TASK BASED PERFORMANCE FEEDBACK AND
SUBSEQUENT WORKER PERFORMANCE

by

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Dissertation submitted to the Faculty of
Virginia Polytechnic Institute and State University
in Partial fulfillment of the requirements for the
degree of
DOCTOR OF PHILOSOPHY
in
Psychology

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March 1990
Blacksburg, Virginia
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(ABSTRACT)
Recent task based performance feedback research has concentrated on investigation of the effects of feedback message characteristics to explain variance in individual's post feedback predicted performances. Results of this research have not been well integrated within existing performance feedback models. The present study was conducted to assess the differential effects of feedback message content and feedback message characteristics on real subsequent task performance. Results of the present study indicate that feedback message content, not characteristics, is the critical factor in improving subsequent performance. However, the subject's perception of certain feedback message characteristics is important in influencing subsequent performance via the subject's overall
perception/acceptance of the feedback message (Ilgen, et al., 1979). Results also indicate that an additional 5% of the variance in subsequent performance can be explained by incorporating a measure of Locke, et al.'s (1981) goal setting into the desire/intention to respond to feedback components of the Ilgen, et al. feedback model, when subjects are asked to articulate their behavioral plans for future task performance. Results are discussed within the framework of current feedback models and future research needs.
Acknowledgements

I want to thank Michelle Evelsizer, Chris Parker, Ret Sacco, and Pam Vines, my undergraduate research assistants, for their many hours of hard work and dedication to this project.

I would also like to thank my committee members for their support, encouragement, and criticism. A special thanks to Neil (for everything, including optimism) and Dennis (for everything and so much more). My appreciation also goes to the support staff in the Psychology Department especially Cindy, Gayle, and Chris.

A very special thanks to Art, without whose support I would not have finished my degree. And a very special thanks to M.E.E., because she believes in me and that makes everything possible.

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Task Based Performance Feedback and Subsequent Worker Performance

I. Introduction

Evaluation of work performance behavior serves multiple purposes including employee counseling, administrative/personnel decision making, and research (Bernardin & Beatty, 1983; Landy & Farr, 1980, 1983). The effectiveness of performance appraisals in altering subsequent employee work performance is dependent upon the employee's reception and utilization of performance appraisal information. Task based performance feedback is information that indicates the accuracy and adequacy of an individual's prior work performance (Ilgen, Fisher & Taylor, 1979).

The purpose of the present research is to distinguish between feedback message content and feedback message characteristics. These results will then be embedded within the framework of current
feedback process models and goal setting theory.

**Historical Overview**

Task based performance feedback is one of the most widely researched topics in psychology. Early researchers (cf. Arps, 1917, 1920; MacPherson, Dees, & Grindley, 1948, 1949; and Thorndike, 1927) examined the relationship between the temporal and informational dimensions of knowledge of results for early task performance, and subsequent task performance within the context of behavior theory.

Ammons (1956) reviewed and interpreted the early knowledge of results research. He noted that (1) knowledge of previous task performance usually affected subsequent task performance, but that (2) as currently conceptualized, behavior theory (cf. Hull, 1943; and Thorndike, 1931) was incapable of specifying what sort of relationship existed or in what manner knowledge of results exerted influence on subsequent task performance. Knowledge of results research concentrated on identification of knowledge characteristics which alter subsequent responses.
Factors which appeared to affect the operation of knowledge of results on subsequent task performance included: worker motivation (Hamilton, 1929; Johanson, 1922; Ross, 1927; Waters, 1933) specificity of knowledge of results information (Angell, 1917; Arps, 1917, 1920; Dees & Grindley, 1951; Judd, 1905-6), and length of the time interval between task completion and receipt of knowledge of results information (Lorge & Thorndike, 1935; MacPherson, Dees, Grindley & Grindley, 1948, 1949; Thorndike, 1931). Ammons (1956) concluded his review by stating that the most troubling experimental finding in knowledge of performance results research was the inconsistency of the effects produced by knowledge of results on subsequent task performance. That is, knowledge of results did not appear to exert universally positive influences on subsequent task performance.

**Goal Setting**

Performance based research continued during the 30 years since Ammons' review. During the 1960's and early 1970's attention was focused on Locke's goal setting theory (Locke, 1967, 1968). Locke (1967, 1968)
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proposed that the effects of knowledge of results on subsequent task performance could be accounted for by task performance goal setting. Later, Locke would describe the effects of goal setting on subsequent task performance as a type of cognitive behavior modification (Locke, Shaw, Saari, & Latham, 1981).

Locke, Cartledge, & Koeppel (1968) distinguished between knowledge of results, feedback, and goal setting. Locke, et al. (1968) stated that knowledge of results may facilitate future performance by providing information regarding past performance errors (feedback) and/or by providing increased worker motivation. Goal setting theorists maintain that neither feedback nor knowledge of results, alone, are sufficient to alter subsequent task performance. Task performance is improved by specific, challenging goals which motivate the worker to improve task performance (Locke, et al., 1981).

Goal setting research has deemphasized the role of task based performance feedback in altering subsequent task performance. Modern goal setting theory (Locke, et al., 1981) states that the utility of feedback in
improving task performance is simply one of providing information on goal attainment. However, this conclusion appears to minimize the early knowledge of results research which demonstrated altered task performance, even in the absence of specific and challenging performance goals. Thus it seems likely that the most effective use of goal setting would be in conjunction with behavioral performance feedback. 

Ilgen, Fisher, and Taylor (1979)

During the past 10 years, several process models of performance feedback have been developed. Each model includes some factors which were hypothesized to account for the previously observed effects of knowledge of performance results on subsequent task performance. The current feedback models also borrow from goal setting theory by acknowledging the role of the feedback recipient as an active information processor, and the multidimensional nature of the feedback message (Ilgen, Fisher, & Taylor, 1979; Ashford & Cummings, 1983; Taylor, Fisher, & Ilgen, 1984). Landy and Farr (1983) highlight the fact that these models are best viewed as
complimenting, rather than competing, with one another. Therefore, Ilgen, Fisher, and Taylor's (1979) model of feedback was selected for presentation in this introduction and as the focal model in the present research. Ashford and Cummings' (1983) and Taylor, Fisher and Ilgen's (1984) models are reviewed in the next chapter.

By extending the early behavior theory model of task based performance feedback from a simple stimulus-response (S-R) behavioral pattern to a S-R pattern which incorporates a route for cognitive processing of feedback information, Ilgen, Fisher, and Taylor (1979) developed the first modern process model of task based performance feedback. Figure 1 depicts Ilgen, et al.'s model (see Figure 1, p. 29).

In their model, Ilgen, et al. recognize the multidimensional nature of the feedback stimulus, and emphasize the importance of recipient individual difference characteristics which may affect cognitive processing of the feedback stimulus. If these factors interact, the may produce the potential for variation in
individual behavioral responses to the same feedback stimulus. In short, the multidimensional nature of the feedback message and individual difference characteristics of the feedback recipient may explain the inconsistent research findings regarding the effects of knowledge of results on subsequent task performance.

The exact nature of the individual difference characteristics which may affect workers' reactions to performance feedback (and subsequent task performance) has been the subject of a considerable amount of recent research. Thus far, it has been demonstrated that personal efficacy (Bandura, 1977), need for achievement (cf. Atkinson & Feather, 1966), locus of control (Rotter, 1966), level of self-esteem (cf. Stone & Stone, 1984, 1985), and need for competence or mastery over the environment (White, 1959) may effect worker performance. Additionally, demographic characteristics such as worker age, experience and job seniority may also effect workers' response to performance feedback and their subsequent task performance (Bernardin & Beatty, 1983).

Characteristics of the feedback message have also
been hypothesized to affect subsequent work performance. These message characteristics include the sign (tone of information: positiveness ornegativeness), frequency and the temporal interval between finished performance and feedback session (Landy & Farr, 1983). However, Landy and Farr (1983) point out that these message characteristics are often confounded in research studies. Also, the much of the importance associated with feedback message characteristics in affecting subsequent task performance in general have been assumed, based on the early knowledge of results research. However, as Locke and his colleagues point out (Locke, Cartledge & Koeppel, 1968), knowledge of results and task based performance feedback are not equivalent phenomena.

Thus it appears as if much of the current task based performance feedback research is based on the assumptions that early knowledge of results research is wholly applicable to modern feedback situations and models; and that the concepts of knowledge of results and task based performance feedback can be used interchangeably. Since these assumptions are also
frequently employed in research on feedback recipient individual difference characteristics, one must also question the validity of results in this research area.

**Current Task Based Performance Feedback Research**

Providing a specific example of individual difference characteristics and message characteristics performance based feedback research, Stone and Stone (1984, 1985) studied the effects of multiple feedback agents and level of self-esteem on the recipient's perception of performance feedback accuracy (1984); and the effects of the feedback favorability and consistency on recipient's perceptions of feedback accuracy (1985). Stone and Stone concluded that the recipient's perceptions of feedback accuracy (and thus, subsequent behavioral response) is a function of (1) the favorability of the feedback, (2) the consistency of feedback information across multiple feedback sources, and (3) self-perceived task competence.

A major short-coming of the current performance based feedback research in general, and Stone & Stone's research in particular, is the overconfidence placed in
the results given potential methodological flaws.

Typically, these research protocols involve a single
task performance session, after which task based
performance feedback is given. Behavioral change in
task performance is then assessed as the feedback
recipients' self-reported intentions to alter behavior
in subsequent performance sessions. Independent ratings
of task performance before and after feedback are
generally not conducted. It may be that these
investigators are relying on research results in other
domains indicating a predictive relationship between a
subject's intended behavioral responses and actual
behavioral responses (cf. Arnold & Feldman, 1982; Mobley,
Griffeth, Hand & Meglino, 1979). The question then
becomes: Does the intended-actual performance
relationship hold in a feedback situation?

In short, the direct relationship between task
based performance feedback message and subsequent worker
performance has been neglected since the early knowledge
of results research. The purpose of the present
research is to address this oversight by examining the
relationship between workers' intended task performance and their actual performance following performance based feedback. This relationship will be assessed through independent ratings of pre- and post-feedback task performances, using a replication of Stone & Stone's (1985) protocol which stressed the mediating effects of message characteristics. Thus, the primary purpose of the present research is to test the theoretical prediction of a direct relationship between characteristics of task based performance feedback and subsequent task performance, as suggested in Ilgen, et al.'s (1979) process model of performance feedback.

A second purpose of the current research is to clarify the distinction between feedback message characteristics and feedback message content. The feedback message is essentially neutral task performance information which may, or may not, be associated with some degree of favorability information. It is assumed that a relationship between performance feedback and subsequent task behavior change does exist. It is hypothesized that the relationship between task based
performance feedback and subsequent task performance is more a function of feedback message content than feedback message characteristics.
II. Performance Feedback and Subsequent Worker Performance:
A Review of the Literature

Performance appraisals have become standard fare in American work settings. Formal work performance evaluations serve multiple functions: research, employee counseling, and personnel/administrative decision making (Bernardin & Beatty, 1983; Landy & Farr, 1980, 1983). A tremendous amount of research has focused on the performance appraisal interview, including the interview structure, content of the performance feedback, goal setting, and the interview process (Biddle & Fisher, 1987).

The purpose of the present study is to further investigate the specific relationship between task based behavioral performance feedback and subsequent task performance. Specifically, we are examining the effects of different behavioral feedback characteristics on subsequent real task performance.
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The evolution of performance feedback research for industrial/organizational psychology purposes begins around the turn of the century with investigations on "knowledge of results." Research in this domain is stagnant for a few decades and then makes a resurgence under the auspices of goal-setting theory. Lastly, in the past decade or so, research on performance feedback has been aimed at greater understanding of the process nature of the feedback message. These research themes are expanded below.

Knowledge of Results

Task-based performance feedback is one of the most widely researched topics in psychology. Early researchers (cf. Arps, 1917, 1920; MacPherson, Dees, & Grindley, 1948, 1949; and Thorndike 1927) sought to describe the relationship between task information and task performance within the framework of the prevailing behavior theory (cf. Hull, 1943; Thorndike, 1931).

Hull (1943, 1951) sought to explain all behavior within a mechanistic, stimulus-response framework. Hull (1943) based his theory of behavior on the conditioning
effects of the interaction of drive and habit. Drive can be loosely defined as motivation, and habit as the response tendency (behavior) evoked by a specific stimulus. Within this theory, task based performance feedback would supply the drive or motivation to alter subsequent behavior.

Early knowledge of results research was aimed toward discovering the exact connection between knowledge results for early performance and subsequent task performance, and identifying the contingencies of this knowledge-performance change relationship. Ammons (1956) summarizes the nature of this early research:

In general, research on the problem of knowledge of performance involves determining the effects of giving or withholding various kinds of information about performance during and for varying amounts of time after that performance (p. 279)

The early knowledge of results research generally employed a mechanical task (such as line drawing to criterion, Thorndike, 1927; making "bull's eyes",

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MacPherson, Dees, & Grindley, 1948, 1949; or estimate direction, Judd, 1905). Knowledge of results consisted of allowing subjects to view the physical discrepancy between their performance and the criterion.

Thus, knowledge of results was self-assessed by subjects as the discrepancy between their own task performance and ideal task performance. Interpretation of the adequacy of performance was left solely to the experimental subject. Ammons (1956) noted that knowledge of results was usually, but not always, sufficient to significantly improve subjects' performance over the performance of subjects without knowledge of task results.

After the relationship between knowledge of results and subsequent performance had been established, the next step for researchers was to identify conditions which would mediate the subsequent performance effects of knowledge of results. Researchers found that the specificity of the knowledge of results information would produce differential subsequent performance, such that greater specificity generally produced greater
performance improvement (cf. Angell, 1917; Arps, 1917, 1920; and Dees & Grindley, 1951). Also, several researchers found that increasing the motivation of the task performer would generally increase the positive effects of knowledge of results information (cf. Hamilton, 1929; Hundal, 1969; Johanson, 1922; Ross, 1927; and Waters, 1933). Other variables, such as the length of the time interval between the performance and knowledge of results (cf. Lorge & Thorndike, 1935; MacPherson, Dees, & Grindley, 1949; Thorndike, 1931) were also investigated, however the majority of research attention focused on the incentive/motivational and informational components of the knowledge of results information.

The knowledge of results research era closed without much headway in identification of the key components which make knowledge of results successful in improving subsequent task performance. Ammons (1956) concluded his review on knowledge of results research by acknowledging that the specific characteristics of knowledge of results information which produce an effect on subsequent performance were not known. Ammons suggested that the
current behavior theory was too simplistic to account for the discrepancies in research results. Ten years later, Hundal (1969) echoed Ammons' conclusions:

It is difficult, however, to know from most studies whether the improvement is due to motivational effects of knowledge of results or to some side effect such as "information" or "reward" which has not been controlled systematically (p. 224).

Feedback in the Goal Setting Model

During the 1960's and '70's, Edwin Locke and his colleagues sought to answer the "why" question posed by early knowledge of results researchers. They (Locke, 1967, 1968; Locke & Bryan, 1969; Locke, Bryan, & Kendall, 1968; Locke, Cartledge & Knerr, 1968; and Locke, Shaw, Saari, & Latham, 1981) suggested that setting goals for future task performance was the key to discrepancies in the earlier knowledge of results research.

Locke (1967) questioned the assumption that mere knowledge of results could produce improved task performance, and suggested instead that improved task
performance was a function of goal setting for future task performance. According to Locke (1967), a goal is anything that an individual is trying to accomplish; it is the purpose or intent of behavior; the task objective or deadline.

Early goal setting studies (cf. Locke, 1968) found a positive relationship between the difficulty of the performance goal and subsequent task performance. That is, the harder the goal, the better subsequent task performance, within the constraints of performer ability. It was also found that specific performance goals led to greater improvement in subsequent task performance than general or vague performance goals (Locke, 1968). Additionally, Locke and Bryan (1969) found that knowledge of prior performance results plus setting specific, difficult goals for future performance produced greater improvement in subsequent task performance than knowledge of prior performance alone.

Despite the strength of the early goal setting research results, the question remained whether improved task performance was a function of the goal setting
activity or the motivational effects of simple knowledge of results. Locke, Cartledge and Koeppel (1968) distinguished between the concepts of feedback, knowledge of results, and goal setting. Knowledge of results incorporated feedback as part of its informational component, and included a motivational factor which encouraged the task performer to persist longer and/or try harder at the task. Locke, et al. (1968) concluded that knowledge of results can only provide sufficient task motivation to performers when challenging, specific goals for future performance are set. Locke, Bryan, and Kendall (1968) demonstrated that even monetary incentives (strong motivation) alone could not produce the same task performance improvement that monetary incentives plus goal setting could produce.

Recent reviews of the goal setting literature (cf. Locke, Shaw, Saari, & Latham, 1981; Mento & Steel, & Karren, 1987) state that hard, specific task performance goals are the variables responsible for improved task performance after knowledge of results has been given. Subsequent research in the goal setting paradigm has
focused on closer examinations of the underlying process involved in the goal setting–performance relationship.

For example, Steers and Porter (1974) stated that it was simply not enough to know that goal setting works, "we must know how and why it works" (p. 445). They assessed the effects of six task-goal attributes (goal specificity, participation in goal setting, feedback, peer competition, goal difficulty, and goal acceptance) on subsequent task performance. Steers and Porter found that goal specificity and acceptance were the attributes most consistently related to improved performance however, performance feedback also significantly improved subsequent performance.

Research results such as Steers and Porter (1974) have led some researchers to hypothesize that goal setting, alone, does not provide a sufficient explanation for subsequent performance improvement. For example, Erez (1977) found that while goal setting did improve subsequent task performance, task based performance feedback coupled with goal setting produced an even greater improvement in subsequent task performance. Erez
suggested that perhaps it is the goal setting–feedback interaction which produces subsequent performance effects. Her conclusions have been echoed by other researchers (cf. Beck, 1978; Kimm & Hammer, 1976).

In their review of the goal setting literature, Mento, Steel, and Karren (1987) conclude:

Certainly, if nothing else, the evidence from numerous studies indicates that these variables [goal specificity, difficulty/specificity, and task performance] behave lawfully. At the same time, it appears as though little more may be gained by continuing to replicate goal difficulty and goal specificity/difficulty-performance relationships. It is time for a change in research emphasis toward underlying mechanisms which contribute to these relationships (p. 74).

It seems that the positive relationships between goal-setting and subsequent performance, and knowledge of results/feedback and subsequent performance have been well established. We also know that specificity and difficulty of task goals are two characteristics which can mediate the effects of goals on subsequent
performance. However, the characteristics of performance feedback which impact subsequent task performance are still missing.

**Task Based Performance Feedback**

Task based performance feedback has been described as the central attribute in employee training, performance, motivation, and satisfaction (Greller & Herold, 1975). However, often the constructs of performance feedback and knowledge of results are confused in the literature. For example, Greller and Herold (1975) highlight one important distinction between knowledge of results research and performance feedback research: the type of task employed. The type of task used will ultimately effect the type and scope of generalizations which can be drawn from the research:

The KR studies which have demonstrated the impact of feedback have generally used simple tasks with gross unidimensional feedback (e.g., time on target in a rotor pursuit task). This makes it difficult to generalize these findings to the complex job situation with multiple sources of feedback (p.244).
Landy and Farr (1983) also noted the distinction between knowledge of results and performance feedback. Although they recognize that knowledge of results research has demonstrated a relationship between knowledge of results and subsequent task performance, Landy and Farr (1980) point out that "knowledge of results" is an ambiguous term with obscure definitions that do not allow specification of the mechanisms for its effects or for generalizing laboratory research results to broader work settings. Thus echoing Greller and Herold's (1975) criticism of knowledge of results research. Landy and Farr (1983) also point out that "feedback" has sometimes been used synonymously with "knowledge of results", often leading to the erroneous conclusion that the knowledge of results-performance relationship is identical to the feedback-performance relationship (Landy & Farr, 1983, p. 267). Given the limitations of knowledge of results research tasks and the generalizations which can be drawn from such research, it has been worthwhile to separately define the task based performance feedback–subsequent performance
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relationship.

Ilgen, Fisher, and Taylor (1979) composed the current definition of performance feedback. It is information that indicates the correctness, accuracy, or adequacy of past behavior. Ilgen, et al. state that there are two primary functions of performance feedback. First, feedback serves a qualitative function: directing the attention of the task performer to the task at hand (i.e., what is being done; the performance). Second, feedback serves a quantitative function: motivating the performer to focus on how much is being done (Ilgen, et al., 1979).

The unique characteristics of task based performance feedback which may effect subsequent task performance (i.e., work-related feedback as opposed to personal identity feedback, etc.; cf. Snyder & Shenkel, 1976; Steiner, 1968) have usually been assessed within the context of the performance appraisal interview. In their review of performance appraisal interview research, Biddle and Fisher (1987) state that the sign (positive, negative, or neutral) of the feedback is hypothesized to effect worker acceptance of the feedback and subsequent
task performance, with positive feedback producing the most performance improvement. Biddle and Fisher also note the importance of the specificity of feedback information in producing subsequent task performance improvement. They report a study by Ilgen, Mitchell, and Fredrickson (1981) which found that subjects believed specific feedback to be more helpful and more motivating than general feedback.

Cummings, Schwab, and Rosen (1971) investigated the effects of the accuracy of feedback messages and goal setting. They found that correct information produced better performance than no information, incomplete information did not significantly effect performance, and erroneous information decreased performance below the level of no information.

Thus, sign, specificity, and accuracy of the feedback message have all been hypothesized to influence subsequent task performance. However, it should be noted that in many of the performance feedback studies, characteristics of the feedback message are often confused with the feedback message itself. For example, giving the task
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performer a message that he is doing "very well" (sign information) is not the same as giving a message that he is doing "better than 85% of the people doing this task, at this point in the experiment." Also, prior research studies tend to focus on a single characteristic of the feedback message rather than the unique process nature of performance feedback described in current feedback models.

Current Feedback Models

The current models of feedback (Ilgen, Fisher, & Taylor, 1979; Ashford & Cummings, 1983; Taylor Fisher, & Ilgen, 1984), attempt to supply the "missing link" in the early behavior theory explanation of the feedback-performance relationship. These models recognize the multidimensional nature of the feedback stimulus and the cognitive complexity of the feedback recipient. Additionally, the current process models of feedback agree that the interaction of the multidimensional feedback message and recipients' individual differences in cognitive processing of the feedback message may explain the discrepancies noted in early knowledge of results research. Because of the similar nature of
these feedback models, Landy and Farr (1983) recommend that they be viewed as complimentary, rather than competitive, models.

(1) Ilgen, Fisher, and Taylor (1979) were the first to extend the early behavior theory framework of feedback as a simple stimulus-response behavioral pattern by incorporating into the S-R model a route for the effects of cognitive processing (see Figure 1). For the first time, in this model the multidimensional nature of feedback message and individual difference characteristics of the feedback recipient are recognized. Ilgen et al. suggest that performance feedback is a multidimensional stimulus message and that individual difference characteristics of the feedback recipient can affect the cognitive processing of the feedback stimulus (message), producing the potential for variations in behavioral responses to the same feedback stimulus.

In this model, the message is the feedback. The feedback message exerts its influence by directing attention to important work behaviors and motivating
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the recipient by associating specific work behaviors with positive or negative outcomes (Ilgen et al., 1979).

Perception of the feedback refers to the recipient's perception of the accuracy of the feedback, regardless of the message's source. Both message and source factors may affect perception of the feedback (Ilgen et al., 1979). Message characteristics include the sign, frequency, and temporal proximity to behavior. Source characteristics include the relationship between the recipient and the feedback agent, the credibility and power of the feedback agent.

Feedback acceptance describes the process by which the recipient comes to believe or accept that the feedback is an accurate account of his/her performance. Acceptance is also affected by message and source factors (Ilgen et al., 1979). Message characteristics include sign and consistency, while source characteristics in this case include credibility and reliability of the source. Additionally, characteristics of the feedback recipient such as locus
of control (Rotter, 1968), need for achievement (cf. Atkinson & Feather, 1966), and self esteem (Stone & Stone 1984, 1985) are hypothesized to affect feedback acceptance.

Desire to respond to feedback refers to the recipient's willingness to respond to the feedback in a manner that is congruent with the content of the feedback message (Ilgen et al., 1979). Message characteristics which may affect desire to respond include the temporal proximity between behavior and feedback, sign, and consistency of feedback. The source characteristic most likely to affect desire to respond is the power of the feedback source (Ilgen et al., 1979).

In Ilgen et al.'s (1979) model, the recipient's intended response is viewed as the major determinant of the recipient's actual behavioral response. However, Ilgen et al. do distinguish between the intended response and the recipient's actual response.

The Ilgen et al. (1979) model attempts to address several of the deficiencies noted in previous research.
The feedback message has both the components in Locke et al.'s (1968) knowledge of results definition: behavioral content and motivation. Furthermore, the acknowledgement of individual difference characteristics is one solution to the variance in performance improvement noted in the early research. Lastly, this model incorporates one form of goal setting, desired response, into stimulus-response behavior pattern.

(2) Ashford and Cummings (1983) proposed a model of performance feedback which emphasizes the role of the feedback recipient as an active information seeker. That is, the primary focus of Ashford & Cummings' model are the motivational factors which prompt the feedback recipient to seek out feedback information from the task, the environment, supervisors, peers, and subordinates (see Figure 2). Ashford & Cummings also emphasize the informational content of the feedback message, as well as including the role played by organizational goals in an individual's response to performance feedback.
Figure 2

Hahord and Cutmore (1983) Feedbac Model

Feedback

Information (Information feedback)

Inquiry Strategy

Personal

Monitoring

Interpretation

Interpretation

Decision Making

Thinking Function

Organizing Function

Motivations for PSB

Error Correction

Uncertainty

Self-Evaluation

Competence

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Environment Information
The motivational and informational components of the Ashford & Cummings (1983) model place the feedback recipient in the role of self-evaluator, striving for task competence, uncertainty reduction and performance error correction; processes assumed in the early knowledge of results research. In the Ashford and Cummings model, the feedback recipient simultaneously processes available feedback information and seeks additional feedback information sources, which takes this research a step beyond the knowledge of results research.

Thus, Ashford & Cummings' (1983) conceptualization of the performance feedback process is an attempt to delineate the cognitive motivations and processes used by feedback recipients. The model does not detail nor describe the possible ramifications of different combinations of motivators, cognitive processes, and/or information seeking behavior on subsequent individual task performance. However, given the specification of individual combinations, it seems appropriate to infer
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that different combinations could produce different individual behavior responses. Recent task based performance feedback research seems to be neglecting the complexity of informational input and behavioral output in the feedback situation.

(3) Recently, Ilgen et. al's. (1979) process model of performance feedback has been restructured in a control theory perspective (Campion & Lord, 1982; Taylor, Fisher & Ilgen, 1984). Essentially, the earlier communication model (Ilgen et. al., 1979) has been embedded within a goal setting framework (see Figure 3), which explicitly suggests a goal setting-performance feedback-subsequent task performance linkage. The control theory perspective of performance feedback recognizes feedback recipients as active information seekers, as do Ashford and Cummings (1983). However, control theorists hypothesize that recipients' subsequent task performance [behavior] is aimed at reducing inconsistencies/discrepancies between self-set and organizationally-set performance behavior standards (goals), rather than limiting the purpose of seeking
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information solely to self-evaluation purposes.

While general themes of individual difference characteristics, individualized behavioral outcomes, and individual cognitive differences are present to some degree in each of the models discussed so far, each model seems to suggest a slightly different process to account for performance behavior. Taylor, Fisher, and Ilgen (1984) suggest that workers react to self-assessed comparisons standards on cognitive, affective, and behavioral levels. Different reactions (e.g.: positive v. negative affective reaction) at the different levels are based on individual motivation patterns, and are hypothesized to account for differences in individual responses to identical feedback stimuli. The Taylor et al. model also emphasizes the importance of consistency between worker and organizational feedback sources. Lastly, this model suggests an increase in utility to the worker when evaluative feedback information is given, as opposed to descriptive feedback information.
Another example of the feedback process within a control theory framework is given by Campion and Lord (1982). In Campion and Lord's (1982) model, the contribution of goal setting theory (cf. Locke, Shaw, Saari, & Latham, 1981) in the control theory feedback framework is emphasized:

...Goal setting should be viewed as a dynamic process in which both self-set goals and environmental feedback are incorporated into a system that monitors performance relative to the desired state and adjusts subsequent goals, behaviors, and strategies (p. 265).

However, while acknowledging the role of goal setting in subsequent task performance, Campion and Lord also note that the "effects of goals have not been well integrated with feedback systems" and that despite the importance of feedback in the goal setting framework, it is still not known "how feedback operates to improve performance" (p. 266). In their incorporation of performance feedback research in control theory, researchers need to extend their research to include the relationship between the goal setting and task based
performance feedback processing.

To summarize this section on performance feedback models, a brief comparison between these feedback models and the earlier knowledge of results, goal setting, and performance feedback research is made. Research prior to the feedback model research was unidimensional. That is, each research domain attempted an explanation of the feedback-performance relationship within the limited scope of the available theory. The great advantage of the feedback models is that they are attempts to compensate for the limited perspective of the earlier research by addressing the questions left unanswered by that work. Specifically, both the feedback (information) and motivation components of knowledge of results are incorporated into the feedback models. The Ilgen et al. (1979) model makes a clear distinction between the informational component of a feedback message and other characteristics, such as favorability, of the feedback message. Lastly, the most recent performance feedback models, control theory models, clarify the need to assess the effects of both
goal setting and performance feedback on subsequent task performance.

Current Feedback Research

Providing a specific example of the current era in performance feedback research, Stone and Stone (1984, 1985) have studied the effects individual difference variables and message characteristics on post feedback performance. Specifically, they have examined the effects of multiple feedback sources and self esteem level on the recipients' perception of performance feedback accuracy (1984); and the effects of feedback favorability and consistency on recipient's perceptions of feedback accuracy (1985).

Stone and Stone (1984) had subjects construct diamond molecule models. After construction, subjects were given variable favorability feedback information (superior or acceptable) from a single feedback source (agent). After the feedback session, subjects were asked to complete a self-report questionnaire assessing perceived accuracy of the feedback. Later, subjects returned to the experimental setting expecting to
perform the same task again. However, they were told that their first performance had been video taped and reassessed either by the same feedback agent or another feedback agent. Subjects were given the same level of favorable feedback by the agent who reassessed their performance.

Stone and Stone (1985) asked subjects to complete a managerial inbasket task during the first experimental session. During the second session both feedback favorability and consistency were manipulated. Favorability was manipulated in the same manner (superior, acceptable) as in the 1984 study. Consistency of feedback was manipulated across both agents and favorability, yielding four feedback session conditions: superior-superior, acceptable-acceptable, superior-acceptable, and acceptable-superior. Subjects then completed the same dependent measure of feedback perception.

From these investigations, Stone and Stone (1984, 1985) concluded that the recipient's perception of feedback accuracy is a function of (1) the
favorability of feedback information, and (2) the consistency of feedback favorability information across multiple feedback agents. They found that perception/acceptance of feedback was more likely if the feedback session began with the most favorable feedback. Stone and Stone concluded that post feedback performance improvement is greatest when feedback favorability information is positive and the favorability information in consistent across feedback sources.

Major short-comings of the current feedback research in general, and Stone & Stone's research in particular, is the confusion of feedback message and feedback message characteristics and the reliance on proxy measures for actual subsequent task performance. Typically, these research protocols involve a single task performance session, after which feedback is given. Behavioral change in task performance is then assessed as the feedback recipients' self-reported intentions to alter behavior in subsequent performance sessions. However, a second task performance trial is never given,
making independent ratings of task performance before and after feedback impossible to obtain. These feedback investigators appear to rely on research results in other domains which indicate a predictive relationship between a subject's intended behavioral responses and their actual behavioral responses (cf. Arnold & Feldman, 1982; Mobley, Griffeth, Hand & Meglino, 1979). Also, note that in neither experiment did Stone and Stone include a negative feedback condition. However some reviewers (cf. Biddle & Fisher, 1987) have overgeneralized results from this type of research by stating that the positive-negative feedback order produces more accurate perceptions of feedback than the negative-positive order without directly testing this assertion.

In short, the direct relationship between task based performance feedback and subsequent worker performance has been neglected since the conception of current feedback models. Current research confuses feedback message content and feedback message characteristics. The purpose of the proposed research
is to address this neglected area by directly examining the relationship between workers' intended task performance and their actual performance following performance based feedback. This relationship will be assessed through independent ratings of pre- and post-feedback task performances, using a replication of Stone & Stone's (1985) protocol. Specifically, it is hypothesized that a relationship between feedback and subsequent task behavior does exist (as predicted by Ilgen et al.'s 1979 model), but that this relationship is due more to the content of the feedback message than to characteristics of the feedback message.

**Summary**

The history of task based performance feedback research has been traced from the beginning of this century. Distinctions between knowledge of results, feedback, and goal setting have been described.

It has been suggested that early knowledge of results research was limited by the ambiguity of the construct and by the specific laboratory protocols used to study this phenomenon. It has also been suggested
that later goal setting research tended to deemphasize the role of task based performance feedback in the goal setting-performance relationship.

It has been suggested that current feedback models are attempts to elaborate on early theories by suggesting the cognitive processes which take place between the reception of performance based feedback information and subsequent task performance. While current feedback research has begun to assess components of feedback models, by and large, this research fails to distinguish between feedback message content and feedback message characteristics. Also, current feedback research has does not attempt to directly interface study results with feedback models.
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Hypotheses

Review of feedback research literature leads to the following theoretical predictions:

Hypothesis 1: Given a relationship between task based performance feedback and subsequent task performance, that relationship will be mediated by favorability (sign) information associated with the feedback message:

Ha: Group means are not equal.

1A: Subjects receiving consistently positive favorability information will obtain the highest mean performance scores of all other groups:

Ha: Mean (++ > Means of all other groups.

1B: Subjects receiving consistently negative favorability information will obtain the lowest mean performance scores of all feedback groups:

Ha: Mean (--) < Means of all other feedback groups.
Hypothesis 2: Given a relationship between task based performance feedback and subsequent task performance, that relationship will be mediated by the consistency of favorability (sign) information associated with the feedback message:

Ha: Feedback group means are not equal.

2A: Subjects receiving inconsistent favorability information will obtain moderate subsequent mean performance scores:

Ha: Mean (++) > Mean [(+-) + (-+)]/2 > Mean (--).

2B: For subjects receiving inconsistent favorability information, reception of initially positive favorability information will produce greater subsequent mean performance scores:

Ha: Mean (+-) > Mean (-+).
Hypothesis 3: In accordance with the Ilgen, et al. (1979) process feedback model, it is expected that the recipient's perception/acceptance of feedback (PAF) to be predictive of subsequent task performance:

\[ H_a: \beta_{PAF} > 0. \]

Hypothesis 4: Following the Ilgen, et al. model, it is expected that desires and intentions to respond (DIR) to feedback (including behavioral goals) will have a greater direct effect on subsequent task performance than the direct effect of PAFs (see Figures 4 and 5):

\[ H_a: p_{2,3} > p_{1,3}. \]
SIGN = subject's perception of feedback favorability
PAF = subject's perception/acceptance of feedback
P2 = Performance 2 Mean Score

Figure 4
Hypothesized Path Model Without Behavioral Intentions (DIR)
SIGN = subject's perception of feedback favorability
PAF = subject's perception/acceptance of feedback
DIR = subject's desire/intention to respond to feedback
P2 = Performance 2 Mean Score

Figure 5

Hypothesized Path Model With Behavioral Intentions (DIR)
III. Method

Overview

This study involved six subject (task performer) groups: four experimental groups and two control groups. Subjects were first given a brief description and practice trial of the library-sort task. Subjects were then asked to complete the entire task (Performance 1). After screening first performances for specific performance criteria, some subjects were eliminated from the study. Those subjects remaining in the study were given six task-based performance (behavioral) feedback statements. Subjects then performed a distractor task. After completing the distractor, subjects were asked to complete a parallel form of the library-sort task (Performance 2).

The second task performances were video-taped and viewed by trained behavioral coders, using a behavioral checklist to assess task performance. Following the second performance, subjects completed a self-report
questionnaire which assessed their perceptions of the performance feedback and the experiment. Performance 2 scores were analyzed. 

Subjects (Task Performers) 

Subjects were self-selected undergraduate students at a large southeastern university. Subjects received extra credit in Psychology courses for their participation in this study.

An appropriate overall sample size (N) was determined using power analysis procedures for group sizes (n; Keppel, 1982; Kirk, 1984). The importance of power analyses in psychological research has been well documented (cf: Rosenthal & Rosnow, 1989; Rosenthal & Rubin, 1982; and Schmidt, Hunter, & Urry, 1976). Cohen (1977, in Keppel, 1982) recommends using a power level of .8. Schmidt, Hunter, and Urry (1976) suggest that .8 is too lenient and recommend setting the power level equal to .9. Both figures appear to be somewhat arbitrary selections. In an effort to balance the theoretical and practical utility of the present research, the power level was set at .85.
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Since previous research in this area has not assessed actual performance change, values for the hypothesized means and standard deviations for the power analysis in the present study were unobtainable. In their stead an effect-size was selected. Cohen (1969, in Kirk, 1984) defines a small effect-size ($d$) as .2, a medium effect-size as .5, and a large effect-size as .8. A moderate effect size ($d = .6$) was selected for use in the present study. Finally, the conventional alpha = .05 was also used.

Equation 1

**Power Analysis for Cell Size**

\[
\begin{align*}
    n & = \frac{[1.645 - (-1.035)]^2}{(.6)^2} \\
    & = 19.95 \approx 20
\end{align*}
\]

$z_{\mu} = 1.645$

$z_{\delta} = -1.035$

$d' = .6$

From Keppel, 1984.
The results of the power analysis (see Equation 1) suggested a minimum group size of 20 subjects. A total of six groups were formed, resulting in an overall minimum N = 120. A total of 170 subjects were given first performance tests and the final sample was composed of the first 136 subjects who met criteria for inclusion in the study.

Experimental Task

Development. One of the purposes of the present study is an attempt to replicate the effects of feedback message characteristics found by Stone and Stone (1984, 1985). The original protocol called for use of one of Stone and Stone's tasks: either diamond molecule building (1984) or a managerial inbasket (1985). However, after careful consideration, it was noted that the managerial inbasket task did not promote the use of specific behavioral feedback statements and that the diamond molecule building task did not have a sufficient number of independent behavioral dimensions on which to provide feedback messages. Pretesting of the experimental task centered on developing a task which
required several distinct behavioral components for successful completion. An additional requirement was that the task employ behaviors which could be assessed from videotapes.

Parallel forms of a library-sort task were developed for use in the present study. The task involves correct alphabetical sorting and shelving of several different professional journal title page groups. Sorting involved proper title grouping and date sequencing journals by date and issue number or volume of the journal. Shelving involved proper alphabetical placement of journal title groups on library shelves.

To increase task difficulty, rather than use real journals which have distinctive cover colors, logos and designs, standardized journal cover pages were manufactured for this study. Behavioral feedback statements based on proper task performance are in shown in Table 1 (p. 56).

Task materials. Standardized journal cover pages were common 8-1/2 X 11 sheets of white paper with the journal title typed 13 lines from the top of the sheet of
Table 1

Behavioral Checklist/Task Components\(^1\), \(^2\)

1. All title pages were collected from all boxes before sorting began.
2. Initial title page sorting was performed on a created work surface (either the floor, or a "table" built from the storage boxes).
3. Journals are sorted by title: all journals with the same title are grouped together.
4. Journals title pages are sorted alphabetically: title groups are arranged alphabetically.
5. Journal groups are numerically sorted: Alphabetically grouped title pages are sorted by issue, number, season, and/or date.
6. Shelving sequence: (A) Collected titles "American Journal of Psychology" through "Journal of Applied Psychology"; carried to appropriate bookcase; appropriately placed title pages on bookcase shelves. (B) Repeated procedure A for titles "Journal of Cross Cultural Psychology" through "Psychological Review"
7. Checked for sorting and shelving errors. (Error checks may be performed several times during task performance, but MUST be performed after all journals have been placed on the shelves.)

\(^1\)Behavioral statements presented in this Table are in sequential task performance order. Feedback statements presented to subject performers will be counterbalanced for order and favorability.

\(^2\)Favorability of feedback clusters will be determined by prefacing each cluster with the appropriate favorability phrase ("You performed in the 85th [15th] percentile.").
paper, the issue date (month and year or season and year) 4 lines below the title, and the volume and number typed six lines below the date. A total of 26 different journal title groups were developed. A 5-minute time limit to complete the task was imposed.

Each performer attempted the task on two separate trials. In order to minimize practice effect, each trial consisted of randomly selected journal title groups composing parallel forms of the library sort task.

**Experimental Materials and Setting**

**Stimuli.** Experimental stimuli were 13 randomly composed packets of journal title groups (see Appendix A). Each packet contained 9 to 10 different title groups. Each journal title group had 8 to 10 issue pages (see Appendix B). Journal title pages in each packet were hand shuffled a minimum of 10 times to randomize their order in the packet. The original 13 packets were randomly ordered and then numbered 1 through 13. Throughout the experiment the packets were then used in this sequential order. Two packets were used for each
subject completing the experiment. Each packet was reshuffled a minimum of 10 times prior to replacement in the proper sequential order for use with subsequent subjects.

**Setting.** Two experimental rooms/areas were used. The task performance room had one large, open storage cabinet with five shelves, placed against one wall. Six boxes for sheaths of unsorted title pages were placed on the middle shelves of the storage cabinet: two boxes on each of three shelves.

Along the opposite wall of the task room were two adjacent bookcases. Printed signs (red on white) were strategically placed on the bookcase shelves to indicate the alphabetically correct first and last title page groups for each bookcase. On the first space of the first shelf of the first bookcase the sign read: "American Journal of Psychology". The last space on the last shelf of the same bookcase read: "Journal of Applied Psychology". On the first space of the first shelf of the second bookcase the sign read: "Journal of Cross Cultural Psychology. The last space on the last
shelf of the same bookcase read: "Psychological Review".

There was a large, empty floor area between the storage cabinet and bookcases. A student desk was placed beside the storage cabinet, and a video camera was placed in the doorway of the task room. Performance feedback was given in the task room.

Close to the task room, but out-of-sight and secure from voices in the task room, was the work area, consisting of a large work table and two chairs. The work area was used for the distractor task, completion of the questionnaire, debriefing, and extra credit record keeping.

A third room, which was isolated from both the task room and work area, was used by the author and experimental confederates to store materials and equipment. Also, task performances were viewed via video monitor in this room.

Procedure

Subjects were greeted in a reception area by a student experimenter (upperclass psychology student; designated as the "experimenter") who escorted the
subject to the task room and introduced the feedback agent. Subjects were informed of the video-taping procedures and given a description of the task prior to signing written consent forms and beginning the experiment.

The introduction to the feedback agent (also an upperclass psychology student; designated as the "feedback agent") stressed the expertise of the feedback agent in performing the task and in giving task based performance feedback (see Appendix C). After the introduction, the experimenter left the task room while the feedback agent gave the subject a detailed explanation of the library-sort task (see Appendix D), and allowed the subject a brief practice session (2 minutes to sort 2 title groups). During the practice session, the feedback agent remained in the task room and checked the video equipment for proper working conditions. After the practice session, the feedback agent informed the subject that the study was ready to begin and that video taping would begin when the subject began the library-sort task. The feedback agent left
the task room and went to the material room to prepare
for the feedback portion of the experiment while the
subject attempted the task.

First performances were viewed via video monitor in
the material room by the student experimenter and the
author (aka: behavioral coders) for agreement with
designated performance criteria. Subjects who displayed
more than one of the designated task behaviors during
the first performance were debriefed by the feedback
agent and dropped from the remainder of the study (n =
34). Subjects retained after the first performance
(i.e., those who performed none or one of the designated
task behaviors) were randomly assigned to an experimental
or control group.

Subjects were allowed 5 minutes to complete the
first performance of the library-sort task. "Time" was
called by the feedback agent who reentered the task room
after 5 minutes elapsed. The feedback agent pretended
to go through and "grade" the sorted and unsorted title
pages. Then the feedback agent presented preselected
feedback messages to the subject: subjects in
experimental groups were given task based performance feedback with favorability/sign information; one control group received feedback messages without any favorability/sign information; and the second control group did not receive any feedback, but spent an equal amount of time interacting with the feedback agent.

Seven task based performance feedback statements were developed for the library-sort task (see Table 1, p. 56). Subjects in the experimental and feedback control groups who performed none of the specified behavioral criteria during the first task performance received six of the seven feedback statements, randomly selected. Subjects who demonstrated one of the criteria behaviors during the first performance received the six remaining feedback statements in their feedback session.

After the feedback session, subjects were taken to the work area and asked to complete the first page of the questionnaire (see Appendix F), which assessed the subjects' own perceptions of their task performance and their behavioral intentions (goals) for future performance.
Upon completion of these questions, the student experimenter asked each subject how they were doing up to this point in the experiment and had a brief "small-talk" conversation with the subject. Then the experimenter asked the subject to construct a replication of a tinker toy model from a photographic example. This construction task served as the distractor task. The experimenter left the subject with the tinker toys and returned to the material room. Subjects were given 3 minutes to build the model.

The feedback agent called "time" on the distractor task, pretended to check the finished product for accuracy, and then escorted the subject back to the task room. Subjects were asked to complete a parallel form (Performance 2) of the library-sort task, which was video taped. A different stimulus packet was used for the second library-sort task performance. After Performance 2, subjects were returned to the work area and asked to complete the remaining portion of the questionnaire. Upon completion of the questionnaire, subjects were debriefed and thanked for their
participation in the study by the author. The student experimenter completed extra credit forms for subjects.

**Independent Variables**

Stone and Stone (1984, 1985) concluded that the feedback recipient's intentions to alter future task performance were functions of the favorability of the feedback (sign: superior or average) and consistency of the feedback message sign across multiple feedback agents. They did directly not assess the effect of message consistency within a single feedback session (i.e., one feedback agent) or the effects of the feedback manipulation on actual subsequent performance.

The task based performance feedback session in the present study is comprised of 6 behavioral feedback statements (see Appendix E). If the subject demonstrated one of the behaviors in the initial performance, the remaining 6 behaviors were given during the feedback session. If the subject did not perform any of the behaviors, 6 of the 7 behaviors were randomly selected for presentation during the feedback session. The 6 feedback statements selected for presentation were
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divided into 2 clusters (first and second feedback clusters) with 3 statements in each cluster. The first feedback cluster was composed of the first 3 or 4 feedback statements (depending on which statement was omitted), and the second cluster was composed of the remaining statements. Presentation of the clusters in the feedback session was randomly determined for each subject.

The independent variable in the present study was the favorability/sign, positive or negative, of the feedback across feedback clusters. This manipulation resulted in four possible favorability combinations and two control groups (++, --, +-, -+, FBC, CON). Note that in the present study, mixed feedback favorability (+- or -+) would come from a single feedback source.

Favorability of the feedback clusters was manipulated by prefacing each feedback cluster with a general statement of positive (85th percentile) or negative (15th percentile) performance (see Appendix E). Two favorability statements were given in each feedback session.
The combination of feedback favorability across feedback clusters generates three relationships which can be analyzed. The first relationship is the effect of feedback favorability (positive vs. negative vs. control/none) on actual subsequent task performance. The second relationship is consistency of feedback favorability within a single feedback session or performance appraisal interview (positive/positive and negative/negative vs. positive/negative and negative/positive). Lastly, the third relationship is the effect of the order of inconsistent feedback sign (positive/negative vs. negative/positive) on subsequent task performance.

**Dependent Variables**

(1) The primary dependent variable in this study consists of performance 2 scores. These scores were derived from codings on the task behavior checklist and reflected the subjects actual post feedback task performance. Behavioral coders were responsible for generating performance scores.

Task performances (1 and 2) were viewed by 2 or 3
behavioral coders. The behavioral coders were 2 self-selected undergraduate psychology students who received course credit for their participation in this experiment and the author. Behavioral coders participated in the development of the behavioral checklist used in this study, which constituted coder training. Additionally, all behavioral coders had personal experience performing the library-sort task.

Behavioral coders viewed the first performance for a given subject and independently coded that performance using the behavioral coding checklist (see Table 1, p. 56). The coders then exchanged information and reached a consensus score for the first performance. The coders informed the feedback agent whether or not that subject could remain in the experiment and if the subject was retained, which of the criterion behaviors had been demonstrated during the first performance.

Performance 2 scores were derived in a similar manner. That is, behavioral coders independently viewed and coded the performance of a given subject. Coded information was exchanged and a consensus performance
score was derived for each subject.

(2) The second set of dependent measures were derived from the self-report questionnaire completed by each subject. The questionnaire (see Appendix F) included (A) assessments of the subject's goals for future task performance; (B) the subject's perception of the accuracy of task performance feedback (a proxy measure for feedback acceptance; Ilgen, et al., 1979; Stone & Stone, 1984, 1985); (C) the subject's intentions to alter future task behavior performance (supplying a direct test of the relationship between intentioned behavioral change and objectively measured behavioral change; Ilgen, et al., 1979; Stone & Stone, 1984, 1985); (D) and the subject's assessment of the feedback agent.

The subject's individual goals for future task performance were compared to their actual subsequent task performance. Goals were coded in two ways. First, an overall code was used for the presence of any future performance goals (0,1). Second, it was noted that if future performance goals were specifically stated (as opposed to the unspecific "try harder" type of goal),
then the stated goals could be matched with the specific behavioral feedback statements which the subject had received. Thus, the goal-feedback was also coded.

Also, relevant questionnaire items were combined into composite variables representing stages in the Ilgen, et al. (1979) feedback processing model. Path analysis was employed to determine the appropriateness of this model when actual behavioral change is measured.

(3) Manipulation checks were also conducted.

Design

The design employed in the present study is a one factor design (6 group Scores) with specified a priori contrasts. In this design, there were three contrasts of interest: a comparison of feedback (experimental) groups to the control group; a comparison of consistent feedback groups to inconsistent feedback groups; and a comparison of the order of feedback sign in inconsistent feedback groups.

The choice of design reduces to a determination of the best test of the stated hypotheses. Higher-order ANOVAs would allow for simultaneous testing of several
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relationships, but only a few of these are of interest and have been specified in the present study. Thus higher-order designs would produce overly conservative error terms when testing for the specified relationships. Additionally, several watchdogs of experimental design, most recently Rosnow and Rosenthal (1989) have cautioned against the use of omnibus tests of significance with specific hypotheses. The advantage of the single factor design is that each error term can be specified for the particular relationship tested and is, therefore, the appropriate test of the hypotheses in this study.
IV. Results

Performance Scores Analyses

Results of the power analysis (see Equation 1, Chapter III) required a minimum cell size of 20 subjects to obtain a power level of .85. In the actual study, six approximately equal groups (cells) were formed, resulting in a final N = 136. One hundred seventy subjects completed performance one in this study, however, 34 of these subjects were excluded from the second performance and subsequent analyses because they did not meet the retention criteria for subjects specified in Chapter III. An approximately equal number of males (n = 64; 47%) and females (n = 72; 53%) participated in the study. Group demographics are displayed in Table 2.

The research hypotheses in the present study were predicated on the assumption of a between groups difference based on feedback message. This assumption
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---

**Table 2**

**Sample Demographics: Gender**

<table>
<thead>
<tr>
<th>Group</th>
<th>Male (%)</th>
<th>Female (%)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10 (43)</td>
<td>13 (56)</td>
<td>23</td>
</tr>
<tr>
<td>2</td>
<td>9 (39)</td>
<td>14 (61)</td>
<td>23</td>
</tr>
<tr>
<td>3</td>
<td>12 (52)</td>
<td>11 (47)</td>
<td>23</td>
</tr>
<tr>
<td>4</td>
<td>12 (50)</td>
<td>12 (50)</td>
<td>24</td>
</tr>
<tr>
<td>5</td>
<td>11 (47)</td>
<td>12 (52)</td>
<td>23</td>
</tr>
<tr>
<td>6</td>
<td>10 (50)</td>
<td>10 (50)</td>
<td>20</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>64 (47)</strong></td>
<td><strong>72 (53)</strong></td>
<td><strong>136</strong></td>
</tr>
</tbody>
</table>
was tested via a one-way analysis of variance on performance two scores by feedback group (6). The SAS Version 5 (1985) GLM procedure for unbalanced cells was employed in a fixed effect model. This analysis produced a significant F ($F_{5,130} = 6.75; p < .0001$). Descriptive statistics for each group are displayed in Table 3; group means are plotted in Figure 6; and the source table for the one-way ANOVA is shown in Table 4.

Subjects were allowed to complete the present study only if their performance one score was less than or equal 1. That is, subjects continued in the study if they performed none or only one of the behavioral criteria in their first performance. It was possible that performance on the first trial could produce consistent effects throughout the experiment. Additional potential confounding variables included gender, feedback agent, experimenter, and knowledge of the true purpose of the experiment. These potential confounding variables were assessed via a
<table>
<thead>
<tr>
<th>Group</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (++)</td>
<td>3.8696</td>
<td>1.3917</td>
<td>1-6</td>
</tr>
<tr>
<td>2 (--)</td>
<td>3.3478</td>
<td>1.5843</td>
<td>0-6</td>
</tr>
<tr>
<td>3 (+-)</td>
<td>3.6522</td>
<td>1.4957</td>
<td>0-6</td>
</tr>
<tr>
<td>4 (-+)</td>
<td>2.8750</td>
<td>1.8252</td>
<td>0-6</td>
</tr>
<tr>
<td>5 (FBC)</td>
<td>2.8696</td>
<td>1.6598</td>
<td>0-6</td>
</tr>
<tr>
<td>6 (CON)</td>
<td>1.4000</td>
<td>1.2732</td>
<td>0-4</td>
</tr>
<tr>
<td>Overall</td>
<td>3.6087</td>
<td>1.4978</td>
<td></td>
</tr>
</tbody>
</table>

FBC = feedback message control group (no favorability information).
CON = control group (no feedback or favorability information).
Figure 6

Performance 2 Mean Scores by Group
Table 4

One-Way Analysis of Variance of Performance

Two Scores

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>group</td>
<td>5</td>
<td>81.7390</td>
<td>6.75</td>
<td>.0001</td>
</tr>
<tr>
<td>error</td>
<td>130</td>
<td>315.0772</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>135</td>
<td>396.8162</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
series of three-way analyses of variance, employing group and performance 1 score as two of the factors, with gender, feedback agent, experimenter, and purpose being the respective third factors. Since these ANOVAs were not independent, the Type I Error alpha level was adjusted accordingly (alpha = .05/4 = .0125).

Although performance 2 scores were different for subjects performing one or none of the behavioral criteria in the first performance (see Table 5), the only significant effect found at the revised alpha level in any of these analyses was between feedback groups. That is, gender, feedback agent, experimenter, and purpose were not significant confounding variables.

The overall results of the these ANOVAs suggest that under all tested circumstances, a main effect for feedback group was demonstrated. The results also suggest that the slight differences between subjects on performance 2 scores based on their performance 1 scores is most likely due to random fluctuations in the data. Due to the unbalanced cell sizes in the performance 1
Table 5

Performance 2 Score Means by Group and Performance 1

<table>
<thead>
<tr>
<th>Group</th>
<th>P1</th>
<th>n</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>16</td>
<td>3.6250</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>7</td>
<td>4.4286</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>17</td>
<td>3.1176</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>6</td>
<td>4.0000</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>15</td>
<td>3.8000</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>8</td>
<td>3.3750</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>20</td>
<td>2.6000</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>4</td>
<td>4.4250</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>19</td>
<td>2.8947</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>4</td>
<td>2.7500</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>15</td>
<td>1.0000</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>5</td>
<td>2.6000</td>
</tr>
</tbody>
</table>

nP1 = 0 = 102
nP1 = 1 = 34
variable, the consistently significant feedback group variable, and nonsignificance of other potential confounding variables, the remaining analyses were performed on the group variable, collapsed across performance 1 scores (see Table 3).

Given a difference between groups based on feedback message, and prior research results, specification of the location of group differences were made. The following hypotheses were tested via a priori Tukey tests using SAS Version 5 (1985) MEANS procedure with an adjusted alpha level and appropriately weighted means. Hypothesis 1 dealt with the effects of consistent favorability information, whether that information be positive or negative in sign. Hypothesis 1A stated that group 1 (++), which received two positive favorability messages along with the behavioral feedback, would have the highest performance 2 mean scores. Hypothesis 1B stated that group 2 (--) , which received two negative favorability messages in addition to the behavioral feedback, would have the lowest performance 2 mean scores. Results of
Table 6

**Tukey A Priori Single Group Comparisons**

<table>
<thead>
<tr>
<th>Contrast</th>
<th>Difference</th>
<th>Between Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 v. Group 2</td>
<td>0.5217</td>
<td></td>
</tr>
<tr>
<td>Group 1 v. Group 3</td>
<td>0.2174</td>
<td></td>
</tr>
<tr>
<td>Group 1 v. Group 4</td>
<td>0.9946</td>
<td></td>
</tr>
<tr>
<td>Group 1 v. Group 5</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>Group 1 v. Group 6</td>
<td>2.4696*</td>
<td></td>
</tr>
<tr>
<td>Group 2 v. Group 3</td>
<td>0.3043</td>
<td></td>
</tr>
<tr>
<td>Group 2 v. Group 4</td>
<td>0.4728</td>
<td></td>
</tr>
<tr>
<td>Group 2 v. Group 5</td>
<td>0.4783</td>
<td></td>
</tr>
<tr>
<td>Group 2 v. Group 6</td>
<td>1.9478*</td>
<td></td>
</tr>
<tr>
<td>Group 3 v. Group 4</td>
<td>0.7772</td>
<td></td>
</tr>
<tr>
<td>Group 3 v. Group 5</td>
<td>0.7826</td>
<td></td>
</tr>
<tr>
<td>Group 3 v. Group 6</td>
<td>2.2522*</td>
<td></td>
</tr>
<tr>
<td>Group 4 v. Group 5</td>
<td>0.0054</td>
<td></td>
</tr>
<tr>
<td>Group 4 v. Group 6</td>
<td>1.4750*</td>
<td></td>
</tr>
<tr>
<td>Group 5 v. Group 6</td>
<td>1.4696*</td>
<td></td>
</tr>
</tbody>
</table>

*Indicates significance at the adjusted alpha = .05 level.
the individual group contrasts are shown in Table 6.

The data in Table 6 indicate that the group 1 (++) mean score is significantly different from group 6 (CON) mean score and that the group 2 (--) mean score is also significantly different from group 6 mean score. Group 1 and 2 means are not significantly different from any other group means, however the group 1 mean is larger than the group 2 mean.

In general, hypothesis 2 tested the effects of inconsistent favorability information on subsequent task performance. Specifically, hypothesis 2A stated that the average performance 2 mean scores for groups 3 and 4 (receiving positive-negative and negative-positive favorability information respectively) would be less than the performance 2 mean score of group 1 (++) but greater than the performance 2 mean score of group 2 (--). Furthermore, hypothesis 2B stated that the order of favorability information would effect subsequent task performance such that group 3 (+-) performance 2 mean scores would be greater than group 4 (-+) performance 2
Table 7
Tukey A Priori Multiple Group Comparisons

<table>
<thead>
<tr>
<th>Contrast</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 v. (3 &amp; 4)/2</td>
<td>2.34</td>
<td>0.1286</td>
</tr>
<tr>
<td>Group 2 v. (3 &amp; 4)/2</td>
<td>0.05</td>
<td>0.8320</td>
</tr>
</tbody>
</table>
Figure 7

Consistency of Feedback Performance 2 Mean Scores
mean scores. Contrast results are shown in Table 7.

As shown in Table 7, consistency of favorability information did not have a significant effect on subsequent performance. However, it will be noted that the weighted combined mean of groups 3 and 4 (3.2636) is less than the mean score of group 2 (3.348) which is less than the mean score of group 1 (3.8696). Thus a slight but nonsignificant difference (see Figure 7) for the effects of consistent information does emerge from the present data such that consistent information, whether it be positive or negative, appears to have a small, but larger, positive impact on subsequent performance than inconsistent information. Of course, this difference is nonsignificant.

As can be seen from Table 6, the only significant differences to appear are between the experimental groups and the no feedback control group (group 6). Specifically, subjects receiving consistently positive favorability information and behavioral feedback did not significantly distinguish their second performance from
the other feedback groups, only from the no feedback control group. On the other hand, the subjects receiving consistently negative favorability information and behavioral feedback also did not significantly distinguish their second performance from the other feedback groups, only from the control group. Also, note that subjects in the two inconsistent favorability information and behavioral feedback groups did not obtain significantly different performance 2 mean scores from each other or from the other feedback groups. Lastly, note that the only significant difference between the feedback (information only) control group and all other groups was observed between the feedback control group and the no feedback control group. Together, these results suggest that the presence of task based behavioral feedback did have a significant effect on subsequent task performance, regardless of the favorability message or consistency of that favorability information associated with the feedback.

Given the presence of this relationship, albeit nonsignificant, for inconsistent favorability
information, additional post hoc Tukey contrasts were specified to assess the order effects of receiving inconsistent favorability information. First, a direct test of performance based on consistent or inconsistent favorability information (groups 1 (++) and 2 (--) v. groups 3 (+-) and 4 (-+) was assessed. Then, the effects of initial favorability information (groups 1 (++) and 3 (+-) v. groups 2 (--) and 4 (-+) were assessed. The results of these analyses are shown in Table 8, and the means are plotted in Figure 8.

First, a nonsignificant result has been obtained again for the effect of favorability consistency (group 1 and 2 v. groups 3 and 4), although the same slight relationship appears again. That is, consistent favorability information shows greater, but nonsignificant, subsequent mean performance scores than inconsistent favorability information. Second, the initial favorability sign is also nonsignificant in subsequent performance, as the mean score for groups 1 and 3 (positive sign first; 3.7609) is not different from the mean score of groups 2 and 4 (negative sign first; 3.1114). [Note, the
### Table 8

**Tukey Post Hoc Multiple Group Comparisons**

<table>
<thead>
<tr>
<th>Contrast</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groups 1 &amp; 2 v. 3 &amp; 4</td>
<td>1.140</td>
<td>0.2872</td>
</tr>
<tr>
<td>Groups 1 &amp; 3 v. 2 &amp; 4</td>
<td>4.040</td>
<td>0.0464</td>
</tr>
</tbody>
</table>
Figure 8
Post Hoc Multiple Group Comparisons
revised alpha = .05/2 = .025]. However, again a slight, nonsignificant difference is obtained such that presenting positive favorability information first in the feedback session seems to have a small but greater positive impact on subsequent performance than initial presentation of negative favorability information.

In summary, the present data show a significant effect for feedback message content information. The feedback effect is not significantly altered by the consistency of favorability information delivered with the feedback information, nor is the feedback content effect significantly changed by the sign of favorability information.

Questionnaire Analyses

The last set of analyses were designed to test hypotheses three and four, regarding the causal model suggested by Ilgen, et al.'s (1979) feedback process model, incorporating Locke et al.'s (1981) goal setting theory. Groups 5 and 6 were omitted from questionnaire analyses. Group 5 subjects were omitted because they
did not receive favorability information and therefore could not answer comparison items. Group 6 subjects were omitted because they did not receive any feedback and as a consequence responded to fewer items than group 5 subjects.

On the basis of prior research (cf. Stone & Stone, 1984, 1985) questionnaire items were summated to form composite indices for two constructs: perception/acceptance of feedback (PAF) and desire/intention to respond to feedback (DIR). Questionnaire items for the PAF index were assessed on a 5-point Likert scale, with conceptual anchors at points 1, 3, and 5. An example of a questionnaire item is displayed in Table 9, the full questionnaire appears in Appendix J.

Items composing the PAF index required subjects to assess whether or not they agreed with the feedback given (accuracy and agreement) and whether or not they correctly interpreted favorability information, in comparison with others. An additional item to be used in this scale was percentile (favorability information on a percentile basis), but subjects were not able to reliably interpret
Table 9

Sample Item from the Self-Report Questionnaire

Item # 7

According to the feedback you received, how well did you perform the library-sort task in comparison to others on the first performance?

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>well below average</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>average</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>well above average</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
their percentile scores.

The DIR index is meant to represent the last two stages in the cognitive processing component of Ilgen et al.'s (1979) feedback model: desires and intentions to respond to feedback. Research to date has assessed these components via subjects' statements of their own intentions to alter their future performance, although no descriptions of the exact items are available. A similar measure was used in the present research.

The DIR index was composed by coding subject's self-stated behavioral plans to alter future task performance (goals). After the first performance, and prior to the second performance, subjects were asked to state any behavioral changes they planned to make when performing the library-sort task again. A strict criterion was employed when coding subject responses: subjects had to make behavioral statements regarding their future task performance. That is, an ambiguous, global statement such as "I'm going to try harder" was not coded as a
behavioral plan, whereas a statement such as "I'm going to sort all the pages by title first" was coded as a behavioral plan. However, subjects who stated that they did have the intention to alter future task performance, regardless of their ability to articulate these plans in a behavioral format, were given one additional point in the BI item. Thus, a total of eight points were available in the DIR index from the summation of subjects' behavioral intentions.

Item intercorrelations are shown in Table 10 for PAF and DIR. Table 10 also shows the reliability estimates (Cronbach's coefficient alpha) for the PAF index (alpha = .81).

The previous ANOVAs conducted on performance 2 mean scores indicated that the feedback message characteristics of favorability and consistency were not significant in affecting subsequent performance scores. A variable called "SIGN" was included in the questionnaire analyses to assess the effects of subjects' perception of the feedback favorability information. Note that the subjects' perceptions and
### Table 10

**Index Item Intercorrelations and Reliabilities*\**

<table>
<thead>
<tr>
<th></th>
<th>PAF</th>
<th>comp</th>
<th>agree</th>
<th>accur</th>
<th>BI</th>
</tr>
</thead>
<tbody>
<tr>
<td>compare</td>
<td>.68</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>agree</td>
<td>.86</td>
<td>.34</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>accuracy</td>
<td>.75</td>
<td>.13</td>
<td>.63</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| DIR    |        |      |       |       |       |
| BI     | .29    | .18  | .26   | .24   |       |

|        |        |      |       |       |       |
| Means  | 10.44  | 2.93 | 3.20  | 3.32  | 2.50  |
| SDs    | 2.60   | 1.23 | 1.10  | 1.11  | 1.46  |

PAF Cronbach's alpha = .81

*N = 93*
the actual sign of favorability information do not have to correspond, which was the rationale for including this variable in the questionnaire analyses. However, a chi-square manipulation check comparing the expected values of SIGN (group n's) with the observed values (questionnaire responses) was nonsignificant ($\chi^2 = 1.036; p > .05$) when groups 3 and 4 (+- and -+) and the neutral/mixed response categories were combined. As an initial test of the rationale for the inclusion of SIGN in subsequent analyses, the relationship between SIGN and the individual items composing the PAF and DIR indices were assessed in separate single factor ANOVAs (Table 11).

The results these single factor ANOVAs indicate that subjects' perception of feedback favorability information does significantly influence the individual items ($p$'s < .0003) in the PAF index. However, SIGN does not appear to directly influence BI ($F_{3,89} = 2.21; p = .092$) or Performance 2 score means ($F_{3,89} = 4.015; p = .675$). Thus,
Table 11

One-Way Anovas with SIGN

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIGN</td>
<td>3</td>
<td>50.27</td>
<td>16.91</td>
<td>.0001</td>
</tr>
<tr>
<td>error</td>
<td>89</td>
<td>88.21</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIGN</td>
<td>3</td>
<td>25.03</td>
<td>8.63</td>
<td>.0001</td>
</tr>
<tr>
<td>error</td>
<td>89</td>
<td>86.09</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIGN</td>
<td>3</td>
<td>21.34</td>
<td>6.96</td>
<td>.0003</td>
</tr>
<tr>
<td>error</td>
<td>89</td>
<td>90.99</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIGN</td>
<td>3</td>
<td>13.56</td>
<td>2.21</td>
<td>.0920</td>
</tr>
<tr>
<td>error</td>
<td>89</td>
<td>181.69</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIGN</td>
<td>3</td>
<td>4.02</td>
<td>.51</td>
<td>.6752</td>
</tr>
<tr>
<td>error</td>
<td>89</td>
<td>232.78</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
it appears that while the actual sign of favorability information is not an important influence in subsequent performance, the subjects' perception of the sign of favorability information is an important influence. Given the relationships between SIGN and the PAF and DIR items, SIGN was placed as a contributing variable to PAF in the path analysis (see Figures 5 and 6, Chapter II).

Least square regressions were performed to assess the relationship between the PAF and DIR indices and performance 2 mean scores. Specifically, hypothesis 3 stated that there would be a significant positive relationship between PAF and performance 2 mean scores. Results of this analysis are displayed in Table 12, indicating a significant relationship between the subject's perception/acceptance of the feedback message and subsequent task performance, as predicted in the Ilgen, et al. (1979) feedback model.
Table 12

Simple Regression of Performance 2 Scores on PAF

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAF</td>
<td>1</td>
<td>24.34</td>
<td>10.42</td>
<td>.0017</td>
</tr>
<tr>
<td>residuals</td>
<td>91</td>
<td>212.46</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$R^2 = .103$

Variables in the Equation:

<table>
<thead>
<tr>
<th>PAF</th>
<th>B</th>
<th>SE B</th>
<th>Beta</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.197</td>
<td>.061</td>
<td>.321</td>
<td>3.229</td>
</tr>
<tr>
<td>constant</td>
<td>1.559</td>
<td>.601</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Hypothesis 4 was concerned with assessing the relationship between DIR and performance 2 mean scores, and in comparing this relationship with the PAF-performance 2 relationship. Note that the DIR-performance 2 relationship would include the indirect effects of PAF on performance 2 score means. A path analysis via least square regression (independent residuals; Pedhazur, 1982) was performed to assess these relationships.

Intercorrelations of the path analysis items are displayed in Table 13. Results of the path analysis regressions appear in Table 14, and the path equations are in Table 15. Calculation of residual paths is shown in Table 16 and in Table 17 the correlations are decomposed. Lastly, the path diagrams are shown in Figures 9 and 10.

The path analysis results indicate that hypothesis 4 was partially supported. That is, PAF does make a significant contribution to predicting
Table 13

Path Item Intercorrelations*

<table>
<thead>
<tr>
<th></th>
<th>P2</th>
<th>DIR</th>
<th>PAF</th>
<th>SIGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>P2 (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIR (2)</td>
<td>.269</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAF (3)</td>
<td>.321</td>
<td>.296</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIGN (4)</td>
<td>.124</td>
<td>.226</td>
<td>.577</td>
<td></td>
</tr>
</tbody>
</table>

Means 3.430 2.495 9.452 2.452
SDs   1.604 1.457 2.598 1.691

*N = 93
Table 14
Path Analysis Regression Results

Model 1: PAF regressed on SIGN

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIGN</td>
<td>1</td>
<td>206.46</td>
<td>45.32</td>
<td>.0001</td>
</tr>
<tr>
<td>residuals</td>
<td>91</td>
<td>212.46</td>
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<td></td>
</tr>
</tbody>
</table>

R² = .332

Variables in the Equation:

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>Beta</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIGN</td>
<td>.886</td>
<td>.132</td>
<td>.577</td>
<td>6.732</td>
</tr>
<tr>
<td>constant</td>
<td>7.279</td>
<td>.391</td>
<td></td>
<td></td>
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</table>

Model 2: P2 regressed on PAF and SIGN

<table>
<thead>
<tr>
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<th>df</th>
<th>SS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>regression</td>
<td>2</td>
<td>25.65</td>
<td>5.47</td>
<td>.0057</td>
</tr>
<tr>
<td>residuals</td>
<td>90</td>
<td>211.15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

R² = .108

Variables in the Equation:

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<tr>
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<th>SE B</th>
<th>Beta</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIGN</td>
<td>-.087</td>
<td>.116</td>
<td>-.092</td>
<td>-.747</td>
<td>.4560</td>
</tr>
<tr>
<td>PAF</td>
<td>.230</td>
<td>.075</td>
<td>.373</td>
<td>3.063</td>
<td>.0029</td>
</tr>
<tr>
<td>constant</td>
<td>1.464</td>
<td>.615</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 14, continued.

Model 3: P2 regressed on DIR, PAF and SIGN

<table>
<thead>
<tr>
<th>Source</th>
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<th>SS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>regression</td>
<td>3</td>
<td>37.01</td>
<td>5.50</td>
<td>.0016</td>
</tr>
<tr>
<td>residuals</td>
<td>89</td>
<td>199.78</td>
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<td></td>
</tr>
</tbody>
</table>

$R^2 = .156$

Variables in the Equation:

<table>
<thead>
<tr>
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<th>B</th>
<th>SE B</th>
<th>Beta</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIGN</td>
<td>-.105</td>
<td>.113</td>
<td>-.110</td>
<td>-.922</td>
<td>.3589</td>
</tr>
<tr>
<td>DIR</td>
<td>.253</td>
<td>.113</td>
<td>.229</td>
<td>2.249</td>
<td>.0270</td>
</tr>
<tr>
<td>PAF</td>
<td>.195</td>
<td>.075</td>
<td>.316</td>
<td>2.593</td>
<td>.0111</td>
</tr>
<tr>
<td>constant</td>
<td>1.211</td>
<td>.612</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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Table 15

Path Equations

PAF = .577(SIGN) + e

DIR = .249(PAF) + .083(SIGN) + e

P2 = .230(DIR) + .316(PAF) - .11(SIGN) + e
Table 16

Calculation of Residual Paths

\[ e_1 = \sqrt{1 - 0.15629} = 0.919 \]
\[ e_2 = \sqrt{1 - 0.09243} = 0.953 \]
\[ e_3 = \sqrt{1 - 0.33244} = 0.817 \]

general formula:

\[ e = \sqrt{1 - x^2} \]
Table 17

Decomposition of Correlations

\[ r_{34} = p_{34} = .577 \]

\[ r_{24} = p_{24} + (p_{23})(p_{34}) = .2266 \]

\[ r_{23} = p_{23} + (p_{24})(r_{34}) = .2968 \]

\[ r_{14} = p_{14} + (p_{12})(p_{24}) + (p_{12})(p_{23})(r_{34}) \]
\[ + (p_{13})(p_{34}) = .124 \]

\[ r_{13} = p_{13} + (p_{12})(r_{23}) + (p_{14})(r_{34}) = .32 \]

\[ r_{12} = p_{12} + p_{13}[(p_{24})(p_{34}) + p_{23}] \]
\[ + p_{14}[p_{24} + (p_{23})(r_{34})] = .298 \]

\[ p_{12} = .229 \]
\[ p_{13} = .316 \]
\[ p_{14} = -.110 \]
\[ p_{23} = .249 \]
\[ p_{24} = .083 \]
\[ p_{34} = .577 \]
Table 17, continued.

\[ r_{34} = .577 = .577 \]
\[ \text{DE} = \text{TE} \]

\[ r_{24} = .083 + (.249)(.577) = .2266 \]
\[ \text{DE} + \text{IE} = \text{TE} \]

\[ r_{23} = .249 + (.083)(.577) = .2968 \]
\[ \text{DE} + \text{NC} = \text{TE} \]

\[ r_{14} = -.11 + (.229)(.083) + (.229)(.249)(.577) \]
\[ \text{DE} + \text{NC} + \text{NC} \]
\[ + (.316)(.577) = .124 \]
\[ + \text{IE} = \text{TE} \]

\[ r_{13} = .316 + (.229)(.296) - (.11)(.577) = .32 \]
\[ \text{DE} + \text{IE} + \text{NC} = \text{TE} \]

\[ r_{12} = .229 + .316[(.083)(.577) + .249] \]
\[ \text{DE} + \text{IE} \]
\[ - .11[.083 + (.249)(.577)] = .298 \]
\[ + \text{NC} = \text{TE} \]

DE = direct effect
IE = indirect effect
NC = noncausal component
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$R^2 = .108$

Path coefficients = standardized regression coefficients

SIGN = subject's perception of feedback favorability
PAF = subject's perception/acceptance of feedback
P2 = Performance 2 Mean Score

Figure 9

Hypothesized Path Model Without Behavioral Intentions (DIR)
Feedback & Performance

SIGN (4)  
\[ e_{2.953} \]
\[ .083 (ns) \]
\[ -.11 (ns) \]
\[ .577 \]

PAF (3)  
\[ \epsilon_{3.817} \]

DIR (2)  
\[ .249 \]
\[ .229 \]

P2 (1)  
\[ e_{.919} \]
\[ .316 \]

\[ R^2 = .156 \]
path coefficients = standardized regression coefficients

SIGN = subject's perception of feedback favorability
PAF = subject's perception/acceptance of feedback
DIR = subject's desire/intention to respond to feedback
P2 = Performance 2 Mean Score

Figure 10
Path Model Including Behavioral Intentions (DIR)
subsequent performance ($p_{31} = .316$) as does DIR ($p_{32} = .184$). However, in opposition to the hypothesis, the total effects of PAF on subsequent performance ($r_{13} = .321$) are greater than the total effect of DIR on subsequent performance ($r_{12} = .299$). Even so, by including a measure of the subjects' desires and intentions to change future performance (DIR), an additional 5% of the variance in performance 2 is accounted for.

Overall then, unlike the true sign of favorability information, it appears that the subjects' own perception of feedback favorability information does indirectly contribute to subsequent performance improvement by affecting their perceptions and acceptance of the feedback information, and subsequent behavioral plans for future performance. Also, although the subjects' perceptions and acceptance of feedback information has a greater total effect on subsequent task performance, by adding the subjects' behavioral plans to the model,
additional variance in subsequent performance can be accounted for.
V. Discussion and Conclusions

The purpose of the present research was to examine the relationship between task based performance feedback, performance feedback characteristics, behavioral goals, and subsequent task performance. Conclusions drawn from previous research seem to emphasize the importance of feedback message characteristics in positively influencing subsequent task performance, however this research overlooks the potential contribution to subsequent performance made by feedback message content. Also, previous research does not use direct measures of performance, claiming instead that behavioral change intentions are an appropriate proxy measure for actual behavioral change. Lastly, previous research appears to be undertaken without attempts to integrate research findings with present feedback models. The results of the present study provide an interesting rebuttal to conclusions based on prior research results.
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The first consideration in the present study concerns the feedback manipulation: was the feedback successful in altering subsequent task performance? All indications seem to lead to an affirmative response. Not only did the feedback message alter later task performance, the feedback message appears to have had a positive impact on subsequent performance. The one-way ANOVA (group by score) indicated a difference between groups ($F_{5,130} = 6.75; \ p < .0001$) but did not specify where the differences between groups occurred.

The specific relationships between groups were examined through use of simple a priori contrasts. By using the contrasts, it was demonstrated that the control group (Group 6), which did not receive any feedback message, was significantly different from the experimental groups (Groups 1, 2, 3, and 4; $\chi^2 = 223.71; \ p < .0001$) and from the no feedback control group (Group 5) which received, feedback information without favorability information ($\chi^2 = 127.28; \ p < .0001$). Clearly then, the control groups' mean task performance is different from the task performance of all the
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feedback groups. However, the key relationship demonstrating the effectiveness of the feedback message content was the contrast between the feedback control group and the experimental groups, which did not yield a significant difference ($t^2 = .93; p = .33$). Since groups 1, 2, 3, 4, and 5 all received feedback information, and their mean performance scores were not different from one another but were different from the no feedback control group, it appears that feedback message manipulation was successful in improving subsequent task performance.

However, additional support for the effectiveness of the feedback manipulation comes from the independent analyses of other classification variables, including performance 1 score. There were no significant differences between any of the groups based on the subject's gender ($F < 1$), the experimenters ($F < 1$), the feedback agents ($F < 1$), or knowledge of the true purpose of the experiment ($F < 1$). In fact then, the only observed difference between groups was whether or not subjects received task based performance feedback.
One aspect of the effects of feedback on subsequent task performance is particularly interesting: performance, in the present study, was improved (performance one scores were constrained to 0 or 1) whether or not the subjects perceived receiving any feedback information. Specifically, subjects in the feedback control group (5) appeared to be confused by the absence of favorability/sign information during their feedback session. In this group, more subjects than not reported that they did NOT receive feedback, yet the group had a significantly higher mean performance 2 score than the control group (2.9 v. 1.4), and a smaller standard deviation (1.7 v. 2.8). Moreover, the descriptive statistics for the feedback control group did not differ significantly from the experimental groups, whose subjects overwhelmingly acknowledged receiving feedback. Obviously then, subjects were able to make use of feedback message content to improve task performance, even when they were not aware of receiving performance feedback.

Future research in performance feedback needs to examine why feedback can influence performance when
Feedback & Performance

subjects are unaware of receiving feedback. Are subject individual differences or feedback message content or feedback characteristics operating here?

The distinguishing features between experimental groups in the present study were characteristics of the feedback message: favorability of feedback information (positive or negative) and the consistency of this sign information within a single feedback session (consistent or not). The results of earlier studies, particularly Stone and Stone's (1984, 1985) research, suggests a clear improvement in projected future task behavior based on these manipulations. However, results from the present study fail to support Stone and Stone's results. Results of the present study indicate that neither positive nor negative favorability information differentially influence subsequent task performance. Even favorability information that was inconsistent within a single feedback session did not differentially effect subsequent task performance.

There are several possible explanations for the discrepancy between Stone and Stone's results and the
results of the present study. It could be argued that the different results are due to the different number of feedback agents in the two studies. Stone and Stone used 2 different feedback agents to deliver feedback information, whereas the present study employed a single feedback agent. Stone and Stone suggest that the differences in predicted performance for their groups lay in the fact that their subjects were more likely to discount the expertise and/or accuracy of the agent delivering less favorable information in experimental groups receiving inconsistent favorability information. Subsequently, subjects who received inconsistent feedback discounted the negative favorability information and were less likely to make plans for future performance behavior change.

In the present study, the consistency manipulation caused subjects to make a more difficult choice than in Stone and Stone's research. It was not a matter of whether or not to believe one source over another, but a matter of believing one part of the information from a single source over another part of the information from
the same feedback source. In the present study, subjects did not automatically reject inconsistent information but apparently used all the information available to them (feedback message content and characteristics) to improve task performance. In essence then, the question is which experimental protocol best represents "real world" conditions.

In their conceptualization of the feedback process, Campion and Lord (1982) highlight the active nature of the feedback process. Ashford and Cummings (1983) make the same point using terms such "feedback seeking behavior" and "information seeking behavior." Finally, Ilgen, et. al. (1979) suggest this same idea, albeit more subtly, through their discussion of the "process" of feedback. A common theme in these feedback models is that the feedback recipient is an active information seeker. To accept Stone and Stone's explanation for the differential effects of inconsistent sign information on predicted subsequent behavior, one would also have to accept that the first act of the feedback recipient is to discard information. Yet all feedback process models
suggest that the first action of the feedback recipient is to gather as much information as is available, and then to evaluate the information. I believe Stone and Stone's interpretation of their results too quickly dismisses the 'process' nature of feedback and places too much importance on a single characteristic of the feedback message. Indeed, the present results suggest that the worker first attends to several components of the feedback message before discarding any information.

Another explanation for the different results obtained in earlier studies and the present one, centers on the nature of the tasks used. Earlier studies have used primarily cognitive tasks, such as managerial inbaskets; or limited dimension tasks, such as molecule building. These types of tasks do not readily lend themselves to behavioral analysis or behavioral feedback. The present study employed a multidimensional behavioral task. Thus performance feedback could be targeted to demonstrable task behaviors. Subjects may have been better able to apply feedback information in the present study because the message emphasized task behaviors.
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A final explanation for the discrepancy between earlier results and the present results lies in the difference in dependent measures. Many of the earlier studies, including Stone and Stone, have relied on the subject's own predictions about their own future task performance rather than using actual subsequent task performance. In other words, subjects are asked to predict their own behavior change. Given the experimental environment of laboratory studies, one could suggest that subjects are self-serving by predicting performance improvement.

For example, in the present study all of the subjects responded in the self-report questionnaire that they had tried "hard" or "very hard" on both their task performances of the library-sort task. This suggests that if the subjects were asked how they thought they would perform on yet another trial, they would respond in the same manner (predicting an improvement) regardless of feedback message characteristics. That is, subjects do not appear to be able to differentiate between how they expect to perform and their actual
performance. Yet, in the present study, there were differences between how the subjects thought they performed and how trained behavior coders thought the subjects performed. Self-predictions regarding future behavior may not be as accurate as objective predictions as future behaviors. Stone and Stone did not objectively assess future performance.

Additionally, the difference between dependent measures used in earlier studies and that employed in the present study may be intensified by the type and nature of incentives offered to subjects. Earlier studies lack explicit descriptions of the incentives used. In the present study, subjects were told they could earn up to one-third of the available extra credit in psychology classes by participating in the experiment. Subjects were told that the amount of extra credit they earned would depend on their task performance. For some students, the incentives offered in the present study may have closely approximated "real world" incentives.

Given the differences between characteristics of previous studies and the present study, as discussed
above, I believe that the present study represents a stronger test of "real world" conditions on the effects of task based performance feedback on subsequent task performance. It seems especially important for future research to return to investigations of the effects message content on subsequent performance, either independently or conjointly with the assessment of the message characteristic effects. However, there are other fundamental concerns in task based performance feedback research which also need to be addressed.

For example, more research needs to be conducted centering on the effects of feedback content and characteristics in dynamic work environments. Specifically, the consistency of favorability information issue needs to be assessed via a direct test between multiple and single feedback sources giving both consistent and inconsistent favorability information. Additionally, future research needs standardized operational definitions of positive, neutral, and negative sign information. Also, attention should be given to generalizability of
dependent measures and incentives across studies. Lastly, future performance feedback research should attempt integration with existing feedback models.

With regard to feedback models, results of the present study support components and causal direction specified by the Ilgen, et al. (1979) model, as tested in hypotheses 3 and 4. Although the Ilgen model was singled out for this study, the point was noted earlier that the present feedback models should be viewed as complimentary, rather than competitive, explanations of the feedback process. For example, the notion of individual difference characteristics playing a role in subsequent task performance is common to all the models discussed in Chapter II (Ilgen, et al.; Ashford & Cummings, 1983; and Taylor, et al., 1984). Although the present study was unable to differentiate between all four components in the Ilgen, et al. (1979) feedback processing step, it was demonstrated that the combined indices of feedback perception/acceptance and desires/intentions to respond to feedback aid in the explanation of subsequent task performance ($R^2 = .15$).
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Additionally, a major component of desires and intentions to respond to feedback was identified as self-set behavior goals \( (r = .299) \), as predicted in Locke's goal setting theory. However, in this study, the subject's perception and acceptance of feedback had an even greater impact on subsequent performance \( (r = .321) \).

As Erez (1977) and other goal setting-feedback interactionists (cf: Beck, 1978; Kimm & Hamme, 1976) have suggested, perhaps it is the interaction of goal setting and performance feedback which impacts subsequent performance. Goal setting in the present study was defined quite conservatively as the subject's articulated behavioral plans for future performance, which may have attenuated the relationship between desires and intentions to respond to feedback (DIR) and performance 2 mean scores. Future research needs to specifically examine the goal setting-feedback interaction.

Unpredicted by Stone and Stone's performance feedback research, and the feedback models, in the present study subjects' perception of feedback
favorability information (not the actual favorability information) significantly contributed to their perception and acceptance of the feedback message ($r = .577$). As a significant, indirect component of subsequent task performance, perceptions of favorability information need to be incorporated into the feedback model. Future research needs to explore message dimensions which are differentially perceived by subjects as positive or negative favorability information. Also, future research needs to explore the variables that create differences between the subject's perception of feedback favorability and the actual favorability information. For example, Biddle and Fisher (1987) suggest that educational level may be a significant component in worker response to performance appraisal interviews. Since task based performance feedback is an integral component of many performance appraisal interviews, it is not unreasonable to suggest that educational level may also affect perception of feedback message characteristics.
The present research strongly supports the notion of feedback recipients as active information seekers, highly motivated to seek out task performance feedback information, as suggested by current feedback models (cf: Ashford & Cummings, 1982). The present research also supports the perspective of the worker actively involved in a comparison process involving both self-set and other-set performance standards (Taylor, et al., 1984; Campion & Lord, 1982). Future research needs to assess the processes involved in setting personal performance standards and then interface these results with feedback message content results from performance feedback research.

In conclusion, the domain of task based performance feedback is not a closed book. Results of the present research suggest that feedback research needs to redirect attention to the contents of the feedback message, identifying the content characteristics which produce performance improvement. Future research needs to combine the effects of message content with message characteristics, rather than continuing the independent
investigation of message characteristics. Also, future research needs to incorporate its design and results within the framework of current feedback models. Especially important is advancing the exploration of the role of the individual worker in creating his or her own performance responses to task based performance feedback.
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416-425.

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Appendix A: Journal Titles
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American Journal of Psychology
American Psychologist
Applied Psychological Measurement
Behavior Analysis and Modification
Behaviorism
Behavior Modification
Behavior Research Methods and Instrumentation
Clinical Psychologist
Cognitive Psychology
Cognitive Therapy and Research
Contemporary Psychology
Journal of Analytical Psychology
Journal of Applied Psychology
Journal of Cross Cultural Psychology
Journal of General Psychology
Journal of Personality
Journal of Personality Assessment
Journal of Psychology
Organizational Behavior and Human Performance
Perception and Psychophysics
Personality and Social Psychology Bulletin
Psychoanalytic Quarterly
Psychological Bulletin
Psychological Record
Psychological Reports
Psychological Review
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Appendix B: Journal Title Groups
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American Journal of Psychology
Summer 1987, Volume 100, Number 2
Fall 1987, Volume 100, Number 3
Winter 1987, Volume 100, Number 4
Spring 1988, Volume 101, Number 1
Summer 1988, Volume 101, Number 2
Fall 1988, Volume 101, Number 3
Winter 1988, Volume 101, Number 4
Spring 1989, Volume 102, Number 1
Summer 1989, Volume 102, Number 2
Fall 1989, Volume 102, Number 3

American Psychologist
December 1986, Volume 41, Number 12
January 1987, Volume 42, Number 1
February 1987, Volume 42, Number 2
March 1987, Volume 42, Number 3
April 1987, Volume 42, Number 4
May 1987, Volume 42, Number 5
June 1987, Volume 42, Number 6
July 1987, Volume 42, Number 7
August 1987, Volume 42, Number 8
September 1987, Volume 42, Number 9

Applied Psychological Measurement
September 1986, Volume 10, Number 3
December 1986, Volume 10, Number 4
March 1987, Volume 11, Number 1
June 1987, Volume 11, Number 2
September 1987, Volume 11, Number 3
December 1986, Volume 11, Number 4
March 1987, Volume 12, Number 1
June 1987, Volume 12, Number 2
September 1987, Volume 12, Number 3
December 1986, Volume 12, Number 4
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Behavior Analysis and Modification

April 1981, Volume 4, Number 4
May 1981, Volume 4, Number 5
June 1981, Volume 4, Number 6
July 1981, Volume 4, Number 7
August 1981, Volume 4, Number 8
September 1981, Volume 4, Number 9
December 1981, Volume 4, Number 12
January 1982, Volume 5, Number 1

Behaviorism

Spring 1986, Volume 14, Number 1
Summer 1986, Volume 14, Number 2
Fall 1986, Volume 14, Number 3
Winter 1986, Volume 14, Number 4
Spring 1987, Volume 15, Number 1
Summer 1987, Volume 15, Number 2
Fall 1987, Volume 15, Number 3
Winter 1987, Volume 15, Number 4
Spring 1988, Volume 16, Number 1
Summer 1988, Volume 16, Number 2

Behavior Modification

October 1987, Volume 11, Number 4
January 1988, Volume 12, Number 1
April 1988, Volume 12, Number 2
July 1988, Volume 12, Number 3
October 1988, Volume 12, Number 4
January 1989, Volume 13, Number 1
April 1989, Volume 13, Number 2
July 1989, Volume 13, Number 3
October 1989, Volume 13, Number 4
January 1990, Volume 14, Number 1
Behavior Research Methods and Instrumentation

July 1972, Volume 4, Number 4
September 1972, Volume 4, Number 5
November 1972, Volume 4, Number 6
January 1973, Volume 5, Number 1
March 1973, Volume 5, Number 2
May 1973, Volume 5, Number 3
July 1973, Volume 5, Number 4
September 1973, Volume 5, Number 5
November 1973, Volume 5, Number 6
January 1974, Volume 6, Number 1

Clinical Psychologist

Winter 1982, Volume 35, Number 4
Spring 1983, Volume 36, Number 1
Summer 1983, Volume 36, Number 2
Fall 1983, Volume 36, Number 3
Winter 1983, Volume 36, Number 4
Spring 1984, Volume 37, Number 1
Summer 1984, Volume 37, Number 2
Fall 1984, Volume 37, Number 3
Winter 1984, Volume 37, Number 4
Spring 1985, Volume 38, Number 1

Cognitive Psychology

July 1985, Volume 17, Number 3
October 1985, Volume 17, Number 4
January 1986, Volume 18, Number 1
April 1986, Volume 18, Number 2
July 1986, Volume 18, Number 3
October 1986, Volume 18, Number 4
January 1987, Volume 19, Number 1
April 1987, Volume 19, Number 2
July 1987, Volume 19, Number 3
October 1987, Volume 19, Number 4
Feedback & Performance

Cognitive Therapy and Research
October 1984, Volume 8, Number 5
December 1984, Volume 8, Number 6
February 1985, Volume 9, Number 1
April 1985, Volume 9, Number 2
June 1985, Volume 9, Number 3
August 1985, Volume 9, Number 4
October 1985, Volume 9, Number 5
December 1985, Volume 9, Number 6
February 1986, Volume 10, Number 1
April 1986, Volume 10, Number 2

Contemporary Psychology
April 1981, Volume 26, Number 4
May 1981, Volume 26, Number 5
June 1981, Volume 26, Number 6
July 1981, Volume 26, Number 7
August 1981, Volume 26, Number 8
September 1981, Volume 26, Number 9
October 1981, Volume 26, Number 10
November 1981, Volume 26, Number 11
December 1981, Volume 26, Number 12
January 1982, Volume 27, Number 1

Journal of Analytical Psychology
October 1979, Volume 10, Number 10
November 1979, Volume 10, Number 11
December 1979, Volume 10, Number 12
January 1980, Volume 11, Number 1
February 1980, Volume 11, Number 2
March 1980, Volume 11, Number 3
April 1980, Volume 11, Number 4
May 1980, Volume 11, Number 5
June 1980, Volume 11, Number 6
July 1980, Volume 11, Number 7
Journal of Applied Psychology
February 1972, Volume 56, Number 1
May 1972, Volume 56, Number 2
September 1972, Volume 56, Number 3
December 1972, Volume 56, Number 4
February 1973, Volume 57, Number 1
May 1973, Volume 57, Number 2
September 1973, Volume 57, Number 3
December 1973, Volume 57, Number 4
February 1974, Volume 58, Number 1
May 1974, Volume 58, Number 2

Journal of Cross Cultural Psychology
September 1987, Volume 15, Number 3
December 1987, Volume 15, Number 4
March 1988, Volume 16, Number 1
June 1988, Volume 16, Number 2
September 1988, Volume 16, Number 3
December 1988, Volume 16, Number 4
March 1989, Volume 17, Number 1
June 1989, Volume 17, Number 2
September 1989, Volume 17, Number 3
December 1989, Volume 17, Number 4

Journal of General Psychology
June 1986, Volume 114, Number 2
September 1986, Volume 114, Number 3
December 1986, Volume 114, Number 4
March 1987, Volume 115, Number 1
June 1987, Volume 115, Number 2
September 1987, Volume 115, Number 3
December 1987, Volume 115, Number 4
March 1988, Volume 116, Number 1
June 1988, Volume 116, Number 2
September 1988, Volume 116, Number 3
### Journal of Personality

- **September 1983**, Volume 51, Number 3
- **December 1983**, Volume 51, Number 4
- **February 1984**, Volume 52, Number 1
- **March 1984**, Volume 52, Number 2
- **September 1984**, Volume 52, Number 3
- **December 1984**, Volume 52, Number 4
- **February 1985**, Volume 53, Number 1
- **March 1985**, Volume 53, Number 2
- **September 1985**, Volume 53, Number 3
- **December 1985**, Volume 53, Number 4

### Journal of Personality Assessment

- **August 1976**, Volume 40, Number 8
- **September 1976**, Volume 40, Number 9
- **October 1976**, Volume 40, Number 10
- **November 1976**, Volume 40, Number 11
- **December 1976**, Volume 40, Number 12
- **January 1977**, Volume 41, Number 1
- **February 1977**, Volume 41, Number 2
- **March 1977**, Volume 41, Number 3
- **April 1977**, Volume 41, Number 4
- **May 1977**, Volume 41, Number 5

### Journal of Psychology

- **September 1971**, Volume 9, Number 9
- **October 1971**, Volume 9, Number 10
- **November 1971**, Volume 9, Number 11
- **December 1971**, Volume 9, Number 12
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Appendix C: Greeting the Subjects Script
Feedback & Performance

Characters in the Script:
1. Experimenter (E; Behavior Coder)
2. Performance Rater (PR; Feedback Agent)
3. Performer (P; Subject)

Order of events in the experimental setting:
1. E greets the P.
2. E introduces P to PR and excuses self.
3. PR describes task to P and supervises completion of the consent form.
4. PR supervises trial performance.
5. PR video tapes (monitors) first performance.
6. E codes first performance (0, 1) for task behaviors and informs PR:
   a. If P remains in the study.
   b. If P performed any of the task behaviors.
   c. Which task behavior(s) P performed.
7. PR assigns P to the appropriate experimental or control group.
8. PR gives appropriate feedback message to P.
9. PR takes P to the Tinker Toy area.
10. PR gives first questionnaire (page 1) to P.
11. E gives P directions for the Tinker Toy assembly task and supervises this task.
12. PR returns P to experimental room after completing Tinker Toy assembly task.
14. PR supervises completion of the second questionnaire.
15. PR debriefs P.
16. E supervises completion of extra credit forms.
Experimenter (E) greeting the performer (P):

Hi. I'm _____ (E's name), the experimenter for the library-sort task study.
Are you _____? (check P's name on schedule)
And what's your social security number? (check schedule)
Please follow me (down here) and we'll get started.

E introduces performer to performance rater (PR/FA):
_____ (P), I'd like you to meet _____ (PR), who is the expert performance rater in this study.

[PR to P: (Hi.)]

_____ (PR) and I will be presenting information to you throughout the experiment from these [show script] written directions. The information is written down for standardization purposes, which means that all subjects receive the same directions.

_____ (PR) will be viewing your task performance on the video monitor in the next room, and after you have finished, she may suggest ways for you to improve your performance.

_____ (PR) is an advanced undergraduate student who has been doing research of this kind for almost a year. For the past 2 semesters, she has been taking special coursework in task performance appraisal and she helped to design this task.

_____ (PR) is considered to be an expert on performance appraisal.

_____ (PR) will explain the study to you and I'll be back later.
Appendix D: Task Directions Script
While the E is greeting the P in the waiting room, the PR is loading the video cartridge in the video camera and reading the experimental room for the study.

PR giving directions to the performer (P):

A major research library has asked us to work in conjunction with them to determine the best and fastest methods for returning library materials used by patrons back to the correct locations within the library. This type of study is called a "task analysis". In our study, we have devised a library-sort task to get an idea of how different people go about this reshelving procedure, and how long it will take them to do a specific amount of work.

The library-sort task involves taking the journal title pages, like this one,

[Hand top page from trial packet to performer to look over.]

from these 6 boxes,

[Point to boxes in the storage cabinet.]

and sorting the title pages, the way they do in the library: placing the journals on the correct shelves in these 2 bookcases.

[Point to bookcases.]

In the library (you know) journals are ordered by their date, by the alphabet, by the title of the journal, by the issue number, and by other such information. We have set it up so that the first bookcase holds journals beginning with the letter "A" and continues through some of the "J's". For example, the first title in this bookcase is the "American Journal of Psychology" and the last title is the "Journal of Applied Psychology".

[Point to the appropriate shelves in the appropriate bookcase.]

The second bookcase holds the rest of the alphabet: the remaining "J's", beginning with the "Journal of Cross Cultural Psychology", and ending with the journal called "Psychological Review".
Feedback & Performance

[Point to the appropriate shelves in the appropriate bookcase.]

As you know, we will be videotaping all your performances of this task, except the trial performance. Later on we will analyze the different ways people approach this task by reviewing the video tapes. These videotapes will not be shown to anyone unconnected with this study, but they may be used in later research. After you have done the task two different times, we would like you to answer some questions and fill out your extra credit sheets in another room.

One more thing. You can earn up to 3 extra credit points for participating in this study. The actual amount of extra credit you receive will be determined by how well you work. That is, your extra credit depends on how quickly and accurately you perform the task.

Do you have any questions?

[If the P does have specific questions, the PR may reread the pertinent sections of the directions. The PR may not add or detract any information from the written directions. After all questions are answered, PR says:]

Please read over the consent form for this study, and then sign it. I'll witness your signature.

We've developed a trial run to help you get the hang of this task. We have a set of journal title pages [hand the trial pages to the P] that you can use for practice. Remember, the journals must be ordered by the date, by the alphabet, by the journal title, by the issue number, and so on. Also, remember that the first bookcase begins with the "American Journal of Psychology" and ends with the "Journal of Applied Psychology".

[Point to the appropriate shelves in the appropriate bookcase.]
The second bookcase begins with the "Journal of Cross Cultural Psychology" and ends with the "Psychological Review".

[Point to the appropriate shelves in the appropriate bookcase.]

Do you have any questions?

You may go ahead and start.

PR checks the video equipment during the practice trial; be sure to check film footage. P gets 2 minutes on the practice trial.

That's "time" on the practice trial. Are you getting the idea? Do you have any questions?
[Refer to question directions above.]

[PR collects all the practice materials while answering any questions about the task procedure.]

Okay, lets start the first performance. This performance, and the next one, will be videotaped. The journal title pages for this performance are in these 6 boxes.

[Point to the appropriate boxes.]

You may begin when I say "go".

[PR turns on the video equipment.]

Go!

[PR leaves the experimental room. E monitors task performance on the video monitor in another room.]
Appendix E: Feedback Messages Script
(and Behavioral Checklist)
Feedback & Performance

Feedback Messages

PR will enter the experimental room and deliver the appropriate debriefment to Ps who are dropped. Ps retained in the study will receive the appropriate feedback message. The no message control group spends an equal amount of time with the PR, but they do not discuss the task or the experiment.

G1(++): Overall, you did very well. In fact, you performed in the 85th percentile of all people performing this task for the first time. However, you can still improve your task performance if you ....

3 task behaviors/feedback statements

Again, you performed very well. Still, there are some additional ways to improve your performance. For example ....

3 task behaviors/feedback statements

G2(--) : Overall, you did not do very well. In fact, you performed in the 15th percentile of all people performing this task for the first time. However, you can still improve your task performance if you ....

3 task behaviors/feedback statements

Since your performance was very poor, some additional ways to improve your performance are ....

3 task behaviors/feedback statements
G3(+ -): Overall, your performance was mixed. Part of your performance was very good, in the 85th percentile of all people performing this task for the first time. But part of your performance was very poor, in the 15th percentile of task performances. You can improve your overall task performance by ....

3 task behaviors/feedback statements

Since you performance was mixed, part of it being very good and part of it being very poor, some additional ways to improve your performance are ....

3 task behaviors/feedback statements

G4(- +): Overall, your performance was mixed. Part of your performance was very poor, in the 15th percentile of all people performing this task for the first time. But part of your performance was very good, in the 85th percentile of task performances. You can improve your overall task performance by ....

3 task behaviors/feedback statements

Since you performance was mixed, part of it being very poor and part of it being very good, some additional ways to improve your performance are ....

3 task behaviors/feedback statements

Feedback Control Group:
Some people perform this task by using this procedure ....

6 task behaviors/feedback statements
Feedback Statements (Task Elements):

After eliminating one feedback statement (either by random elimination or because that was the behavior emitted by the P), the remaining 6 statements are divided into 2 cluster of 3 statements. The clusters will be randomly presented to the P.

1. Collect all the title pages from all the boxes before you begin to do any sorting.

2. Remove the boxes from the storage cabinet, turn them over, and create a large work surface for sorting.

3. Sort the journal title pages into title groups before sorting them in any other way.

4. Sort the journal title pages into alphabetically ordered groups, before sorting by any other information on the title page.

5. Sort the journal title pages by date, number, or issue information as the last sorting task. The most recent title page should be on top of each title group.

6. Separate and collect all the journal title page groups that belong in the first bookcase, carry these groups to that bookcase, and then place the title groups on the correct shelves. Do the same for title page groups belonging in the second bookcase.

7. Check your finished work for sorting and/or shelving errors.
To all Ps:

Do you have any questions?

[If the P does have specific questions, the PR may reread the pertinent sections of the feedback message. The PR may not add or detract any information from the written feedback message.]
Feedback & Performance

Appendix F: Distractor Task Script
Performance Rater:
Next, we'd like to you answer a few questions and then we've set up a small assembly task for you, in an area down the hall. This way ....

[PR leads P done the hall to the Tinker Toy area.]

Please have a seat. Please answer these questions as completely as you can.

[Give P the first questionnaire and a pencil.]

When you have finished _____ (E) will help you to start the assembly task.

Experimenter:
Hi. How's it going so far?

[Listen to a brief response.]

Now we would like you to build this

[show pictures to P]

Tinker Toy model. Although this task will be timed, the key element is accuracy. Make sure your finished product looks EXACTLY like the picture.

Any questions? Go ahead and start.
Appendix G:  Task Performance 2 Script
Performance Rater:
[Enter the Tinker Toy assembly area quietly, but in view
of the P. Glance at timepiece for a few seconds.]

Time's up on the assembly task. We've set up another
trial of the library-sort task for you in the other
room. Please follow me.

[Return to the experimental room.]

We've put some new title pages in the boxes here.
[point to the 6 boxes in the
storage cabinet]

Otherwise, the task is exactly the same as the first
time. Do you have any questions? When I say "go" you
may begin.

[PR starts the video taping.]

GO!

[After P completes the second performance, PR returns to
the experimental room.]

Thank you for your time. If you will return to the
Tinker Toy assembly area, we have another brief
questionnaire for you to fill out. When you have
finished this questionnaire, ______ (E) will help you
fill out your extra credit sheets.

[PR takes P to the Tinker Toy area.]

Please have a seat. [Hand P the second questionnaire
and a pencil.]

Please answer all the questions asked on this question-
naire which pertain to YOUR experience with the library-
sort task. Please answer the questions in the exact order
they are asked. If you finish the questionnaire before I
return, please sit quietly and wait for me.

[PR leaves the P to complete the questionnaire. When P
has completed the questionnaire, PR returns to debrief
the P.]
Feedback & Performance

Appendix H: Subject Debriefing Script
[When P has completed the questionnaire, PR returns to debrief the P.]

Thank you for participating in our study.....

[appropriate debriefment]

PR debriefment for Ps completing two task performances and the self-report questionnaire.

The true purpose of this experiment was to assess the effects of task feedback on subsequent task performance. We are interested in finding out how task feedback may actually change subsequent worker performance on a specific task.

In reality, the task was designed so that NO ONE could successfully complete it on the first performance. Therefore, the feedback you were given was randomly determined and does NOT reflect your real abilities. The performance feedback you received does NOT reflect your actual performance on the library-sort task.

In order to increase the motivation of our subjects, we told them that they could earn 1 to 3 extra credit points, based on their task performance. You will receive 3 extra credits points for your participation in this study.

In order to preserve the validity of our manipulations for future subjects, we ask that you do not discuss the nature or any part of this study with any one, except the experimenters.

Do you have any questions?

Thank you very much for your participation in this study.
Feedback & Performance

PR debriefment for each P dropped from the study after completing only the first performance.

The true purpose of this experiment was to assess the effects of performance feedback on subsequent task performance. We are interested in finding out how performance feedback may actually change subsequent performance on a specific task.

At this time we are unable to continue to use you as a subject in this experiment. However, you will receive 3 extra credit points for participating this far in the study.

In order to preserve the validity of our manipulations for future subjects, we ask that you do not discuss the nature or any part of this study with any one except the experimenters.

Do you have any questions?

Thank you very much for your participation in this study.

____(E) will help you fill out the extra credit sheets now. Please wait quietly for her. Thank you again.

[PR leaves P. E enters and gives directions for completing the extra credit opscans. E notes whether extra credit is given in Intro Psych, or another Psych course. E escorts P out of the experimental area.]

Thank you for participating in our study. Have a good evening.
Appendix I: Statement of Informed Consent*

*Text printing reduced 10%.
Feedback & Performance

Experiment # 3083-89

Consent Form

Subject #

Virginia Polytechnic Institute and State University

Social Security # __ __ __ __ __ __

By signing this form I, ______________________________, agree to participate in the Library Sort Task Experiment. I understand that this study involves learning to do and performing the library sort task. I understand that my task performance will be videotaped and the tapes will be viewed by task evaluators. I understand that the video tapes will be viewed only by people connected with this study or with future experimental studies. I understand that my identity will be protected but that the tapes must be kept for a minimum of 5 years after publication of the research.

I understand that by participating in this experiment I will receive extra credit in the Psychology course in which I am currently enrolled. I understand that I may withdraw my participation from this experiment without jeopardizing my extra credit points.

Signature: ______________________________ Date: _____

Witness: ______________________________ Date: _____

If you have any concerns regarding the research, you may contact the researcher, the faculty sponsor, or the Institutional Review Board. Also, you may have a copy of this form for your records if you so request.

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Appendix J: Self-Report Questionnaire*

*Text printing reduced 10%.
Library-Sort Task Questionnaire

DIRECTIONS: Please answer each question. Some questions can be answered by circling the number that you feel best represents your answer. Other questions require you to write a sentence or two.

1. REGARDLESS of any feedback you MAY have received, to what extent did you try to perform well on the first performance of the library-sort task?

   1  2  3  4  5
not hard somewhat hard hard
at all hard

2. REGARDLESS of any feedback you may have received, how well do you think you performed the library-sort task, in comparison to others?

   1  2  3  4  5
well below average average well above average

3. REGARDLESS of any feedback you may have received, have YOU made any personal plans to change the way you do this task in the future?

   If yes, what are you going to change? If no, why not?
4. To what extent did you try to perform well on the second performance of the library-sort task?

1 2 3 4 5
not hard somewhat very
at all hard hard

5. In comparison to others, how well do YOU think you performed the library-sort task on the second performance?

1 2 3 4 5
well below average well above average
average

6. DID you receive any feedback about your first performance of the library-sort task?

Yes No

7. ACCORDING to the feedback you received, how well did you perform the library-sort task in comparison to others, on the first performance?

1 2 3 4 5
well below average well above average
average

8. ACCORDING to the feedback you received, which of the following percentile ranks best describes your first performance?

1 2 3 4 5
0 - 20th 21st-40th 41st-60th 61st-80th 81st-100th

9. If you received feedback on the first trial, how much do YOU agree with that feedback?

1 2 3 4 5
totally disagree somewhat totally agree agree
10. IF you received feedback on your first performance, what do you feel is the expertise level of the performance rater?

| 1. not at all expert | 2. somewhat expert | 3. very expert |

11. IF you received feedback on the first performance, was the feedback .... ?

neutral positive mixed negative

12. IF you received feedback on the first performance, how well (accurately) do YOU think that feedback describes your performance?

| 1. not at all accurate | 2. somewhat accurate | 3. very accurate |

13. IF you received feedback about your first performance, can you recall what that feedback was? Please write SPECIFIC feedback statements.
14. IF you received feedback, how credible was the performance rater?

|   | 1. not at all credible | 2. somewhat credible | 3. credible | 4. very credible |

15. How believable was the experimental cover story?

|   | 1. not at all believable | 2. somewhat believable | 3. believable | 4. very believable |

16. What was the main purpose of this study?

17. Do you think there were any other purposes to this study? If so, what do you think the other purposes were?
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