significantly and positively related to self-evaluations, self-perceptions of ability, expected performance, and expected scores on the next test (all $ps < .01$, see Table 6). Although we did not generate specific hypotheses

regarding reactions to objective test scores, these results are consistent with accuracy motivation—they show that people evaluated themselves and based future expectations in large part on their actual performance. Actual test scores did not significantly relate to the attributions and perceptions of feedback accuracy scale, the Anxiety scale, or the Affect scale (all $t_s < 1$, ns).

Relations between self-esteem and affect. We also found significant relations between self-esteem and affect. Higher self-esteem was associated with lower negative affect on both the Anxiety scale ($b = -.48$, $\beta = -.38$, $p < .001$) and the Affect scale ($b = -.04$, $\beta = -.20$, $p < .01$). These relations were neither predicted nor precluded by our model or by any of the three self theories (see Table 1). They probably occurred because people low in self-esteem generally tend to be more anxious than people high in self-esteem (Brockner & Guare, 1983; Watson & Clark, 1984). There were no other significant effects on either of the affect measures (see Table 6).

DISCUSSION

Support for the Integrative Model

Results confirmed predictions generated by our model integrating self-consistency, self-enhancement, and accuracy in reactions to feedback. Consistent with previous research, the current study showed that self-enhancement influenced affective reactions and self-consistency influenced cognitive reactions (Arkin & Appleman, 1983; Lake & Arkin, 1985; Shrauger, 1975; Swann et al., 1987; Sweeney & Wells, 1990). Although numerous theoretical perspectives suggest that people often are motivated to evaluate themselves accurately (Festinger, 1954; Fiske & Taylor, 1991; Kunda, 1990; Pyszczynski & Greenberg, 1987; Trope, 1986; Vallacher & Wegner, 1987), this motivation has not been explicitly incorporated into much research on the role of the self in reactions to feedback (Arkin & Appleman, 1983; Jones, 1973; Jussim et al., 1987, 1989; Lake & Arkin, 1985; McFarlin & Blascovich, 1981; Moreland & Sweeney, 1984; Shrauger, 1975; Swann et al., 1987; Sweeney & Wells, 1990; Wells & Sweeney, 1986). Our study has highlighted the importance of accuracy concerns in influencing people's reactions to feedback.

Affective reactions. Results replicated previous research demonstrating the importance of distinguishing between affective and cognitive reactions (e.g., Lake & Arkin, 1985; Shrauger, 1975; Swann et al., 1987; Sweeney & Wells, 1990; Zajonc, 1980). The factor analyses showed that, in comparison to a one-factor structure, a two-factor structure (one cognitive, the other affective) was much more successful at accounting for the covariances among the dependent variables. Further, the pattern of self-esteem and feedback main effects and interactions was very different for

affective reactions than for attributions and perceptions of feedback accuracy.

Cognitive reactions. Although most research on reactions to feedback now distinguishes between affective and cognitive reactions, we know of no research that has attempted to distinguish among cognitive reactions. The current study documents the importance of doing so. Factor analyses showed that assuming that self-evaluations and expectations constituted one construct and attributions and perceptions of feedback accuracy constituted another was more viable than assuming they all constituted a single construct. Further, the pattern of inter-factor correlations showed that the self-evaluations and expectations factor correlated more strongly with the affect factor than they correlated with the attribution and perceptions of feedback accuracy factor.

Even more important than the factor analyses, however, were the main analyses testing the predictions generated by the model. The pattern of feedback and self-esteem main effects and interactions was dramatically different for the two different types of cognitive reactions. There was a feedback by self-esteem interaction for attributions and perceptions of feedback accuracy, and no main effects. In contrast, there were main effects for both feedback and self-esteem for self-evaluations and expectations, and no interactions.

The underlying process. The pattern of findings was generally consistent with the three-stage process depicted in Fig. 1. Although we did not explicitly test the time sequencing of reactions, abundant research suggests that affective reactions are simpler and often precede cognitive reactions (Swann, 1992; Zajonc, 1980). Most people want to view themselves favorably, and because affective reactions occur so quickly, they occur prior to much analysis. Thus, affective reactions are dominated by self-enhancement.

Attributions and perceptions of feedback accuracy are arrived at in a more analytical way, and may involve comparing feedback to one's self-concept (Swann et al., 1987; Swann, 1992). If the feedback fits (negative feedback fits with low self-esteem; positive feedback fits with high self-esteem), it is accepted; if it does not fit (positive feedback does not fit with low self-esteem; negative feedback does not fit with high self-esteem), it is rejected. Thus, these types of reactions are dominated by self-consistency.

The current study, however, goes beyond previous theory and research by documenting the importance of accuracy concerns in influencing people's reactions to feedback. Although feedback effects on self-evaluations and expectations are not precluded by self-consistency or self-enhancement theory, nor have such effects been specifically predicted in any empirical study of the role of the self in reactions to feedback of which we are aware (e.g., Arkin & Appelman, 1983; Greenberg & Pyszczynski,

1985; Lake & Arkin, 1985; McFarlin & Blascovich, 1981; Moreland & Sweeney, 1984; Swann et al., 1987; Sweeney & Wells, 1990). Although some theoretical perspectives may have implicitly assumed that feedback influences self-perceptions (e.g., Jones, 1973; Swann, 1987; Shrauger, 1975), the role of accuracy had not been made explicit.

An important contribution of the current study, therefore, has been identifying the theoretical rationale for a role for accuracy in reactions to feedback and empirically documenting that role. Theoretically, if people wish to view themselves accurately, and if they receive feedback they consider useful, that feedback should influence their self-perceptions (regardless of their initial level of self-esteem). Our results supported this theoretical analysis by showing that feedback influenced self-perceptions primarily when people considered it to be accurate and when they took responsibility for it.

Our theoretical analysis also suggested that an interplay of self-consistency and accuracy would lead to self-esteem main effects for self-evaluations and expectations. Negative feedback should reduce self-evaluations of people low in self-esteem (because they accept it) more than it reduces self-evaluations of people high in self-esteem (because they reject it). Positive feedback should increase self-evaluations of people high in self-esteem (because they accept it) more than it increases self-evaluations of people low in self-esteem (because they reject it). Our results provide modest support for this analysis. Highs did accept positive feedback more readily than they accepted negative feedback and lows did accept negative feedback more readily than they accepted positive feedback. Further, the more feedback was accepted, the more it influenced self-evaluations and expectations. And, consistent with our theoretical analysis, relations of self-esteem to self-evaluations and expectations were reduced after controlling for the extent to which people accepted the feedback.

However, those relations were not reduced much, and the self-esteem main effects remained statistically significant. Thus, some explanation other than our self-consistency-plus-accuracy explanation must account for this pattern. Perhaps self-esteem directly influenced self-evaluations and expectations. Alternatively, perhaps measures of perceived feedback accuracy and attributions more reliable than those we used would more strongly mediate self-esteem effects. Understanding the sources of relations between global self-esteem and specific self-perceptions remains an important question for future research.

Unanswered Questions and Limitations

Did we provide a critical test of the three theories? The main objective of the current study was to provide new insights into how people respond

to feedback. Our objective was not to provide a critical test of the three theories. Others have examined the role of accuracy, self-consistency, and self-enhancement motives in contexts that have little to do with understanding how feedback influences people (e.g., Kunda, 1990; Sedikedes, 1993; Steele, 1988; Swann & Read, 1981; Trope, 1986). For example, research examining the types of feedback that people prefer to receive, or the conditions under which they find different types of feedback to be useful, or the types of tasks they prefer to engage in, has also been performed to compare self-enhancement with either accuracy or self-consistency (Swann & Read, 1981; Trope, 1975; see Fiske & Taylor, 1991, for a review). Such research is valuable and important and may provide insights into how the self might influence task preference and information-seeking. However, our purpose was not to understand factors that influence people's task preferences or information-seeking.

Our main purpose has been to compare predictions generated by self-enhancement, self-consistency, and accuracy regarding reactions to feedback, and to integrate those predictions into a unifying model. We are not aware of any previous research on reactions to feedback that has simultaneously tested predictions generated by all three of these theories. However, although it did not address reactions to feedback, there has been one attempt to compare predictions generated by all three theories (Sedikedes, 1993). Because it is the only such attempt of which we are aware, we will describe it in some detail.

Sedikedes (1993). Sedikedes (1993) focused on "self-reflection," which was defined conceptually as "the consideration of whether one possesses certain personality traits" (p. 318). Although several studies were conducted (with some variation in procedures), this was typically operationalized by asking subjects to choose several questions about their personality traits from a list of 12. The traits varied in centrality (central traits vs peripheral traits, where high centrality means both personally important and highly self-descriptive), and in valence (positive or negative). The questions varied in diagnosticity (i.e., informativeness of the potential answer). Sedikedes (1993) compared the three theories by analyzing the questions subjects chose to ask themselves. For example, if subjects mainly chose to ask themselves highly diagnostic questions about traits that they knew to be positive (rather than diagnostic questions about negative traits), results were interpreted as evidence of self-enhancement; if they chose questions about highly central traits, regardless of whether they were positive, it was interpreted as self-consistency; if they chose to ask diagnostic questions about peripheral traits, it was interpreted as an attempt at accurate self-assessment. Sedikedes (1993) concluded that self-enhancement was the strongest motive and that self-consistency was second (however, his procedures may have artificially reduced support for

self-consistency; see Sedikedes [1993], p. 330, p. 334). He concluded that there was little support for self-assessment because people rarely asked diagnostic questions about peripheral attributes.

Sedikedes' (1993) procedures for testing the three theories were so fundamentally different from those used in the present investigation that any attempt to integrate the two must be highly speculative. However, one difference may be particularly relevant—Sedikedes (1993) focused on the role of the self in *information-seeking*, whereas we focused on the role of the self in using feedback (i.e., in responding to information already received). Thus, when given free reign to seek out any information whatsoever about themselves (as in Sedikedes' studies) people may often seek positive information. However, our three-stage model may be more relevant to understanding the role of self-enhancement, self-consistency, and accuracy when people are confronted with self-relevant information (in this case, performance feedback), regardless of whether that information was sought after. If Mary is great at math and terrible at history, and she has a choice of courses to take, Sedikedes' (1993) research suggests that she may generally choose math over history. Our study is mute on this issue. However, Sedikedes (1993) research is mute on the question of how Mary will react after doing well or poorly in either course. Our study suggests that she will enjoy success more than failure in either course; that she will be more likely to take credit for doing well in math and for doing poorly in history; and that, despite her initial self-perceptions, she will evaluate her performance and ability more favorably after doing well in either course than after doing poorly in either course.

Is it really motivation? A limitation to this research is that we did not directly assess *motivation* to see oneself accurately, favorably, or consistently. Instead, our main focus was on understanding reactions to feedback. Our integration of self-enhancement, self-consistency, and accuracy led to clear predictions for the types of reactions we assessed. Of course, confirming those predictions does not "prove" any of the theories.

Are all relationships with self-esteem correlational? Another limitation to the current study is that all relationships between global self-esteem and the dependent variables are essentially correlational. People cannot be randomly assigned to self-esteem conditions. One can attempt to manipulate self-esteem, for example by inducing success or failure, but such attempts are necessarily indirect (i.e., one manipulates success/failure, which may or may not influence global self-esteem—in fact, it rarely does; see, e.g., the current study; Jussim et al., 1992; Markus & Kunda, 1986; McFarlin & Blascovich, 1981).

In studies of the influence of self-esteem on perception and social interaction, therefore, it is always possible that some factor that correlated with self-esteem, rather than self-esteem per se, led to the observed pattern of results. Of course, this limitation characterizes nearly all inves-

tigations of the role of any individual difference in any social or psychological process. It characterizes most studies of the role of the self-concept in self-perception and social perception (Bohrstedt & Felson, 1983; Felson, 1981, 1985, 1989; Jussim et al., 1987; Markus, 1977; McFarlin & Blascovich, 1981; Moreland & Sweeney, 1984; Swann et al., 1987; see reviews by Markus & Wurf, 1987; Shrauger, 1975; Swann, 1987).

What are the contenders for this hypothetical alternative to self-esteem? If it is some conceptually related factor, such as self-efficacy, self-perceptions of competence, etc., this "alternative" does not seriously undermine the support for our integrative model. The current study would still show that self-consistency dominates cognitive reactions, self-enhancement dominates affective reactions, and both self-consistency and accuracy influence evaluative judgments following feedback. Even this perspective seems unlikely, however, given Moreland and Sweeney's (1984) findings that global self-esteem influenced reactions to feedback substantially more than did specific expectations.

A greater problem would be posed if this third variable were some nuisance factor, such as response bias. However, response bias interpretations would be hard-pressed to account simultaneously for results supporting self-consistency in cognitive reactions, self-enhancement in affective reactions, and accuracy in self-evaluations and expectations.

CONCLUSION

The current study provided four main contributions: (1) Development and preliminary test of our new, three-stage model of the role of the self in reactions to feedback; (2) Highlighting the importance of accuracy in accounting for self-evaluations and expectations; (3) Empirically documenting fundamental differences among some types of cognitive reactions to feedback; and (4) Replicating classic work on the importance of distinguishing between affective and cognitive reactions to feedback. Previous theory has not attempted to incorporate the motive to accurately perceive one's performance and ability into perspectives on self-consistency and self-enhancement in reactions to evaluations (Fiske & Taylor, 1991). Most perspectives on the role of the self in reactions to evaluations emphasize bias; either self-enhancing biases, self-consistency biases, or both (Arkin & Appelman, 1983; Greenberg & Pyszczynski, 1985; Jussim et al., 1987, 1989; Lake & Arkin, 1985; Markus & Wurf, 1987; McFarlin & Blascovitch, 1981; Moreland & Sweeney, 1984; Jones, 1973; Shrauger, 1975; Miller & Ross, 1975; Swann et al., 1987; Swann, 1987, 1992; Sweeney & Wells, 1990; Wells & Sweeney, 1986). These articles have not explicitly claimed that the self biases reactions so much that one's self-evaluations are completely insensitive to feedback. In fact, the idea that feedback could influence self-evaluations is implicit in much research on self-consistency and self-enhancement. An important contribution of the current study,

therefore, has been to make this implicit assumption explicit—to provide a clear theoretical rationale for why and how accuracy motivation influences reactions to feedback.

Despite their biases, people's self-perceptions are highly sensitive to both interpersonal evaluations, such as praise and criticism, and objective performance, such as test scores (see also Bohrnstedt & Felson, 1983; Feather, 1966; Jussim et al., 1992). The current study, therefore, supports several recent theoretical perspectives claiming that although people's beliefs, motives, and attitudes may bias perception, inference, and judgment, people are nonetheless often heavily influenced by the characteristics of the stimuli they perceive (Jussim, 1991; Kunda, 1990; McArthur & Baron, 1983; Pyszczynski & Greenberg, 1987; Vallacher & Wegner, 1987). As both Smith (1968) and Shrauger (1975) acknowledged, even self-enhancement theory suggests that people wish to view themselves as favorably as they can get away with. The self-enhancement perspective, therefore, acknowledges (albeit implicitly) that the type of feedback people receive influences what they feel they can get away with. As research in other areas of social psychology has shown, people are subject to all sorts of cognitive and motivational biases. Nonetheless, their perceptions and judgments also are usually heavily influenced by social reality.

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