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A Component Analysis of the Impact of Evaluative and Objective Feedback on Performance

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Despite the frequency with which performance feedback interventions are used in organizational behavior management, component analyses of such feedback are rare. It has been suggested that evaluation of performance and objective details about performance are two necessary components for performance feedback. The present study was designed to help clarify which components are required for maximal effectiveness by comparing four conditions: (a) combined evaluative and objective feedback, (b) evaluative feedback alone, (c) objective feedback alone, and (d) no feedback. A total of 105 undergraduate students were recruited to work on a simulated bank check processing task while being exposed to one of the four feedback conditions. The number of checks correctly processed served as the dependent variable. Results suggest that a combination of objective and evaluative feedback is necessary for maximal performance.

KEYWORDS evaluative feedback, objective feedback

Performance feedback is one of the most common interventions in organizational behavior management (OBM), with 65% to 70% of OBM interventions utilizing feedback either alone or in combination with some other intervention component (Balcazar, Shupert, Daniels, Mawhinney, & Hopkins, 1989; Bucklin, Alvero, Dickinson, Austin, & Jackson, 2000; Nolan, Jarema, & Austin, 1999). For example, a literature review by Alvero, Bucklin, and

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Austin (2001) identified 65 applications of feedback from 43 separate applied studies. Despite the prevalence of this intervention, there is little consensus on how feedback acts to change behavior or what components are necessary to make it effective. In an article discussing the usage of the term *feedback* in the behavioral literature, Peterson (1982) noted that *feedback* is sometimes regarded as a discriminative stimulus, is sometimes regarded as a reinforcer, and sometimes has an unclear usage. Ultimately, the terminological classification of feedback can vary as its function varies, owing to the fact that feedback does not have an inherent status besides that of stimulus.

Just as problematic as feedback's definition is the question of which components are crucial for successful implementation. As literature reviews have demonstrated, the effects of feedback are variable, and the implementation of feedback is quite different from study to study (Alvero et al., 2001). As noted by D. A. Johnson, Dickinson, and Huitema (2008), most feedback implementations involve some component of evaluation and objective information about past performance. These different components may serve different behavioral functions. Evaluative feedback could potentially serve as reinforcement for previous desirable performance or punishment for previous undesirable performance, although the typical delays between performance and feedback provision are conceptually problematic from a molecular perspective (Malott, 1992). Alternatively, evaluative feedback can serve as an antecedent for rule-governed future performance by implicitly or explicitly specifying the contingencies related to positive and negative evaluations of performance (Agnew & Redmon, 1992; Haas & Hayes, 2006; R. A. Johnson, Houmanfar, & Smith, 2010). For example, as a result of receiving evaluative feedback, an employee may generate verbal statements such as "If I keep slacking off, then I will be criticized again" or "If I work as hard as I did last time, then the boss will say nice things again." These self-generated verbal descriptions of workplace contingencies may in turn lead the performer to execute different levels of performance, which is likely to be followed by self-generated verbal stimuli with reinforcing or punishing properties (such as "Whew, I won't get yelled at next week" or "That performance wasn't good enough and I'm likely to be in trouble").

Evaluative feedback may also serve to establish a performance goal by suggesting the necessary levels of performance (O'Hora & Maglieri, 2006). For example, after repeated contact with evaluative feedback, an employee is likely to derive approximately which criteria are necessary for achieving positive evaluations or at least avoiding negative evaluations, even if the provider of the feedback did not explicitly specify the minimal desired performance levels. Under such conditions of rule-governed behavior, the goal may serve as a motivating operation, discriminative stimulus, or some other antecedent function, evoking higher levels of performance (Agnew, 1998; Fellner & Sulzer-Azaroff, 1984; Squires & Wilder, 2010).

Objective feedback may more clearly specify the goals and contingencies in place and the employee's performance in relation to those goals and contingencies. Thus, objective feedback may become more valuable when another controlling variable such as evaluative feedback is present (e.g., "I care about those performance numbers when I know that my boss will have something to say about them"). This would suggest that evaluative feedback is functioning as a motivating operation and objective feedback is functioning as indirect reinforcement to support the more direct verbally mediated reinforcers, although other functional relations are possible. Authors such as Daniels and Daniels (2004) have also suggested that for feedback to be effective it should detail specific information about performance. According to these authors, objective feedback is essential because it provides the performer with specific information about the factors that contribute to performance and provides a clear measure of performance improvement. In many ways, objective feedback may also inform the employee that the manager is engaging in actual performance monitoring rather than making assumptions about performance (Komaki, 1986). The notification that one's actual performance is being closely monitored may generate verbal statements that could operate as motivating operations or discriminative stimuli (e.g., "I'm being watched and might get in trouble if I don't work," "Someone actually cares enough to pay attention," "If I work hard it will actually matter now") that will evoke higher levels of desired workplace behavior. Again, evaluative feedback and objective feedback could potentially serve any or all of these functions and may serve more than one of these functions simultaneously, depending on the individual's unique learning history and the current organizational contingencies.

Although feedback can involve both evaluative and objective components, it is unknown which of those components are necessary for feedback to be maximally effective. For example, D. A. Johnson et al. (2008) examined objective feedback (i.e., specific information about past performance absent evaluation such as praise or criticism). In that study, participants were randomly assigned using a 2 × 2 factorial design. The experimental conditions were (a) incentive pay without objective feedback, (b) incentive pay with objective feedback, (c) fixed pay without objective feedback, and (d) fixed pay with objective feedback. Participants completed a data entry task in which they repetitively entered numbers (dollar amounts corresponding to a digital paycheck) using a computer keyboard. The feedback for the relevant conditions consisted of both the total number of checks completed correctly and the average number of checks completed correctly per minute, which was continuously updated every 30 s throughout the experimental session. Monetary incentives did significantly increase the number of correctly entered checks and the amount of time that participants spent working on the experimental task, although speed and accuracy measures were not impacted by this variable. The results indicated that objective feedback had

no discernable effect on any performance measures for the data entry task, either alone or when paired with monetary incentives. These results led the authors to speculate that "some type of evaluative component may be necessary for feedback to enhance performance" (p. 71). Similar conclusions were recently reached by Slowiak, Dickinson, and Huitema (2011) when they extended this line of research to self-solicited feedback.

The existing literature on performance feedback offers several examples that illustrate that evaluation may be an important component. Brown, Willis, and Reid (1981) compared the effectiveness of objective feedback alone and objective feedback with praise in reducing off-task behavior and increasing on-task behaviors of staff at a residential facility. Following a 1-hr time sample, supervisors provided feedback to staff on an individual basis. The supervisors were instructed to refrain from providing either approval or criticism and instead to only present objective descriptions of the observed work. Although off-task behaviors decreased, feedback alone had little or no effect on increasing on-task behavior. When used along with feedback, statements of approval resulted in lasting decreases in off-task behavior and significant increases in on-task behavior.

Crowell, Anderson, Abel, and Sergio (1988) compared the effects of objective feedback to social praise combined with objective feedback on the quality of bank tellers' interactions with customers. Objective feedback was delivered in the form of a numerical score, and bank managers were instructed to deliver that score without evaluative comments. From baseline the mean quality of teller–customer interactions improved by an average 21.6 points (out of 100) for each teller. When praise was delivered along with objective feedback, mean service quality scores increased again by an average of 26.6 points for each teller.

Chapanis (1964) tried to isolate the motivational effects of knowledge of performance from its informative and rewarding aspects on a data entry task. Sixteen male college students were separated into four groups. Performance feedback in the form of a counter that tallied the keystrokes of the participants was given to two of the groups. A third group recorded their own progress. A fourth group, acting as a control group, received no feedback at all. Results showed no significant difference in performance among the different interventions.

Taken together, these studies suggest that using objective feedback in isolation is less reliable and less effective than combining objective feedback with some form of evaluation. However, these studies did not compare evaluation alone against evaluation combined with objective feedback. It is quite plausible that the evaluative component alone influenced performance and that the objective feedback was an unnecessary component in the studies that examined objective feedback combined with evaluation. Thus, it is important to determine whether objective information about past performance makes feedback more effective than just a simple general appraisal of

past performance. Despite the suggestions that specific and objective feedback may make evaluative judgments more effective and that evaluation is a necessary component for performance feedback to be maximally effective, research on the topic is still lacking. The purpose of the present study was to compare the effects of objective feedback alone, evaluative feedback alone, combined evaluative and objective feedback, and no feedback on productivity for a data entry task.

METHOD

Participants and Setting

A total of 105 students were recruited through undergraduate courses and recruitment flyers posted at a midwestern university in the United States. Sessions were conducted in a small university laboratory containing multiple computer workstations partitioned from one another by cubicle walls and small private rooms. The cubicle walls prevented both researchers and participants from observing one another's computer screens while working on the experimental task. With the exception of the feedback interactions, researchers remained completely out of view of the participants during the sessions, and no more than a single session was completed each day. Researchers did not provide pay or credit to the participants, although it may have been possible for participants to receive extra credit for classes unrelated to the study.

Experimental Task and Alternative Activities

The experimental task was a computerized data entry task that was modeled after the job of a check processor in a bank. This was the same experimental task utilized in D. A. Johnson et al. (2008), although feedback was not delivered via the computer task. The computer presented simulated bank checks with values ranging from $10.00 to $999.99. These displayed values were presented so that participants could enter these values using the computer's keyboard. The computer automatically recorded the number of checks completed correctly. Participants also had access to six computer games at any time (FreeCell, Solitaire, Spider Solitaire, Hearts, Minesweeper, and Pinball), and the participants could resume the experimental task at any time. The alternative off-task activities were available to prevent the participants from working at high rates simply because there was nothing else available to them.

Dependent and Independent Variables

The dependent variable was the number of checks completed correctly. The independent variables were evaluative feedback (the presence or absence of

evaluative statements regarding prior performance) and objective feedback (the presence or absence of objective feedback regarding prior performance). A 2 × 2 factorial design composed of four experimental conditions was used: (a) combined evaluative and objective feedback ($n = 27$), (b) evaluative feedback alone ($n = 26$), (c) objective feedback alone ($n = 27$), and (d) no feedback of any kind ($n = 25$). Participants were randomly assigned to one of the four experimental conditions following the pre-feedback session (described in more detail in the "Experimental Procedures").

Participant performance was labeled according to one of four values: excellent, good, average, or poor. Participants were not told about these labels or the criteria for these labels. Participant performance in which 990 or more checks were correctly processed during the previous 45-min session was labeled *excellent*. Participant performance in which 770–989 checks were processed correctly during the previous session was labeled *good*. Participant performance in which 330–769 checks were processed correctly during the previous session was labeled *average*. Participant performance in which fewer than 329 checks were processed correctly during the previous session was labeled *poor*. These values were determined using the standard deviation and average performance of individuals who did not receive incentives or feedback in a previous study using the same experimental task (D. A. Johnson et al., 2008). These labels were relevant for the following evaluation conditions.

Combined evaluative and objective feedback condition

At the beginning of every experimental session, participants were brought into a small private room. Participants were read one of 40 evaluative statements about their previous session's performance, including objective details on performance. A variety of sentences were used to decrease the possibility that participants would perceive the statements as rote and insincere. In addition, research assistants were trained to not read directly from the scripts in order to make statements appear more authentic to the participants, although scripts were kept in view of the research assistants to permit a quick glance in order to ensure treatment integrity. Participants were never allowed to view the scripts associated with these evaluations. Research assistants received extensive training prior to data collection to ensure that their delivery of the scripts was accurate and fluent, and such training did not conclude until these objectives were met. The specific sentence that was read to participants depended in part on whether their previous performance was categorized as excellent, good, average, or poor (10 random sentences for each category). Examples of such sentences included "During the previous session, you correctly completed _____ checks. That's a *really* impressive number of checks!" (excellent condition, with extra emphasis placed on the

delivery of the word in italics), "During your previous session, you correctly completed _____ checks. That's one of the better performances we've seen recently" (good condition), "During you previous session, you correctly completed _____ checks. That's about what the average person does" (average condition), and "During your previous session, you correctly completed _____ checks. Unfortunately, that's considered a low number of checks" (poor condition). The blanks were filled with the participant's actual performance from the previous session. Within each evaluative category, the particular evaluative comment to be used was randomly selected. After the feedback had been delivered, the research assistants confirmed the participants' upcoming schedule of sessions and then took the participants to the room with the computer workstations in order to begin the experimental task.

Common features within the excellent condition included phrases indicating strong praise and extra emphasis in the vocal delivery of the evaluative terms (e.g., "*really* impressive," "*wow*," "*easily* one of the best performers"). Common features within the good condition included phrases indicating praise (e.g., "impressive," "high ranking," "one of the better performers"). Common features within the average condition included phrases indicating performance within a normal range (e.g., "normal number of checks," "pretty typical performer," "standard level of performance"). Common features within the poor condition included phrases indicating mild criticism (e.g., "under the standard," "performance has been somewhat low," "below what the average person does").

Evaluative feedback alone condition

This condition was similar to the combined evaluative and objective feedback condition discussed previously except that no objective details about performance were given. In other words, the sentence "During your previous session, you correctly completed _____ checks" was omitted from the feedback statements, and evaluative comments that were similar in nature were used. Otherwise, this condition resembled the previous condition in all other respects.

Objective feedback alone condition

This condition was similar to the combined evaluative and objective feedback condition discussed previously except that no evaluative comments about performance were given. Participants were read the following sentence in a neutral tone: "During your previous session, you correctly completed _____ checks." Research assistants provided no evaluation of performance, taking care not to convene any subtle body language that might be interpreted as approving or critical (i.e., smiling, frowning, nodding of the head, etc.).

Neutral delivery of the objective feedback was included as part of the training procedures mentioned earlier. Otherwise, this condition resembled the previous conditions in all other respects.

No feedback condition

At the beginning of every experimental session, participants in this condition were brought into a small private room. These participants were asked to confirm their upcoming schedule of sessions before being taken to the room with the computer workstations, as was the case with the other experimental conditions. The purpose of this procedure was to confirm their subsequent appointment without disturbing any other working participants and to increase the similarity of experimental procedures across conditions. No further instructions or information about their performance were provided.

Experimental Procedures

Participants attended an introductory session followed by a pre-feedback session and then three experimental sessions. After informed consent was obtained during the introductory session, the research assistant demonstrated the experimental task to the participant, demonstrated the alternative activities (i.e., computer games), explained that the purpose of all sessions was to correctly complete as many checks as possible, and concluded the introductory session. The pre-feedback session immediately followed the conclusion of the introductory session.

At the beginning of the pre-feedback session, the research assistant seated the participant at one of the desktop computers. The purpose of the pre-feedback session was to obtain data for the covariate and to gather performance data to be used in the subsequent session's feedback. The following instructions were given to participants at the beginning of the session:

> If you have a cell phone, please silence it during the session. You may take a break whenever you like for as long as you like. You may play one of the computer games as a break, or you may also just stretch and relax. After I start the check task, I will be available on the other side of the cubicle wall. If you need anything during the session, just come get me. Do you have any questions?

The research assistant started the experimental task, started a timer set for 45 min, and left the view of the participant. When the timer indicated that the session was concluded, the research assistant thanked the participant for attending and dismissed him or her from that day's session.

The three experimental sessions involved the same activities and duration as the pre-feedback session, except that the research assistant took the participant to a small private room at the beginning of the experimental session. Once there, the research assistant implemented the procedures as described in "Dependent and Independent Variables" and then returned the participant to the experimental task.

RESULTS

Table 1 displays the means for the pre-feedback sessions and the average performance during the three experimental sessions for the number of checks completed correctly. The results demonstrated a decline in performance for the no feedback condition. The results also demonstrated performance gains of similar size for the evaluative feedback alone condition and the objective feedback alone condition (gains of an average of 85 and 88 checks completed correctly, respectively). A stronger gain in performance was seen in the combined evaluative and objective feedback condition, showing an average improvement of 175 checks completed correctly.

The average number of checks completed correctly during the three experimental sessions was analyzed using a two-factor analysis of covariance (ANCOVA). The number of checks completed correctly during the pre-feedback session served as the covariate. The results of this analysis were significant at the $p = .05$ level. Table 2 displays the adjusted means based on this ANCOVA, and Table 3 displays the source table for the ANCOVA. When the adjusted mean for the no feedback condition was used as a point of comparison, the addition of evaluative feedback alone resulted in a 17% increase in performance, as did the addition of objective feedback alone. The addition of both evaluative and objective feedback combined resulted in a 30% improvement in performance. Tukey pairwise comparisons were calculated, and the results indicated that performance under the combined evaluative and objective feedback condition was significantly higher than that under all other conditions at the $p = .05$ level. The evaluative feedback alone condition and the objective feedback alone condition both resulted in

TABLE 1 Raw Means for Checks Completed Correctly: Pre-feedback and Experimental Sessions

Condition	*n*	Pre-feedback	Experimental
No feedback	25	670	647
Evaluative feedback alone	26	657	742
Objective feedback alone	27	662	750
Combined evaluative and objective feedback	27	718	893

TABLE 2 Adjusted Means for Correctly Completed Checks

Condition	Evaluative feedback	No evaluative feedback	Overall
Objective feedback	849.8	765.7	807.7
No objective feedback	762.8	654.0	708.4
Overall	806.3	709.9	

TABLE 3 Source Table for Analysis of Covariance

Source	*df*	SS	MS	*F*	*p*
Evaluative feedback (A)	1	243,655	243,655	19.62	.000
Objective feedback (B)	1	257,639	257,639	20.75	.000
A × B	1	4,065	4,065	0.33	.572
Baseline	1	4,275,285	4,275,285	344.34	.000
Error	100	1,241,588	12,416		
Total	104				

statistically significant higher performance than the no feedback condition. No other statistically significant comparisons were discovered. Effect size calculations indicated Cohen's *d*s of 0.78 for the evaluative feedback alone condition, 1.00 for the objective feedback alone condition, and 1.76 for the combined evaluative and objective feedback condition.

Figure 1 displays the average number of checks completed correctly over time. As Figure 1 illustrates, all four conditions showed slight increases in performance across the first, second, and third experimental sessions. A test for parallelism was conducted and was not found to be significant

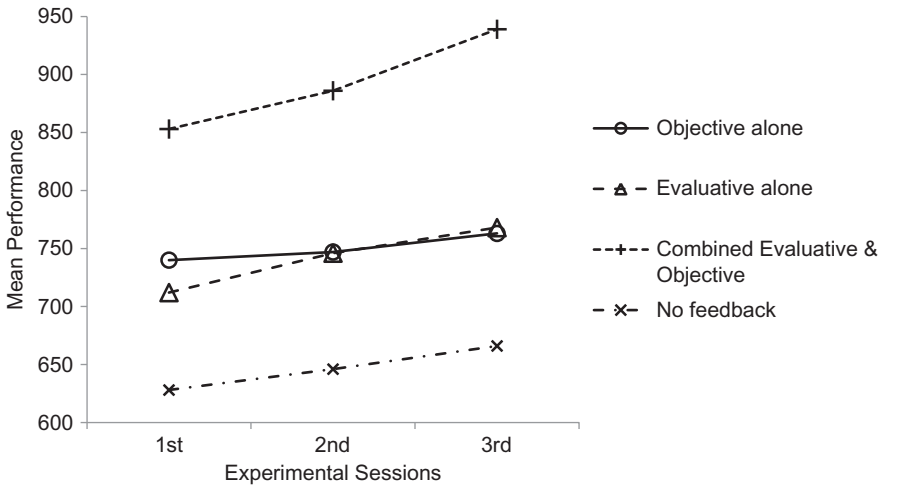

FIGURE 1 Average number of checks completed correctly over time.

($p = .45$), confirming that the slopes were parallel and that there were no noteworthy differences in direction across experimental conditions. Thus, the source of differences between the four experimental conditions can be attributed to solely to changes in the levels of performance.

DISCUSSION

The present study was designed to do a component analysis of feedback and discover whether evaluative and objective feedback elements are necessary. The study demonstrates a benefit of having both evaluative and objective feedback, both in isolation and combined. The study also illustrates a valuable application for organizational settings. An intervention that required less than 1 min of a supervisor's time (per worker) produced a 17%–30% average improvement in performance. Of course, time investments for collecting and providing feedback in actual organizations may vary quite a bit from this analog experiment, but the basic point remains: For a relatively small investment of time, a large and immediate gain in performance was seen. It is also possible that the instructions given to the participants may have resulted in the impact of this intervention being understated. Although participants were told to complete as many checks as possible, they were also told that they could take a break or relax whenever they wanted. This contradiction in the instructions may have suppressed maximum responding across conditions. In real-world settings a suggestion to take breaks or relax is likely to be absent, given that many employers would prefer their employees to work as much as possible. This underscores the potential influence of performance feedback in organizational settings. It also suggests that supervisors should take the effort to provide both objective feedback and precise evaluation, as this combination produced stronger gains than just general evaluation alone or objective feedback alone. Although many supervisors may be reluctant to initially implement such feedback because of time constraints, the results of this study suggest that the benefits of their efforts may be enough to justify the cost in time and energy.

This study does conflict with some of the findings of previous studies. For example, D. A. Johnson et al. (2008) demonstrated no benefit to using objective feedback alone, whereas the current study demonstrates a clear benefit to objective feedback. One reason for this discrepancy may have to do with the method of delivering the objective feedback. In D. A. Johnson et al. the objective feedback was delivered by a computer, with performance data presented on the screen. In the current study, the objective feedback was delivered by a person. Although care was taken to prevent the delivery of any signs of approval or criticism during the objective feedback alone condition, participants may have believed that evaluation was implied. It is rare that other individuals, particularly those in supervisory

positions, would take time to deliver objective feedback without a form of evaluation. The effects of such a historical correlation between in-person delivery of performance data and evaluation of that performance may not extend to computer-delivered performance data. Further studies should examine whether in-person delivery of objective feedback is more effective than computer delivery of objective feedback. Future studies may also wish to examine the dependent measures in more detail, accounting for how variables such as time on task, rate of responding, and accuracy are influenced on a moment-by-moment basis throughout the experimental session, not just the overall average impact on performance.

Another area for future research is to address the influence of normative standards. In the present study, many participants were given evaluative statements that suggested that their performance was in the average range. It is possible that this may have created a suppressive effect on further performance improvements. Previous research has suggested that many individuals will work hard to keep their performance consistent with the standards set by the local social community (Asch, 1951; Goldstein, Cialdini, & Griskevicius, 2008). For example, in the classic Asch studies of conformity, a lesser known experimental variation was conducted that involved a single research confederate who consistently disagreed with the judgments of a group of 16 experimentally naïve participants. During the experiment, the participants began openly mocking the confederate who was alone in his individuality. It is plausible the many employees also have a similar history of receiving punishment for performing outside the normal range, both below the average performance (e.g., criticized by supervisors for poor performance) or above the average performance (e.g., criticized by peers for making them look bad). It is possible that evaluative statements could have produced even greater increases in performance if care had been taken to avoid suggesting that performance was normative. Future research could address this possibility within the context of social comparison and goal setting.

Care should also be taken in future studies to ensure that evaluative statements are interpreted by recipients as excellent, good, average, or poor in content. Although the statements in the present study were carefully selected and assumed to reflect such categories, future research should corroborate these assumptions with participant self-reports. Furthermore, future studies could also investigate the differential impact of these various categories of evaluation on performance. Because of the variability in the sequencing of evaluative statements in the design of the present study, such an analysis could not be implemented with the current data set (e.g., some participants received good feedback first, then average feedback, and finally excellent feedback; others received a good/good/ excellent feedback sequence; others an average/poor/good feedback sequence). An analysis of only the first instance of feedback (avoiding sequencing considerations) was also precluded by the fact that only half of the participants received

evaluative feedback, and the majority of those participants fell within the average range of performance evaluation during their first session. However, future studies could be designed to explicitly assess the different evaluation categories by exposing participants to a particular type or sequence of feedback in a more controlled fashion.

The accuracy of evaluative feedback is another variable for future investigation. In the present study, evaluative feedback was accurately delivered to performers. In many real-world contexts, the evaluative judgments of supervisors may be less than accurate, particularly if supervisors attempt to deliver performance feedback in the absence of actual performance monitoring. This may occur if a supervisor hears about the benefits of performance feedback but does not wish to invest the time or effort to ensure that feedback delivery is truly contingent. The effect of such inaccurate evaluations on performance could be studied experimentally. For example, investigators could examine whether praise or criticism still has an influence on performance if paired with a history of inaccuracy. Furthermore, this research could examine whether the effect would be the same on high and low performers. Alternatively, a future study could investigate whether a distorted normative statement (e.g., saying that the average performance was higher than it truly was) would increase performance to match the believed range of normal performance and whether this increase would be more than the corresponding increase for an accurate normative statement.

Although it has frequently been demonstrated that performance feedback can enhance employee behavior, component analyses of feedback are rare. Given the commonality of this intervention approach, it is important that researchers continue to investigate different methods and techniques for refining this performance tool. Furthermore, future studies should not only attempt to identify the necessary components for effective feedback but investigate the behavioral function of such feedback. Although no particular functional status is inherent to performance feedback, it is likely that the most common behavioral functions in applied settings could be isolated. It is hoped that the present study contributes to a better understanding of feedback and that further studies will continue such investigations.

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