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Influence of Feedback Specificity and Simultaneous Goals on Task Performance

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Abstract

A laboratory experiment was conducted examining the influence of feedback specificity and simultaneous quantity and quality goals on the performance of an assembly task including the effect of feedback specificity on perceptual and behavioral measures of intrinsic motivation. The hypotheses were framed in terms of a traditional goal setting model and a control systems-goal conflict model. Neither model was supported for the quantity performance measure in that varying the specificity of quantity of performance feedback did not result in differential quantity of performance. The traditional goal setting model was supported based on results from the quality performance measure . These results were that quality performance was significantly higher in the presence of specific quality of performance feedback than in the presence of non-specific quality of performance feedback. The prediction based on the control systems-goal conflict model that the simultaneous quantity and quality goals would come into conflict and result in higher performance on one of the goals (as the result of the attention focusing property of specific performance feedback) at the expense of reduced performance on the other goal was not supported. The exploratory research hypotheses, that specific feedback would be viewed as autonomy supportive and would enhance intrinsic motivation, and that non-specific feedback would be viewed as controlling and would diminish intrinsic motivation, were not supported based on the results of the perceptual measures of intrinsic motivation; the exploratory hypotheses were supported based on the results of the behavioral measures of intrinsic motivation.

Influence of Feedback Specificity and Simultaneous Goals on Task Performance

The purpose of the present research is to investigate the effect of specificity of feedback and simultaneous quantity and quality goals on task performance. This research represents an attempt to more realistically represent in a laboratory experiment the multidimensional nature of tasks, and to improve on some methodological problems extant in past goal setting research investigating simultaneous or conflicting goals (Austin & Bobko, 1985). In the present study it is useful to view the goal setting motivational technique in a control systems theory framework. A control systems theory approach represents a more dynamic view of the goal setting process. This approach takes into account a greater degree of cognitive self-regulation on the part of the individual (Campion & Lord, 1982; Carver & Scheier, 1981, 1982; Powers, 1973). In addition to the primary focus of this study were various exploratory predictions based on intrinsic motivation research findings about the effects of controlling versus informational feedback on task interest, task satisfaction, and free-choice task persistence (Deci & Ryan, 1985, 1987).

In preparation to present the details of this experiment, the following topics will be addressed: goal setting as a cognitive theory of motivation; major findings from goal setting research; research on conflicting goals; measuring quality of performance; a control systems theory approach to goal setting; and intrinsic motivation research on controlling versus informational feedback. Following the presentation of these topics, the specific experiment will be presented along with hypotheses and the experimental methodology.

Goal Setting Theory of Motivation

Goal setting theory has been a widely researched cognitive theory of motivation (Austin & Bobko, 1985; Latham & Yukl, 1975a; Locke, 1968; Locke, Shaw, Saari & Latham, 1981; Steers & Porter, 1974). Motivation, as described by Steers & Porter

(1974), consists of energizing, directing, and maintaining components. In goal setting theory the energizing component is the goal an individual desires to achieve regarding the performance of some activity. The directing component is the feedback the individual receives regarding success, or lack thereof, in reaching the goal in mind. The maintaining component is the support the individual receives encouraging the continued target goal performance over time. That goal setting theory as a cognitive theory of motivation is related to a basic assumption of goal setting research, that "goals are immediate regulators of human action" (Locke et al., 1981, p. 126). Thus, the conscious directing of the contents of an individual's mind toward a specific goal regulates the behavior of the individual toward achieving that goal.

Goal Setting Research

Prior to, and especially following, Locke's (1968) article that defined and outlined goal setting research results to date, the study of goal setting and the associated boundary conditions has been a frequently researched topic. This fact is evidenced by several extensive literature reviews published since that time (Austin & Bobko, 1985; Latham & Yukl, 1975a; Locke et al.,1981; Steers & Porter, 1974). Much of the research performed since 1968 was designed to replicate or explore Locke's findings that when specific, difficult goals are set and accepted, and when feedback is provided, performance will be higher than when easy or ambiguous goals are set. The strength of the goal setting technique is further supported in a recent chapter by Latham and Lee (1986) in which a frequency count of studies supporting goal setting performance increases far outnumbered unsupportive studies. The volume of research into this topic indicates the importance researchers place on goal setting. Nonetheless, research into boundary conditions within

which goal setting is effective continues to be indicated (Austin & Bobko, 1985; Locke et al., 1981).

As stated above, specific findings revealed in the goal setting reviews show that specific, difficult goals increase performance more than moderately easy, easy, or "do your best" goals (Locke, 1968; Locke et al., 1981). Laboratory findings are based on tasks such as simple addition (Locke & Bryan, 1969b), chess (Campbell & Ilgen, 1976), and figure selection (Bavelas & Lee, 1978). Field studies have tested goal setting on tasks such as driving trucks (Latham & Baldes, 1975; Latham, Steele, & Saari, 1982), logging (Latham & Locke, 1975), and maintenance work (Ivancevich, 1977). Some studies have found that when specific, difficult goals are participatively set, performance increases (Latham & Yukl, 1975a), while others found mixed or no support (Ivancevich, 1976; Ivancevich, 1977; Latham & Yukl, 1976). Some studies have shown that it is necessary for feedback or knowledge of results to be provided for goal setting to improve performance (Erez, 1977; Feeney, 1973; Komacki, Barwick, & Scott, 1978; Latham & Kinne, 1974). Although most research on acceptance and commitment has not yielded any definitive results (Latham & Saari, 1979a, 1979b; London & Oldham, 1976; Oldham, 1975; Yukl & Latham, 1978), Erez and Zidon (1984) found support for their hypothesis that goal acceptance moderates the goal difficulty to task performance relationship. Their most notable finding was that of a negative, linear goal difficulty to task performance relationship when a goal is rejected.

Conflicting Quantity and Quality Goals

A dimension of goal content that has received little research attention is that of goal conflict. Goal conflict has been defined as "the degree to which attaining one goal negates

or subverts attaining another" (Locke et al., 1981, p. 127). With regard to conflicting goal research Austin and Bobko (1985) write:

> Goal setting research, with few exceptions, has focused on unidimensional quantity goals. Quality goals and multiple goals, which are logical outgrowths of a multivariate concept of criteria (Smith, 1976), have been infrequently examined in goal setting research. In turn, quantity and quality goals within the same task may lead to goal conflict-perceived or objective. Multiple goals (from multiple role sets, multiple supervisors, matrix management, etc.) also occur and could lead to conflict (Barton, 1981; Schoderbek, Schoderbek, & Kefalas, 1980). (p. 290)

This is one goal setting research issue that the present research has attempted to more deeply investigate.

Both Locke et al. (1981) and Austin and Bobko (1985) agree that further research into quality and conflicting goals is a necessary step in delineating boundary conditions within which goal setting operates. The necessity of conducting this type of research is even more compelling when one considers the concept of criterion deficiency (Brogden & Taylor, 1950; Nagle, 1953) as it relates to goal or task content. If there are both quantity and quality goal dimensions present in a particular task and only the quantity dimension is addressed, an important aspect of that task and its performance measurement has been lost. In the Austin and Bobko (1985) research review the authors submit that the lack of research into quality and conflicting goals is due in part to the difficulty in finding an appropriate measure of quality. They also identify some methodological problems apparent in what little research has been done in this area. First, some findings from research that has addressed quality and conflicting goals are presented.

As per Austin and Bobko's (1985) publication, at that time only a few studies had collected quality data (Bavelas & Lee, 1978; Jackson & Zedeck, 1982; Sorcher, 1967), and only two studies had actually examined quality goals (Sorcher, 1967; Terborg & Miller, 1978). Sorcher (1967) found that increased role training and responsibility, when paired with decreased repetitiveness, resulted in improvements in both quantity and quality. This study included participatively set quality goals. Terborg and Miller (1978) tested the effects of goals and incentives on effort and performance on a toy assembly task. The quantity goal was to complete 9 models. The quality goal was to earn 10 of 12 quality points as assigned by a rater. They found that goals affected quantity and quality performance in an additive manner, and that monetary incentives (one half of the subjects were paid on a piece-rate basis while the other half were paid on an hourly basis) affected only quantity performance. This is not too surprising, however, since the monetary incentives were based only on the quantity performance dimension. The latter piece of research appears supportive of other findings that money rarely prompts an increase in quality performance (Hechler & Wiener, 1974; Kessler & Wiener, 1972) suggesting the usefulness of setting quality goals to increase quality performance (Austin & Bobko, 1985).

Research by Bavelas and Lee (1978) set only quantity goals but measured both quantity and quality performance in an attempt to discover what happens to the quality of performance as a function of quantity goals. On an addition task, they found in interviews that subjects may have cognitively redefined the task. In three follow up studies they included measures of both quantity and quality in an effort to expose behavioral evidence that subjects were cognitively redefining the tasks (word uses, figure selection, and estimation of sums). They concluded that subjects may have used the assigned quantity goal as a cue to determine a quantity-quality trade-off.

Austin and Bobko (1985) stated that although the studies done by Bavelas and Lee (1978) showed that quality of performance can be affected by quantity goals, and that quality performance can be operationalized in a wide variety of ways, there were some design issues that, if improved upon, could guide and enhance future research on this topic. One issue pointed out was that although Bavelas and Lee (1978) used several approaches to measure quality of performance, no quality goals were set, and feedback was not provided. These are important conditions that should be included in future research. The setting of specific, difficult quantity and quality goals with feedback provided will enable a more accurate comparison of how goal setting affects quantity versus quality performance. These specifications have been built into the design of the present study.

Another issue raised by Austin and Bobko (1985) was the possibility that focusing on only quantity goals could prime subjects to attend only to the quantity dimension of a task and attend less to the quality dimension. They write, "If goals are viewed as attentional controls, attention focused on the quantity goal may cause other dimensions of performance (e.g. quality) to suffer" (Austin & Bobko, 1985, p. 293). This point further supports the necessity to set concrete quantity and quality goals. If this is done it will be possible to examine the effects of attention being focused on simultaneous, possibly conflicting goals (perceived or objective). If there can truly be a cognitive trade-off between quantity and quality goals, it would be under these improved methodological conditions that such a discrepancy would be most meaningful.

In an unpublished thesis, Whitenack (1984) investigated the effect of simultaneous quantity and quality goals on the performance of simple addition problems. He wanted to see if there would be performance increases on both the quantity and quality task dimension, or, if there would be a trade-off with increased performance on one goal dimension at the expense of decreased performance on the other. A positive aspect of this

experiment was that it attempted to include the essential characteristics of acceptance, difficulty, specificity, and feedback which are necessary for effective goal setting. Also included was one condition in which concrete quantity and quality goals were both set. The results indicated a main effect for both quantity and quality performance increases. These results were supportive of Locke's (1982) traditional position that goal setting can facilitate performance increases even if simultaneous goals are set for different performance dimensions. The results were non- supportive of the role-conflict hypothesis which predicted a performance trade-off. Some difficulties within this study that might explain why the predicted trade-off did not occur will now be addressed.

A major reason that the predicted trade-off did not occur may have been due to the nature of the task. The task of solving simple addition problems provides little opportunity for differing task strategies to come into conflict as is often the case with more complicated sensory-motor types of tasks. That is to say, the goals of solving addition problems quickly and accurately did not appear to be perceived by subjects as conflicting. Another difficulty with this experiment was that rated task difficulty was low, so subjects did not appear to perceive this task as difficult. Therefore, due to the characteristics of the task and low perceived task difficulty, the predicted quantity-quality trade-off did not occur. In the current study this problem was addressed by using a sensory-motor type assembly task. Such a task should provide more opportunity for differing task strategies and should be perceived as more difficult.

Measuring Quality Performance

The difficulties inherent in measuring quality performance have restricted researchers from more actively pursuing studies involving quality goals. Muckler (1982) identifies sources of data to evaluate quality as coming from the system, self-reports, and

direct observation. Some problems with these sources are that the system may not deliver accurate data, self-reports can become biased in favor of the individual, and there may be reactive distortions in performance as a result of observation.

Another difficulty in measuring quality performance is that in emphasizing outcomes there may be a trade-off in that easily measured quantity outcomes are favored over more ambiguously measured quality outcomes (Etzioni, 1964). One approach to this problem has been simply to not measure quality at all. Another approach has been to use errors as a measure of quality. Errors are easily counted and can provide specific feedback information. The assigning of quality points by a rater has been an effectively used measure of quality performance (Terborg & Miller, 1978). It appears that measuring quality performance will be a continued area of difficulty in researching this topic. It is hoped that the execution of the present study will be an effective step in resolving this difficulty.

Control Systems Theory Approach to Goal Setting

In this section the relationship between the goal setting theory of motivation and control systems theory as it applies to the current experiment is presented. The control systems theory approach is explained as well as the link between control systems theory and goal setting theory. Also, some goal setting research regarding feedback is evaluated in light of the control systems theory approach.

The main ideas of cybernetic or control systems theory have been around for some time, and have been applied to situations as varied as physiology (Cannon, 1929, 1932), engineering (Dransfield, 1968; Ogata, 1970), economics (Balakrishnan, 1973; Pindyck, 1973), and applied mathematics (Berkovitz, 1974; Davis, 1977). Carver & Scheier (1981, 1982) have addressed control systems theory and self-regulation as applied to psychology.

The control systems model utilized in the present application is patterned after Powers' (1973) approach which links control theory, goal setting, and feedback. This approach consists of a system that monitors a specific, relevant environment with a "sensor". The function of the sensor is to provide the system with information or a signal which is compared to a "referent", "standard", or "desired state". If a discrepancy or error is detected between the sensor's signal from the environment and the existing referent, then the motivation to (self-) correct is created. At this point an individual will make a choice between two possible responses. One method of self-correction is to change the environment through the use of an "effector" function. The individual behaviorally enacts a change to or in the relevant environment. The other method of self- correction is to change the referent. The individual cognitively alters the referent, standard, or goal. The result of either approach is to "maintain congruence between the environment and the desired state of affairs" (Campion & Lord, 1982, p. 267). The linkage between goal setting, feedback, and control systems proposed by Powers (1973) was utilized by Campion & Lord (1982) using grades as the performance measure in a classroom situation.

In keeping with the aforementioned approach, the present study views the referent state as the current goal, and information derived from the environment by the sensor function will be compared to the referent or goal. In this approach the "comparator" is the mechanism by which the referent (goal) and feedback from the environment are compared. The comparator is analogous to the individual's cognitive evaluation of the immediate situation. Thus, if the degree of discrepancy or error detected between the goal and the environmental (task) feedback is great enough, then some method of self-correction or self-regulation will begin. According to this approach, either a cognitive or a behavioral change will be made. It is interesting to note that the necessity of having both a referent goal and feedback information available for system regulation fits well with goal setting research

which, indicates that both goals and feedback are necessary for performance to be positively impacted (Erez, 1977; Locke et al., 1981). The implication is that if either a goal or feedback is missing, then it will not be possible to detect error, and self-correction or self-regulation will not be enacted. The difficult and specific goal will not be attained.

Another implication that can be derived from a control systems approach is that specific goals lead to higher performance because specific goals permit the use of more precise feedback from the environment (Ilgen, Fisher, & Taylor, 1979). Conversely, the use of vague, "do best" goals provide a poor referent, so comparison with feedback information from the environment would not easily indicate the existence of a discrepancy. The need for self-correcting action would never be detected. To take this a step further, the assumption is that although specific goals do permit the use of more precise feedback, this does not guarantee that precise feedback will in fact be administered. This is especially true if feedback is administered exogenously. Since control systems theory provides a framework with which to view goal setting, and this framework emphasizes process rather than outcome, then specificity of feedback is one moderator that may have an impact on the individual's process of achieving a goal.

In a related piece of research Ilgen and Moore (1987) conducted a goal setting study in which performance feedback on a proofreading task was administered for either the quantity dimension, the quality dimension, both dimensions, or neither dimension on. Results indicated that subjects receiving both quantity and quality feedback increased speed of performance with no decrement in quality. There was no difference in the quality of performance between this group and the group receiving only quality feedback. The group that received only quantity feedback exhibited a decline in quality relative to their increased speed of performance. It would appear that the presence or absence of feedback exerted some degree of attentional control regarding the performance dimensions in this study.

Exploratory Research Propositions

In addition to the present study's primary research focus on goal setting theory and feedback specificity, some exploratory research issues and related predictions are now presented. These predictions are based on intrinsic motivation research findings regarding the effects of controlling versus informational feedback on indicators of intrinsic motivation such as task interest, task satisfaction, and free-choice task persistence (Deci & Ryan, 1985, 1987). The exploratory proposition which will now be elaborated upon states that the functional significance of feedback administered in the goal setting paradigm may be one moderator of the success of the goal setting-performance increase relationship.

Intrinsic Motivation and Goal Setting

As previously cited, the goal setting technique appears to be an effective approach to increase productivity or performance. However, as identified by Manderlink and Harackiewicz (1984) and Mossholder (1980), there may be some potentially dysfunctional aspects of goal setting when viewed within the framework of Deci's cognitive evaluation theory (1972). This issue is briefly discussed as an introduction to the competence information component of Deci's cognitive evaluation theory (1972) which is viewed as one determinant of intrinsic motivation. This component relates to the potentially controlling versus the informational/autonomy supportive quality of feedback. Based on these aspects of feedback or competence information, certain predictions may be made regarding increases or decreases in intrinsic motivation specific to the current research.

According to Deci's cognitive evaluation theory (1972), task behavior which permits individuals to feel competent and self-determined is intrinsically motivated behavior. However, external incentives can reduce a task's potential for imparting feelings

of competence and self-determination with the result being reduced intrinsic motivation, interest, and satisfaction. Some related research has shown that when an individuals' behavior is monitored the result will also be reduced feelings of competence and self-determination, and reduced intrinsic motivation (Lepper & Greene, 1975).

In a laboratory experiment Mossholder (1980) explored the idea that "some dynamics included in the process of goal assignment could function to mitigate intrinsic motivation" (p. 203). This approach posits that while goals are generally used to gain increases in performance, they can easily be viewed as controlling rather than motivational. In short, the results of this study were that with an interesting task the assignment of specific, difficult goals reduced task interest, persistence, and satisfaction with the task. On a boring task, the assignment of specific difficult goals resulted in an increase in task interest only. In the Mossholder (1980) study the performance session was divided into three 14 minute segments, and subjects in the assigned goal condition had separate goals assigned for each segment. In this way subjects could assess their performance and adjust their work pace accordingly. In other words, feedback was self-administered.

If both external incentives and externally assigned goals can reduce intrinsic motivation, it would then seem reasonable that externally administered feedback viewed in a controlling or evaluative manner could also serve to reduce intrinsic motivation. This component of cognitive evaluation theory will now be addressed.

Controlling versus Informational Feedback

It has been suggested (Ryan, 1982) that regardless of whether rewards or feedback are self-administered or other-administered, they may be viewed as either informational and autonomy supportive or controlling depending on the meaning or functional significance the rewards or feedback holds for the individual. Deci and Ryan (1985) have suggested

that factors within reward or feedback which imply evaluation tend to pressure people and, therefore, are experienced as controlling. They go on to define informational events as "those that allow choice (i.e., that are free from unnecessary pressure) and that provide information that is useful for a person in his or her attempts to interact effectively with the environment" (Deci & Ryan, 1985, p. 96). Hence, informational events are perceived as autonomy supportive. The definition of informational events utilized in the intrinsic motivation literature appears to be analogous to the control systems theory approach in which the more specific the environmental information or feedback that is available to the system or individual, the greater the probability that a discrepancy between the desired performance and current performance will be detected with the result being that self-correction or self-regulation will occur. Stated in the language of the intrinsic motivation literature, self-determined behavior will be enacted. The implication from either perspective is that informational feedback is autonomy supportive, allows greater choice for individuals to interact effectively with the environment, and should result in self-determined behavior and an increase in intrinsic motivation.

In a recent review (1987), Deci and Ryan summarized intrinsic motivation research findings regarding events and contexts that either supported autonomy (self-determination) or controlled behavior. One of the identified events was positive feedback. In the present research feedback provided to subjects reflected actual performance information about progress towards attaining the simultaneous goals. If performance towards the goals by a particular subject was reasonably high, then the feedback administered may indeed have been positive. However, if progress towards the goals was lagging, then the feedback provided reflected this fact regardless of whether the feedback was precise, specific or global, non-specific. The difference between the present research and other research on positive competence feedback is that feedback in the present research reflected actual

performance, while feedback in past research provided mainly positive or positively phrased feedback. Despite this difference the following position should hold for both approaches to feedback. In their evaluation, Deci and Ryan (1987) contend that positive competence feedback:

> ...neither supports autonomy nor controls behavior per se. It can enhance intrinsic motivation by affirming competence (e.g., Harackiewicz, Manderlink, & Sansone, in press) because intrinsic motivation is based in the need for competence as well as the need for self-determination, although it will do so only when the sense of competence is accompanied by the experience of self-determination (Fisher, 1978; Ryan, 1982). But it can also undermine intrinsic motivation by being experienced as a form of interpersonal control (Ryan, Mims, & Koestner, 1983). (p. 1027)

The implication the above statement holds for the present study is that depending on whether the functional significance of the feedback presented in a goal setting situation is perceived by recipients as either providing competence information or as interpersonally controlling, then the intrinsic motivation enhancing or undermining quality of the feedback provided may be one moderator of the goal setting-performance increase relationship.

The informational content of the feedback administered in the present study is now assessed in light of the preceding discussion. It is important to remember that at this point only the informational content of the levels of feedback to be used in the present study is being considered, ignoring for the moment the controlling quality which feedback can possess. It may be useful to keep in mind that the informational content of feedback can be represented as a continuum. Feedback can thus be seen as containing relatively more or less information.

The present study included difficult, specific goals set for both quantity and quality of performance on an assembly task. Two types or levels of performance feedback were

provided in the 2 X 2 factorial design. The informational content of each level of feedback to be provided will now be addressed.

One level of feedback which was administered is termed precise, specific and is viewed as relatively more informational than the other level of feedback, which is termed global, non-specific. The level of feedback termed precise, specific provided a greater degree of usable performance or competence information that could be derived and utilized by subjects (i.e., exact total of models completed so far and/or average quality points earned over completed models). It was predicted that providing this type of feedback would result in the increased likelihood that subjects would adjust their performance in order to achieve the set goals. This type of feedback was predicted to provide subjects greater choice to, as Deci and Ryan (1985) put it, interact effectively with the environment. Based on this rationale the precise, specific feedback that was provided was predicted to lead to greater self-determination and result in enhanced intrinsic motivation and increased indicators of intrinsic motivation, such as greater task interest, task satisfaction, and greater duration of free-choice task persistence.

The other level of feedback which was administered in the present study is termed global, non-specific and is viewed as relatively less informational than precise, specific feedback. This global, non-specific level of feedback was predicted to provide a lesser degree of usable performance or competence information that may be derived and utilized by subjects (i.e., ratings of high, moderate, or low for both the number of models completed so far and/or the average quality points earned over completed models). It was predicted that providing this type of feedback would decrease the likelihood that subjects would adjust their performance in order to achieve the set goals. This type of feedback was predicted to provide subjects with relatively less choice to interact effectively with the environment. Based on this rationale the global, non-specific feedback was predicted to

reduce self-determined behavior and undermine intrinsic motivation with the result of decreased indicators of intrinsic motivation, such as lower task interest, task satisfaction, and reduced duration of free-choice task persistence.

As has been shown, the levels of feedback used in the present study differed along the continuum of degree of information contained within the feedback. Specific, precise feedback was predicted to provide a relatively greater degree of usable performance or competence information than global, non-specific feedback. Next, the topics of the potentially controlling aspect of feedback, and the feedback used in the present experiment, are examined.

Harackiewicz and Larson (1986) studied the impact of supervisor feedback on subordinate task interest, and they determined that the content and style of feedback given by supervisors may either undermine or enhance ssuborddinate perceptions of task interest and competence. Related intrinsic motivation research has indicated that within interpersonal contexts, such as supervisor-subordinate or experimenter-subject relationships, a simple change in delivery style or locution can serve to change the functional significance of feedback or reward from being more competence informational and autonomy supportive (e.g., "you solved ten problems," or "you will receive $3 if you perform well") to become more evaluative and controlling (e.g., "you solved ten problems as you should have," or "you will receive $3 if you perform well, as you should") (Deci & Ryan, 1987; Harackiewicz & Larson, 1986; Ryan, Mims, & Koestner, 1983). Further research has indicated that feedback delivered in a controlling manner does act to reduce task interest (Pittman, Davey, Alafat, Wetherill, & Kramer, 1980; Ryan, 1982).

With respect to the above mentioned content of feedback or reward, this can also impact intrinsic motivation. When feedback provides competence information by way of social comparison about the recipient's relative competence as compared with others,

feedback can positively or negatively affect the recipient's intrinsic motivation (Harackiewicz & Larson, 1986). When feedback involves positive social comparisons (e.g., "you correctly answered twice as many questions on the exam as the class average"), intrinsic motivation and task interest will be enhanced (Boggiano & Rubble, 1979; Deci, 1972; Harackiewicz, 1979). Conversely, when feedback involves negative social comparison (e.g., "you correctly answered only half as many questions on the exam as the class average"), there will be a decrease in intrinsic interest (Bandura, 1982; Deci & Ryan, 1980). The important point to remember is that depending on the style and content of the performance feedback delivered by a superior, a recipient's intrinsic motivation may be either enhanced or undermined.

Because the focus of the present study was not concerned with social comparison issues, no social comparison group was identified in the content of either of the two feedback levels. If, however, a simple change in the locution of verbally administered feedback can serve to either undermine or enhance intrinsic motivation in recipients, then it seems reasonable to expect that a similar change in the semantics or wording of feedback administered in writing could likewise serve to either enhance or undermine intrinsic motivation. With this in mind, the following distinction regarding the difference in the controlling nature of the levels of feedback used in the present study seems justifiable.

The reason that the global, non-specific feedback used in the present study is viewed as relatively more controlling than the precise, specific feedback concerns the issues of the choice of wording used to convey the feedback and of implied interpersonal control. However, before addressing these issues, the presentation of the following information about the experimental procedure may prove helpful. The subjects knew that the experimenter was rating their progress toward the goals based on the exact number of models completed and the exact average of quality points earned as explained at the

beginning of the experimental session for all conditions. This was true regardless of whether subjects received precise, specific feedback; global, non-specific feedback; or a combination of both during the 5 minute feedback administration period which occurred between the two 15 minute performance periods.

It was predicted that when subjects received global, non-specific feedback in which the words chosen to convey the feedback information were general (i.e., ratings of high, moderate, or low), and did not reflect a specific quantity of work performed or number of quality points earned, the implication would be that the experimenter was withholding the more precise or specific performance information which was available. It was predicted that the withholding of performance information by the experimenter would be interpreted as interpersonally controlling since the experimenter would actually possess the more specific information or feedback. If the more specific information were available then it could be used by subjects to more accurately adjust their performance. The resulting prediction was that the global, non-specific feedback would be experienced by subjects as relatively more controlling, and that intrinsic motivation would be undermined.

In the opposite case, it was predicted that when subjects received precise, specific feedback in which the words chosen to convey the feedback information were of an exact, quantitative nature (i.e., 5 models completed or an average of 4.5 quality points earned over the models completed so far), the implication would be that the experimenter had conveyed the most precise, specific performance information that could potentially be fed back to the subject. The administration of such accurate, exact performance information by the experimenter was predicted to deemphasize interpersonal control since the experimenter would not have withheld any performance information. With the more specific performance information available subjects could more accurately adjust their performance.

It was predicted that the precise, specific feedback would be experienced by subjects as relatively less controlling, and that intrinsic motivation would be enhanced.

To summarize: Precise, specific feedback was predicted to be perceived as relatively more informational and relatively less controlling than global, non-specific feedback. Conversely, global, non-specific feedback was predicted to be perceived as relatively less informational and relatively more controlling than precise, specific feedback. Thus, the functional significance of precise, specific feedback was predicted to enhance intrinsic motivation, while the functional significance of global, non-specific feedback was predicted to undermine intrinsic motivation. Hence, the functional significance that the feedback provided within the goal setting paradigm holds for recipients may be a moderator of the goal setting-performance increase relationship. Feedback that enhances intrinsic motivation may contribute positively to the effectiveness and efficiency of the goal setting technique. These exploratory predictions have been incorporated into the present study.

The Present Study

It has been suggested that specific goals do permit the use of precise feedback, but this does not guarantee that precise feedback will in fact be administered. The present research explores the effect of differential specificity of feedback on performance when difficult and specific quantity and quality goals are simultaneously set. In this study two types or levels of feedback were administered. One level of feedback consisted of precise, specific performance information. An example of this level of feedback would be ratings of 0 or 1 point on several dimensions of quality. The other level of feedback consisted of global, non-specific performance information. An example of this level of feedback would be ratings of high, moderate, or low performance.

A 2 X 2, fully crossed, factorial design was used. The factors were 2 levels of quantity of performance feedback (precise, specific vs. global, non-specific) X 2 levels of quality of performance feedback (precise, specific vs. global, non-specific). Thus, the present study includes four conditions. In each condition specific, difficult goals were non-participatively set on both quantity and quality performance dimensions. The four experimental conditions were as follows:

Condition 1

Precise, specific feedback administered on both the quantity and the quality performance dimensions of the task.

Condition 2

Precise, specific feedback administered on the quantity performance dimension of the task. Global, non-specific feedback administered on the quality performance dimension of the task.

Condition 3

Global, non-specific feedback administered on the quantity performance dimension of the task. Precise, specific feedback administered on the quality performance dimension of the task.

Condition 4

Global, non-specific feedback administered on both the quantity and the quality performance dimensions of the task.

This design permits examination of the effect of specificity of feedback on performance, with feedback viewed in a control systems theory framework as being compared with a referent or a goal. It is predicted that the greater the specificity of feedback, the more likely it is that error or discrepancy between actual performance and the

desired (referent) performance will be detected. This is predicted to result in a higher probability that self-correction will occur bringing performance in line with the desired (referent) performance than if less specific feedback is administered. This design also permits examination of the exploratory research issues concerning the effect of informational/autonomy supportive versus controlling feedback on intrinsic motivation. It is predicted that the more feedback is perceived to be informational/autonomy supportive, the more likely intrinsic motivation will be enhanced. Conversely, the more feedback is perceived to be controlling, the more likely intrinsic motivation will be undermined. This perception of feedback considered within the goal setting paradigm predicts that feedback is a moderator of the goal setting-performance increase relationship. Based on this logic the dependent variables for the present experiment and the exploratory research issues are now presented along with their respective hypotheses.

Dependent Variables and Hypotheses

Task Performance Quantity

The hypotheses for the performance quantity dependent variable may be stated in terms of a traditional goal setting model and a control systems theory-goal conflict model. The traditional goal setting model is based on the position taken by Locke (Locke et al., 1981) which posits that providing differential feedback specificity to simultaneous quantity and quality goals will not result in conflict; rather, there will be performance increases for the goal dimension(s) provided with precise, specific feedback. Thus, according to this approach, when setting simultaneous quantity and quality goals, the performance quantity measure will be positively affected by the administration of specific quantity of performance feedback. In the present study, the traditional goal setting model predicted that for the performance quantity dependent measure there would be a significant main effect for the quantity of performance feedback (specific versus non-specific) manipulation, and there would be no effect for the quality of performance feedback (specific versus non-specific) manipulation. Further, because the traditional goal setting model predicts that simultaneous goals will not come into conflict (Locke et al.,1981), it was predicted that there would be no significant interaction effect.

In contrast to Locke's traditional model, the control systems theory-goal conflict model is based on the view that simultaneous goals each require a different strategy, and if attention is focused more on one goal dimension than the other, then performance will be higher on the dimension commanding the most attention. As a result, performance on the other dimension will suffer. As with the traditional goal setting model, the hypothesis based on the control system-goal conflict model predicted that on the performance quantity measure there would be a significant main effect for the quantity of performance feedback

(specific versus non-specific) manipulation such that performance quantity would be higher in the presence of specific quantity of performance feedback than when in the presence of non-specific quantity of performance feedback. In addition, a significant interaction effect on the performance quantity measure was predicted between the quantity of performance feedback and quality of performance feedback variables reflecting goal conflict: Performance quantity will be significantly higher in condition 3 (specific quantity of performance feedback + non-specific quality of performance feedback) than in any of the remaining conditions. This is predicted because in condition 3 the majority of attention will be focused on the quantity goal, while in condition 1 attention will be divided between the quantity and the quality goal; in condition 2 the majority of the attention will be focused on the quality goal; and in condition 4, due to non-specific feedback being provided for both goals, overall attention will be diminished and equally divided between both goals.

Task Performance Quality

The hypotheses for the performance quality dependent variable may also be stated in terms of a traditional goal setting model versus a control systems theory-goal conflict model. According to the traditional goal setting model, when setting simultaneous quantity and quality goals, the performance quality measure will be positively affected by the administration of specific quality of performance feedback . In the present study, the traditional goal setting model predicted that for the performance quality measure there would be a significant main effect for the quality of performance feedback (specific versus non-specific) manipulation and no effect for the quantity of performance feedback (specific versus non-specific) manipulation. For the same reason stated in the preceding section, this model also predicted that there would be no significant interaction effect.

As with the traditional model, the hypotheses based on the control systems theory-goal conflict model predicted that on the performance quality measure there would be a significant main effect for the quality of performance feedback (specific versus non-specific) manipulation. The nature of the predicted main effect was that performance quality would be higher in the presence of specific quality of performance feedback than in the presence of non-specific quality of performance feedback. In addition, the control systems theory-goal conflict model also predicted a significant interaction effect between the quality of performance feedback and quantity of performance feedback variables on the performance quality measure. This predicted interaction would reflect conflict between the quantity and the quality goals. The nature of this predicted interaction was that performance quality would be significantly higher in condition 2 (specific quality of performance feedback + non-specific quantity of performance feedback) than in any of the remaining conditions. Justification for this prediction is that in condition 2 the majority of attention would be focused on the quality goal, while in condition 1 attention would be divided between the quantity and the quality goal; in condition 3, the majority of the attention would be focused on the quantity goal; and in condition 4, due to non-specific feedback being provided for both goals, overall attention would be diminished and equally divided between both goals.

Exploratory Dependent Variables and Hypotheses

Task Interest and Task Satisfaction

The task interest variable and the task satisfaction variable are perceptual indices of intrinsic motivation. Two significant main effects were predicted for the task interest and the task satisfaction dependent measures. The first predicted a significant main effect for the quantity of performance feedback variable such that task interest and task satisfaction would be significantly higher in the presence of specific quantity of performance feedback than in the presence of non-specific quantity of performance feedback. The second predicted a significant main effect for the quality of performance feedback variable such that task interest and task satisfaction would be significantly higher in the presence of specific quality of performance feedback than in the presence of non-specific quality of performance feedback.

These predictions were based on intrinsic motivation research findings which indicated that subjects who perceived the functional significance of feedback as informational/autonomy supportive would rate task interest higher, and would be more intrinsically motivated than subjects who perceived the functional significance of feedback as controlling (Deci & Ryan, 1987; Harackiewicz & Larson, 1986). In the present study, the words chosen to convey specific performance feedback were of an exact, quantitative nature. Because feedback in this form provides subjects with a maximum amount of information which they may use to determine their subsequent task related behavior, specific performance feedback was predicted to be viewed by subjects as informational/autonomy supportive. In contrast, the words chosen to convey non-specific performance feedback were of a general nature that did not reflect a specific quantity or

quality of work performed. Because feedback in this form provides subjects with a minimal amount of information to determine their subsequent task related behavior, and because it implies interpersonal control (subjects know that the experimenter possesses more specific information which could be shared), non-specific feedback was predicted to be viewed by subjects as controlling. Thus, specific performance feedback was predicted to be perceived by subjects as more informational/autonomy supportive than non-specific performance feedback; non-specific performance feedback was predicted to be perceived by subjects as more controlling.

Free-Choice Task Persistence

The free-choice task, persistence variable is a behavioral measure of intrinsic motivation. Intrinsically motivated behavior has commonly been defined as behavior that occurs in the absence of external constraints or contingencies; it has been operationalized as free-choice task persistence (Deci & Ryan, 1980). Two significant main effects were predicted for free-choice task persistence. The first predicted a significant main effect for the quantity of performance feedback variable such that free-choice task persistence would be significantly higher in the presence of specific quantity of performance feedback than in the presence of non-specific quantity of performance feedback. The second predicted a significant main effect for the quality of performance feedback variable such that free-choice task persistence would be significantly higher in the presence of specific quality of performance feedback than in the presence of non-specific quality of performance feedback.

These predictions were based on intrinsic motivation research findings which indicated that subjects who perceive the functional significance of feedback as informational/autonomy supportive exhibit a greater degree of free-choice task persistence,

and are more intrinsically motivated than subjects who perceive the functional significance of feedback as controlling (Deci & Ryan, 1987; Harackiewicz & Larson, 1986). For the same reasons stated in the previous section, specific performance feedback was predicted to be perceived by subjects as more informational/autonomy supportive than non-specific performance feedback; non-specific performance feedback was predicted to be perceived as more controlling.

Method

Subjects

Subjects were 80 male and female undergraduate students who earned extra credit points toward their introductory psychology course grades. There were an equal number of males and females in each of the four treatment conditions.

Design

A 2 X 2, fully crossed, factorial design was employed. The factors were 2 levels of quantity of performance feedback (precise, specific vs. global, non-specific) X 2 levels of quality of performance feedback (precise, specific vs. global, non-specific). The dependent measures were task performance quantity, task performance quality, task satisfaction, task interest, and free-choice task persistence. The exact nature of the feedback which was administered will be described in detail later as will the schedule or timing of the feedback administration. Simultaneous quantity and quality goals were non-participatively set for all subjects in all conditions.

Task

The task used in the present experiment involved the assembly of complex models using Tinker Toy parts. A similar task was used by Terborg and Miller (1978) in a related study; it was chosen because the task was interesting, performance on quantity and quality dimensions could be measured and would likely vary, and different assembly strategies could be employed. This task was also chosen because its complexity level had been judged to be higher than reaction time, perceptual speed, and simple arithmetic tasks (Wood, Mento, & Locke, 1987). It was hoped that an assembly task of this complexity would enhance the external validity of this study by being more similar in nature to assembly jobs found in industry. One potential difficulty with using a task of this type is

that due to the greater level of complexity the resulting effect size may be smaller than those found in studies using tasks of less complexity (Wood et al., 1987).

Ability differences were measured in the Terborg and Miller (1978) study by analyzing the time required for subjects to complete a one-hand and two-hand manipulation of the Minnesota Rate of Manipulation Test (Guion, 1965), plus a small Tinker Toy model. Although Terborg and Miller (1978) found no significant ability differences in their study, which used only male subjects, it was deemed necessary to investigate potential ability differences in the present study as both male and female subjects were used. Another important difference to consider is that the subjects in the Terborg and Miller (1978) study were recruited by way of posters and advertisements in a campus newspaper offering a chance to participate in a research project and earn up to $2.50 per hour. Since subjects in the present study were recruited by way of posted sign up sheets offering extra credit points, and there was no pay contingency offered, the nature of the subjects recruited in the present study might have been different than those in the Terborg and Miller (1978) study. This further strengthened the need to test for ability differences in the present situation. Therefore, the measure of ability differences used in the present study was the number of attachments and the average quality points earned during the 5 minute practice period which occurred prior to the actual performance sessions.

Subjects assembled the Tinker Toy models at a large table. On the table was an example model and a container with an ample supply of parts. Subjects worked at the task for 30 minutes. There was a 5 minute break after the initial 15 minutes during which performance feedback was administered by way of feedback cards which will be described below. Following the 5 minute break, subjects worked an additional 15 minutes. The subjects moved assembled models through a curtained space in a wood barrier placed between themselves and the experimenter, who was seated on the other side of the work

table. There were two reasons for separating the subject and the experimenter with the barrier. One reason was to reduce the evaluative effect of the experimenter's presence during the procedure by blocking the subjects' view of the experimenter so that they did not view the experimenter rating the completed models and filling out the feedback cards. The other reason was that by moving the completed models through the barrier and out of sight the possibility that subjects would self- administer feedback, especially on the quantity goal, would be reduced. This was predicted to strengthen the effect of the feedback cards and the procedure in general.

Procedure

The following procedure was administered by the experimenter to subjects one at a time. Upon arrival to the work area each subject read, signed, and dated an informed consent agreement. The experimenter then explained that the research involved the assembly of a number of Tinker Toy models. Each subject was then given the opportunity to practice assembling models for 5 minutes. At this point the number of attachments made and the average quality points earned during the 5 minutes were recorded as the indices of ability. Following the 5 minute practice session the experimenter verbally set the predetermined difficult and specific quantity and quality goals for each subject. At this point each subject was also informed that there would be two 15 minute work periods with a 5 minute break between the 15 minute work periods. Each subject was also informed that feedback towards the goals would be administered during the 5 minute break period and that the feedback would be related only to their individual progress towards the goal. There was no comparison group stated in order to eliminate any social comparison processing by the subjects.

The specific and difficult quantity goal was determined in pilot work during which subjects were asked to simply build as many models as quickly as possible in 15 minutes. It was discovered that 75 seconds was the shortest period of time in which one model could be completely assembled. Based on this rate of construction, the quantity goal was set such that subjects were asked to completely assemble 20 models (22 separate attachments per model) in 30 minutes. This could be accomplished if a subject worked at a very quick pace and completed one model every 75 seconds. As a general rule, models completed in this short period of time by pilot subjects were of quite poor construction quality. However, pilot subjects were not directed to pay attention to the quality of the models they built.

Performance quality was assessed by the experimenter on the following six dimensions: sail squareness; sail perpendicular; structure squareness; structure flatness; joint assembly; and leg squareness. It was possible to earn either 0 or 1 point on each dimension. In this way the quality on each dimension was judged to be either absent (score = 0) or present (score = 1). This scoring approach was chosen for several reasons. One was that this approach would allow the experimenter to quickly and easily rate each quality dimension. With the dichotomous scoring approach, the experimenter needed only to make the simple decision based on a visual inspection of each model that either acceptable quality was present or was not present on each dimension. With this approach the matter of degree of quality need not be considered. Also, because specific criteria were required to be met on each quality dimension before a point could be awarded, the potential for rater error was reduced.

Due to the fact that the experimenter performed all of the quality point ratings during the experimental procedure, and the experimenter was aware of the feedback conditions while making quality point ratings, a post hoc test of the reliability of the quality point

ratings was performed in order to assess the degree of potential rater bias during the assessment of performance quality. The index of inter-rater reliability was the percent of agreement between quality performance ratings made by two separate and independent raters. The raters were the experimenter and an additional rater unfamilier with the details of the present study. The additional rater was trained to rate performance quality based on the criteria stated for each performance quality dimension presented below. Two additional subjects were recruited to construct ten models each. Each subject was acquainted with the performance quality dimensions and was then instructed to build ten models as quickly as possible, while attempting to achieve high quality on each model constructed. Subject 1 required 22 minutes to complete ten models. Subject 2 required 17 minutes to complete ten models. There was 88% agreement between the raters' allocation of quality points on the models constructed by subject 1. There was 83% agreement between the raters allocation of quality points on the models constructed by subject 2. The percent agreement between raters on these quality point ratings was sufficiently high to conclude that bias in experimenter ratings of models during the actual procedure was minimal. Prior knowledge of feedback condition did not significantly bias the experimenter's quality point ratings. It is appropriate at this point to more specifically define each quality dimension and describe what criteria needed to be met for a point to be awarded on each dimension.

Sail Squareness

Sail squareness refers to the white, square shaped, plastic part termed the "coupler" (see figure 1), the bottom of which was inserted into the wooden spool located in the middle of the square base structure. Into the top of this coupler was inserted the yellow, squarely shaped plastic part termed the "sail". In order for a point to be awarded on this dimension the square, flat surface of the coupler had to be oriented squarely in exact relationship so that each side was parallel to each corresponding side of the square, base

structure (see figure 2). If, upon visual inspection, the sides of the coupler are not obviously parallel to the sides of the base structure, then no point was awarded.

Sail Perpendicular

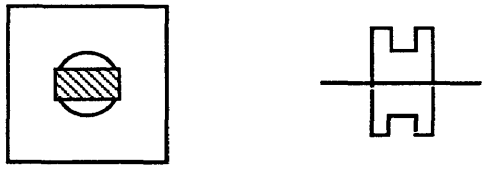
Sail perpendicular refers to the yellow, thin, squarely shaped plastic part termed the "sail". The middle of the lower edge of the sail is inserted into a slot located in the top of the coupler described in the preceding section (see figure 3). In order for a point to be awarded on this dimension, the lower edge of the sail had to be obviously parallel to the top of the base structure. Correspondingly, the sides of the sail had to be perpendicular to the top of the base structure. If, upon visual inspection, each condition was not met (i.e., the sail is "crooked"), then no point was awarded.

Structure Squareness

Structure squareness refers to the main or base portion of the model. The base structure is assembled using four wooden rods and four wooden spools which form the perimeter of the structure such that the wooden rods form the sides and the wooden spools (which serve as connecters) form the corners of a square. Within the square perimeter, four additional wooden rods formed diagonals by connecting, one each, to the corner wooden spools and joining in the centermost portion within the perimeter of the structure by a fifth wooden spool (see figure 4). In order for a point to be awarded on this dimension ,the perimeter of the structure had to form an obviously square shape, and the interior diagonal members had to form obvious 45 degree angles to the sides of the square. If, upon visual inspection, the sides of the structure were out of square and diagonal members did not form 45 degree angles to the sides of the square, no point was awarded.

Figure 1

Overhead and Side View of "Coupler



a. b.

Figure 1a: Overhead view of "coupler".

Figure 1b: Side view of "coupler".

Figure 2

Overhead View of Sail Squareness Dimension

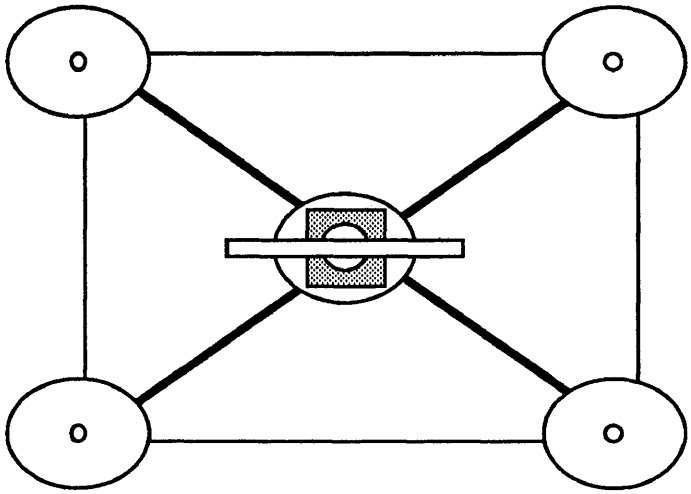


Figure 2: Sail Squareness dimension indicated by shaded area.

Figure 3

Side View of Sail Perpendicular Dimension

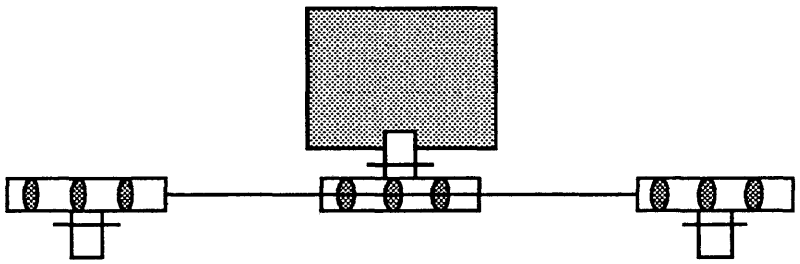


Figure 3: Sail Perpendicular dimension indicated by shaded area.

Figure 4

Overhead View of Structure Squareness Dimension

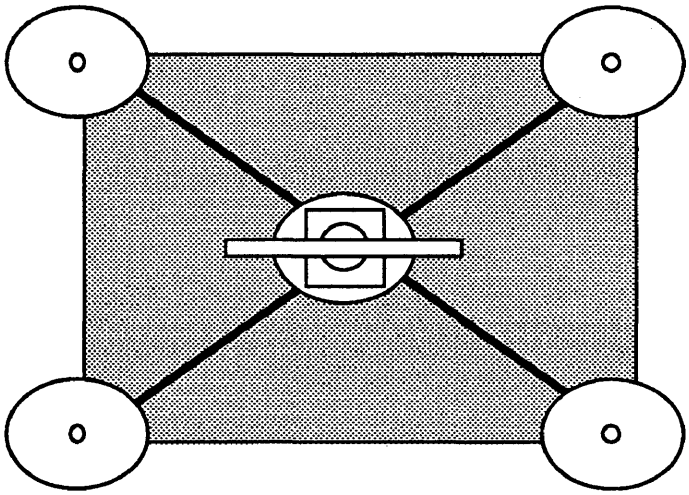


Figure 4: Structure Squareness dimension indicated by shaded area.

Structure Flatness

Structure flatness also refers to the main portion of the structure described in the preceding section. In this case, the main structure was scrutinized from a side view in order to determine if the top of the structure formed a level plane (see figure 5). In order for a point to be awarded on this dimension, the main structure, when viewed from the side, had to form a flat plane. If, upon visual inspection, the top of the main structure did not form a flat plane (i.e., is twisted), then no point was awarded.

Joint Assembly

Independent of any of the other quality dimensions, joint assembly refers to the insertion of the wooden rods into the wooden spools which serve as connecters. In order for a point to be awarded on this dimension each end of each rod had to be solidly and completely inserted into its corresponding hole in the wooden spools. If, upon visual inspection, even one rod was either partially inserted or not inserted at all into the appropriate hole, no point would be awarded.

Leg Squareness

Leg squareness refers to the same white, plastic couplers described in the sail squareness section. One each of these couplers is inserted into the underside of each of the four wooden spools which serve as the corners of the squarely shaped main structure. In this way the couplers serve as "legs" for the main structure (see figure 6). In order for a point to be awarded on this dimension, each of the four couplers had to be oriented in the same square fashion as the main structure of the model. If, upon visual inspection, even one of the legs was out of square with the main body of the model, then no point was awarded.

Figure 5

Side View of Structure Flatness DImension

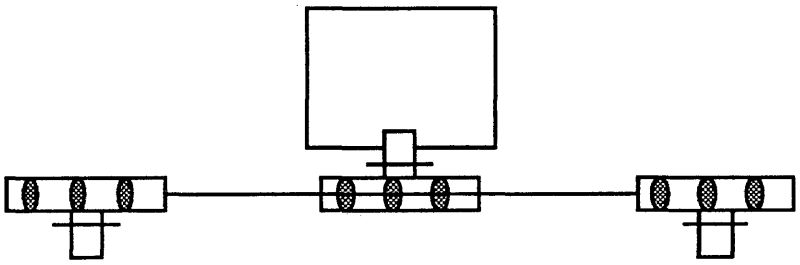


Figure 5: Structure Flatness dimension as assessed from side view.

Figure 6

Underside View of Leg Squareness Dimension

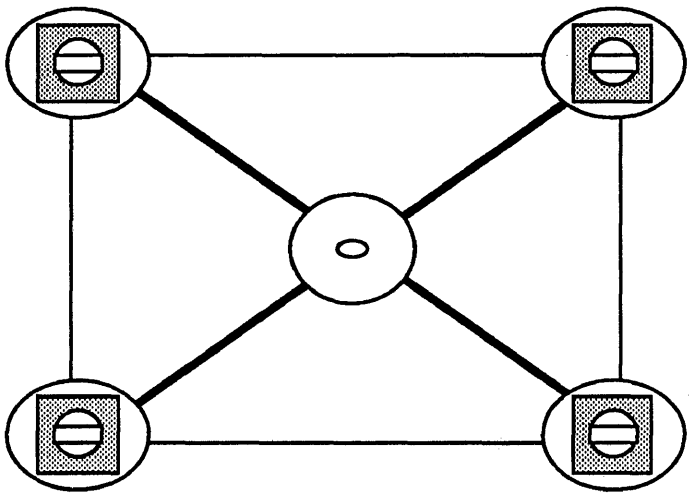


Figure 6: Leg Squareness dimension indicated by shaded area (as viewed from underside of model).

Based on the scoring approach used in the Terborg and Miller (1978) study, the quality goal was set such that subjects were asked to average 5 out of 6 possible quality points over all the models they completed. A placard specifically stating both the quantity and quality goals, and the six quality dimensions with their potential point values was posted in constant view of the subjects.

It should be noted that subjects in all conditions received the information on how the quality points would be measured, even if the feedback later provided on this dimension was global and non-specific. Also, all subjects in all conditions were informed that the experimenter would be rating the quantity and quality performance on the completed models.

In addition to the experimenter verbally setting the goals, each subject also received a written copy of both goals which was available for their reference throughout the entire experimental session (See Appendix A). After the experimenter set the goals and gave each subject a written copy of those goals, a check on perceived goal difficulty was then collected by having subjects rate six 7-point Likert scale items (See Appendix B). At the same time, the experimenter also administered a goal acceptance scale as a check on whether this aspect of goal setting was present. This scale was adapted from a goal acceptance scale utilized in the Whitenack (1984) study and consisted of four 7-point Likert scale items (See Appendix C).

After the completion of the goal acceptance scale, the experimenter instructed the subject to begin working for the initial 15 minute work period. At the end of the first 15 minute work period the experimenter instructed each subject to stop working. This point signaled the beginning of the 5 minute break/feedback period. During this time the experimenter finished rating models and completed filling out the feedback card (See Appendix D). The feedback card was then given to each subject for his/her examination.

At the end of the 5 minute break/feedback period, the experimenter instructed the subject to put aside the feedback card and then administered the second goal difficulty measure. After this measure was completed and returned, the experimenter then verbally started the final 15 minute work period.

At the end of the final 15 minute work period, the experimenter instructed each subject to stop working and transfer the final model through the curtained space in the barrier. The experimenter then rated the quality of the work performed on the final model and recorded the number of attachments completed. Following this the experimenter told each subject that he was out of the final questionnaires the subject was required to fill out and that he would have to get more from his office downstairs. If construction of the final model was incomplete at this point it was returned to the subject. Each subject was then told that the time while the experimenter was gone could be used to continue building the assembly task or to just relax. Subjects were told that if they chose to continue with the activity the results would not count towards the goals which were set earlier. The experimenter then left the room and the 5 minute free-choice period began. Each subject was video taped through a one-way mirror throughout the 5 minute free-choice period. In this way the experimenter was able to accurately determine the amount of time that each subject continued to engage in the activity during the free-choice period.

Following the completion of the free-choice period, the experimenter returned with the final questionnaires. The questionnaires/dependent measures were then filled out by each subject. After completing these final measures, each subject was then debriefed, given the earned extra credit points, and dismissed. The experimenter then recorded the number of additional attachments, if any, made during the free-choice period. Total quantity and quality performance results for the two 15 minute work periods were also calculated and recorded at this point.

It should be emphasized that during the two 15 minute work periods and the intervening 5 minute break period, the experimenter was seated on the opposite side of the wood barrier obscuring the view between the experimenter and the subject. As each subject worked, the experimenter rated performance quantity and quality of completed models and prepared the feedback information cards to be transferred through the barrier to each subject during the 5 minute break period. The work and break/feedback periods were timed with a stopwatch, and the experimenter started and terminated the work and break/feedback periods verbally from behind the barrier.

Independent Variables

Precise, specific feedback was defined in this case as exact, numerical, task-related, progress information. This type of feedback was administered by way of a "feedback" card rating the models which were completed by the mid-point of the task. This card conveyed exact, numerical, task-related progress information for the quantity goal by indicating the number of models completed at the midpoint of the work session (e.g., # of models completed = 8). The same card could also convey exact, numerical, task-related progress information for the quality goal by indicating the average points which had been earned for each of the six individual dimensions, and by indicating the average number of quality points earned overall on the models completed by the mid- point of the work session (e.g. avg. quality points earned = 4.9).

Global, non-specific feedback was defined in this case as approximate, non-numerical, task-related progress information. This type of feedback was also administered by way of a "feedback" card rating the models which were completed by the mid-point of the task. For the quantity goal the approximate, non-numerical, task-related, progress information consisted of a rating of high, moderate, or low for the number of models

completed at the mid-point of the work session. The cut-offs for the non-specific quantity of performance ratings were: high = 10 or more models completed; moderate = 8 or 9 models completed; low = 7 or fewer models completed. Providing additional justification for these quantity of performance cut-offs is appropriate at this point. It was reasoned that if a subject had completed 10 or more models by the mid-point of the work session, and they worked at the same rate during the second 15 minute work session, then the likelihood that they would completely assemble 20 or more models by the end of the work session was judged to be high. Based on this logic it was determined that subjects completing 10 or more models by the end of the initial 15 minute work session should receive a non-specific quantity of performance rating of "high". If, however, a subject had completed 8 or 9 models by the mid-point of the work session, and they continued to work at the at the same rate during the second work session, then they would likely complete between 16 and 19 models by the end of the work session. It was reasoned that in order for subjects completing 8 or 9 models during the first work session to complete the goal of 20 models by the end of the work session it would require a modest increase in rate of performance during the second work session. Based on this logic it was determined that subjects completing 8 or 9 models by the end of the initial work session should receive a non-specific quantity of performance rating of "moderate". Finally, if a subject had completed 7 or fewer models by the end of the initial 15 minute work session, and they continued to work at the same rate, then they would likely complete 14 or fewer models by the end of the work session. In this case it was reasoned that in order for subjects completing 7 or fewer models during the first work session to complete the goal of 20 models by the end of the work session it would require a large increase in rate of performance during the second work session. Based on this logic it was determined that subjects completing 7 or fewer

models by the end of the initial 15 minute work session should receive a non-specific quantity of performance rating of "low".

For the quality goal the approximate, non-numerical, task-related progress information consisted of a rating of "high", "moderate", or "low" for the overall average of quality points earned on the models completed at the mid-point of the task. The cut-offs for the non-specific quality of performance ratings were: "high" = average of 5 or more quality points earned over completed models; "moderate" = average between 4.00 and 4.99 quality points earned over completed models; "low" = average of 3.99 or fewer quality points earned over completed models. Further justification of the quality point cut-offs is also appropriate at this point. It was reasoned that if a subject had earned an average of 5 or greater quality points over the models completed by the mid-point of the work session, and they continued to work with the same attention to quality, then the probability would be high that the goal of an average of 5 quality points over the models completed by the end of the work session would be met. Based on this logic it was determined that subjects averaging 5 or greater quality points by the end of the initial 15-minute work session would receive a quality of performance rating of "high". If, however, a subject had averaged between 4.00 and 4.99 quality points over the models completed by the mid-point of the work , then it was reasoned that it would require a modest increase in attention to quality of performance in order to reach the goal of an average of 5 quality points by the end of the entire work session. Based on this logic it was determined that subjects earning average quality points between 4.00 and 4.99 by the end of the initial work session should receive a quality of performance rating of "moderate". Finally, if a subject had averaged 3.99 or fewer quality points over the models completed by the mid-point of the work session, then it was reasoned that it would require a large increase in attention to quality of performance in order to reach the goal of an average of 5 quality points over all the models completed by

the end of the final work session. Based on this logic it was determined that subjects earning average quality points of 3.99 or fewer by the end of the initial work session should receive a quality of performance rating of "low."

It should be noted at this point that even if the treatment conditions required that different levels of feedback be administered (e.g. global, non-specific quantity feedback paired with precise, specific quality feedback), both levels of feedback were recorded and administered on the same card (For an example of each feedback card, See Appendix D).

Manipulation Checks

The goal setting manipulation was implemented by the experimenter verbally setting difficult and specific quantity and quality performance goals on the assembly task. No measure was taken as a check on the goal setting manipulation. Instead, in order to minimize any potential misunderstanding of the goals, subjects were given a sheet on which both the quantity and quality goals were explicitly stated (See Appendix A). This goal sheet was posted on the subject side of the wood barrier and was available to subjects throughout the session.

A check on the perceived difficulty of the goals was collected with six 7-point Likert scale items developed specifically for this experiment (See Appendix B). Three of the items were designed to measure perceived quantity goal difficulty while the other three items were designed to measure perceived quality goal difficulty. The items making up each of these measures were summed and averaged to form self-report indices of both perceived quantity goal difficulty and perceived quality goal difficulty. This set of measures (hereafter referred to as the goal difficulty A measure) was administered immediately after the experimenter verbally set the goals and had given the subjects a written copy of those goals. The same set of measures (hereafter referred to as the goal

difficulty B measure) was administered again at the end of the 5 minute feedback/break period as a check on potential changes in the perceived difficulty of the goals following the initial 15 minute work period.

A check on acceptance of the goals was collected with four 7- point Likert scale items adapted from a scale used in the Whitenack (1984) study (See Appendix C). Two of the items were designed to measure quantity goal acceptance, while the other two items were designed to measure quality goal acceptance. The items making up each of these measures were summed and averaged to form self-report indices of both quantity goal acceptance and quality goal acceptance. This set of measures was administered prior to the initial 15 minute work period at the same time as the first administration of the perceived goal difficulty measure.

A check on the specificity of feedback manipulation was a paper and pencil measure consisting of items that investigated the subjects' perception of the degree of specificity of both the quantity of performance and the quality of performance feedback the experimenter administered to them. This measure consisted of four 7-point Likert scale items designed specifically for the present experiment. Two of the items were designed to measure the perceived specificity of the quantity of performance feedback, while the other two items were designed to measure the perceived specificity of the quality of performance feedback. The items making up each of these measures were summed and averaged to form indices of perceived specificity of both quantity and quality of performance feedback (See Appendix E). This set of measures was administered at the end of the experimental session.

A second check on the feedback manipulation was a paper and pencil measure with items that investigated subjects' perception of whether the feedback was more informational/autonomy supportive or more controlling. This measure consisted of eight 9-point semantic differential scale items developed specifically for this study (See Appendix

F). The scale items were summed and averaged to form a self-report index. This measure was administered at the end of the experimental session.

Dependent Variables

The performance quantity measure was the number of completed attachments made during the initial work session, and then the number of completed attachments made during the final work session. The performance quality measure was the average quality points earned over the models completed during the initial work session, and then the average quality points earned over the models completed during the final work session. As each of these measures was taken at two different times, a repeated measures analysis of variance was used to analyze the results..

Also measured was satisfaction in performing the task and task interest. These measures were taken following the final work period. The attitudinal measure of task interest was collected with six 7-point Likert scale items identical to those used by Cellar (1985) (See Appendix G). These items were summed and averaged to form a self-report index. Task satisfaction was measured with six 7-point Likert scale items developed specifically for this experiment (See Appendix H). The task satisfaction scale items were also summed and averaged to form a self-report index. The reliabilities of all of the previously stated scale measures were assessed using the internal consistency method. Specifically, the reliability estimate used was Cronbachs' alpha (Cronbach, 1951). The reliabilities are presented below in the results section.

The behavioral measure of intrinsic motivation was taken in two ways during the 5 minute free-choice period. The first measure was the amount of time (in minutes) the subject continued to build the model during the 5 minute free- choice period. The second

measure was the sum of attachments made during the 5 minute free-choice period. Both of these measures are referred to collectively as the free-choice, task persistence measure.

Data Analysis

The dependent variables performance quantity and performance quality were analyzed using the repeated measures analysis of variance statistical technique. The dependent variables task satisfaction, task interest, and free-choice task persistence were analyzed using the analysis of variance statistical technique. Supplementary analyses were done to investigate the efficacy of the specific versus non-specific feedback manipulation, the perception of feedback as informational versus controlling, goal acceptance, and perceived goal difficulty.

Results

Equal numbers of male and female subjects were assigned to each treatment condition; therefore, it was possible to analyze for main and interaction effects due to sex. The results of these analyses are reported whenever a significant main or interaction effect due to sex occurred.

Goal Acceptance

The internal consistency for the three item quantity goal acceptance scale was α = .76. The internal consistency measure of reliability for the quality goal acceptance scale was α = .90. Both measures of internal consistency are acceptably high in terms of reliabilities for measurement scales (Nunnally, 1978). Mean goal acceptance ratings by subjects for the quantity goal and the quality goal are presented in Table 1. The range of possible scores on the goal acceptance measures was from 1 to 7 with higher scores indicating higher levels of goal acceptance. Visual inspection of the means reveals little apparent variability. The analysis of variance performed on the quantity goal acceptance data revealed no significant main or interaction effects. The analysis of variance performed on the quality goal acceptance data also revealed no significant main or interaction effects. Overall, both quantity goal acceptance and quality goal acceptance was uniformly high for subjects in all conditions.

Table 1

Means of Manipulation Check Measures

		Quality of Performance Feedback			
		Specific		Non-Specific	
		Quantity of Performance Feedback		Quantity of Performance Feedback	
Measure	Range	Specific	Non-Specific	Specific	Non-Specific
Goal Acceptance	1-7				
Quantity Acceptance		5.72	6.67	6.30	6.12
Quality Acceptance		5.75	6.65	6.40	6.37
Goal Difficulty A	1-7				
Quantity Difficulty A		4.36	3.83	4.90	4.56
Quality Difficulty A		3.98	3.81	3.83	4.21
Goal Difficulty B	1-7				
Quantity Difficulty B		5.05	5.30	5.38	5.50
Quality Difficulty B		5.01	5.20	5.16	5.26
CONTC	1-9	5.66	5.63	5.43	4.96

Goal Difficulty A and B

The goal difficulty measures were administered on two separate occasions during the experimental session. The first administration occurred immediately after the experimenter set the goals. The second administration occurred during the 5 minute break/feedback period following the administration of the performance feedback. This was done in an effort to measure if subjects' perceptions of goal difficulty changed after actually performing the task for a period of time. This was also designed to measure whether or not the goals were perceived as difficult overall.

The goal difficulty A measures were administered at the beginning of the experimental session. The internal consistency for the three item quantity goal difficulty A scale was $\alpha = .79$. The internal consistency for the three item quality goal difficulty A scale was $\alpha = .87$. At this initial administration of the goal difficulty measures, subjects on the whole moderately agreed that the goals were difficult. The mean ratings by subjects per condition for the three item quantity goal difficulty A and the three item quality goal difficulty A measures are presented in Table 1. The higher the score, the more difficult the goals were perceived to be, with a possible range of 1 to 7. Examination of the means reveals little variability, and analysis of variance showed no significant main or interaction effects for either the quantity goal difficulty A measure or the quality goal difficulty A measure.

The goal difficulty B measures were administered following the initial 15 minute work session. The internal consistency measure for the three item quantity goal difficulty B scale was $\alpha = .85$. The internal consistency measure for the three item quality goal difficulty B scale was $\alpha = .94$. The mean ratings by subjects per condition for the three item quantity goal difficulty B scale and the three item quality goal difficulty B scale are presented in Table 1. The means show little apparent variability, and analysis of variance

revealed no significant main or interaction effects for either the quantity goal difficulty B or the quality goal difficulty B measures. At the second administration of the goal difficulty measures subjects appeared to rate both the quantity and the quality goals as more difficult than at the first administration of the measures.

The results of both the goal difficulty A and B measures indicates that subjects in all conditions perceived the quantity and quality goals to be first moderately, and then above moderately difficult, contrasting the beginning of the procedure with the middle of the procedure. To further investigate these increases, a repeated measures analysis of variance was performed with quantity goal difficulty A and quantity goal difficulty B as one set of repeated measures, and with quality goal difficulty A and quality goal difficulty B as the other set of measures. The results indicate that subjects within each group rated that the quantity goal was perceived as significantly more difficult at the second administration of the quantity goal difficulty measure B as compared to the initial administration (quantity goal difficulty A), $F(1,76) = 38.23$, $p < .001$. The results also indicate that subjects within each group rated that the quality goal was perceived as significantly more difficult at the second administration of the quality goal difficulty measure B as compared to the initial administration (quality goal difficulty A), $F(1,76) = 50.05$, $p < .001$. The complete analysis of variance summary tables for the repeated measures analyses are presented in Table 2 and Table 3. The significance of these results are that in the present study, subjects continued to perceive the goals, both quantity and quality, as difficult even after having the opportunity to perform the task for an extended period of time. This reinforces that one of the required aspects of goal setting, goal difficulty, was indeed present and in fact increasing.

Table 2

Repeated Measures ANOVA: Quantity Goal Difficulty A and B

Analysis of Variance Summary Table

Dependent Variables = Quantity Goal Difficulty A; Quantity Goal Difficulty B

Source	DF	MS	F	p <
Within Cells	76	.83		
Trials	1	31.80	38.23	.001
Quality Feedback By Trials	1	1.34	1.62	.207
Quantity Feedback By Trials	1	3.80	4.57	.036
Quality Feedback By Quantity Feedback By Trials	1	.28	.33	.565

Table 3

Repeated Measures ANOVA: Quality Goal Difficulty A and B

Analysis of Variance Summary Table

Dependent Variables = Quality Goal Difficulty A; Quality Goal Difficulty B

Source	DF	MS	F	p <
Within Cells	76	1.15		
Trials	1	57.60	50.03	.001
Quality Feedback By Trials	1	.00	.00	.961
Quantity Feedback By Trials	1	.01	.01	.922
Quality Feedback By Quantity Feedback By Trials	1	1.00	.87	.354

Feedback Specificity

The feedback specificity measure consisted of four items, two of which were constructed to measure the perceived specificity of the quantity of performance feedback and two of which were constructed to measure the perceived specificity of the quality of performance feedback. The means, standard deviations, and analysis of variance summary table for specificity of quantity of performance feedback ratings are presented in Table 4. The range of possible scores on this measure was from 1 to 7 with high scores indicating higher perceived specificity of quantity of performance feedback. Examination of the means indicates the existence of variability, and the analysis of variance revealed a significant main effect for the quantity of performance feedback variable, $F(1,76)= 162.805$, $p < .001$. As was intended, the specific quantity of performance feedback which was presented was perceived as significantly more specific than the non-specific quantity of performance feedback presented. The proportion of variance accounted for by the main effect of the quantity of performance feedback variable was high, $\omega^2 = 0.67$. There was no main effect for the quality of performance feedback variable on the perceived specificity of quantity performance feedback measure, $F(1,76) < 1$, and there was no interaction effect $F(1,76) < 1$. The internal consistency of the two-item, specificity of quantity feedback scale was high, $\alpha = .97$.

The means and analysis of variance summary table for specificity of quality of performance feedback ratings are presented in Table 5. The range of possible scores on this measure was also from 1 to 7 with high scores indicating higher perceived specificity of quality of performance feedback. Examination of the means does reveal some variability. The results of a 2 (quality of performance feedback specificity) X 2 (quantity of performance feedback specificity) X 2 (sex of subject) analysis of variance are presented

Table 4

ANOVA: Rated Specificity of Quantity Feedback

Mean Ratings Quantity Feedback Specificity

Quality of Performance Feedback	Quantity of Performance Feedback: Specific	Quantity of Performance Feedback: Non-Specific
Specific	M= 6.50 S= 1.47	M= 1.87 S= 2.02
Non-Specific	M= 6.48 S= 1.43	M= 1.80 S= 1.52

Analysis of Variance Summary Table

Dependent Variable = Rated Specificity of Quantity Feedback

Source	DF	MS	F	p <
Quality Feedback	1	0.050	.019	0.891
Quantity Feedback	1	432.450	162.805	0.001
Interaction	1	0.012	0.005	0.945
Residual	76	2.656		
Total	79	8.030		

in this section. The analysis of variance revealed a significant main effect for the quality of performance feedback variable $F(1,72) = 46.95$, $p < .001$. As was intended, the specific quality of performance feedback which was presented was perceived as significantly more specific than the non-specific quality of performance feedback presented. The proportion of variance accounted for by the effect of the quality of performance feedback variable was high, $\omega^2 = 0.34$. There was also a significant main effect for the quantity of performance feedback variable $F(1,72) = 8.670$, $p < .004$ on the perceived specificity of the quality of performance feedback measure. The proportion of variance accounted for by this effect was $\omega^2 = 0.05$. The small amount of variance accounted for by this unexpected main effect minimizes the importance of the seemingly highly significant F statistic. When compared to the variance accounted for by the main effect found for the specificity of quality of performance feedback variable, $\omega^2 = 0.34$, the main effect for the specificity of quantity of performance feedback variable carries little practical weight. The important finding in this case is that specific quality of performance feedback was rated as significantly more specific compared with non-specific quality of performance feedback.

In addition, there was a significant main effect for the sex of subjects variable, $F(1,72) = 4.360$, $p < .040$, on the perceived specificity of the quality of performance feedback measure. Female ratings of the specificity of quality of performance feedback measure were significantly higher than male ratings of the same measure. The mean ratings were 4.4 versus 3.7, respectively. However, the percent of variance accounted for by this effect was extremely low, $\omega^2 = 0.02$, indicating little practical significance for this finding. In interpreting this result it appears that overall, females made higher ratings on the perceived specificity of quality of performance feedback than males. For some reason males were less sensitive to differences in the specificity of quality of performance feedback. However, it was not such overall results that were of prime interest in this case.

The result of interest was the effect of differential specificity of quality of performance feedback on the perceived specificity of quality of performance feedback measure, and as stated above, subjects rated specific quality of performance feedback as significantly more specific than non-specific quality of performance feedback, regardless of sex. There were no interaction effects. The internal consistency of the two item specificity of quality of performance feedback scale was also high, $\alpha = .97$.

Table 5

ANOVA: Rated Specificity of Quality Feedback

Mean Ratings Quality Feedback Specificity

Quality of Performance Feedback	Quantity of Performance Feedback: Specific	Quantity of Performance Feedback: Non-Specific
Specific	M= 6.40 F= 6.50	M= 3.95 F= 5.80
Non-Specific	M= 2.40 F= 3.70	M= 2.20 F= 1.55

Note: M=Male; F=Female

Analysis of Variance Summary Table

Dependent Variable = Rated Specificity of Quality Feedback

Source	DF	MS	F	p <
Quality Feedback	1	204.800	46.95	0.001
Quantity Feedback	1	37.813	8.67	0.005
Sex	1	19.010	4.36	0.040
Quality Feedback by Quantity Feedback	1	0.800	0.17	0.674
Quality Feedback by Sex	1	0.000	0.00	1.000
Quantity Feedback by Sex	1	1.510	0.35	0.558
Quality Feedback by Quantity Feedback by Sex	1	7.200	1.65	0.203
Residual	72	4.360		
Total	79	7.407		

Control of Feedback

The perceived controlling versus autonomy supportive property of feedback measure consisted of eight 9-point semantic differential items, half of which were reverse scored. The range of possible scores was from 1 to 9 with high scores indicating that the feedback received was perceived to be more controlling in nature and low scores indicating that the feedback received was perceived to be more informational/autonomy supportive. The internal consistency measure for the perceived controlling property of feedback scale was a meager $\alpha = .19$. A reliability this low indicates a serious problem with this scale. It appears that at least some of the items in this scale may not have been measuring the intended construct of perceived control of feedback. Reexamination of the items suggested that this measure actually consisted of two distinct scales: one scale included items 3, 4 , 6, and 8 which measured the perceived controllingness of feedback; the second scale included items 1, 2, 5, and 7 which measured the perceived supportiveness of feedback. Hereafter the scale measuring controllingness of feedback will be referred to as CONTC; the scale measuring supportiveness of feedback will be referred to as CONTS. Examination of item-total statistics revealed that the reliability of the CONTC scale could be improved such that $\alpha = .79$ when items 3, 4, and 6 were retained, deleting item 8. Examination of item-total statistics revealed that the reliability of the CONTS scale could be improved such that $\alpha = .89$ when items 1, 2, and 5 were retained, deleting item 7. When an analysis of variance was performed on the revised CONTC scale the results showed no significant main or interaction effects. The mean ratings by subjects per condition for the reduced item CONTC measure are presented in Table 1.

The means and analysis of variance summary table for the 2 (quality of performance feedback specificity) X 2 (quantity of performance feedback specificity) X 2 (sex of

subject) analysis of variance performed on the revised CONTS measure are presented in Table 6. Examination of these results revealed a significant interaction effect of the quality feedback specificity by quantity feedback specificity by sex independent variables, $\underline{F}(1,72) = 4.520$, $\underline{p} < .037$ on the CONTS measure. The percent of variance accounted for by this effect was $\omega^2 = .05$. The nature of this interaction was that males who were presented with non-specific performance feedback on both goal dimensions made significantly higher ratings on the CONTS scale than subjects in all other conditions. It is necessary to reiterate that low scores on the 9 point CONTS scale indicated that feedback was perceived as more informational/autonomy supportive. Therefore, the males in this condition rated that the feedback provided was significantly less supportive compared to the rest of the subjects in the study. This was the only finding consistent with the prediction that non-specific feedback would be perceived as more controlling and less informational/autonomy supportive than specific feedback.

Interestingly, the means for the other conditions on the CONTS measure were below the midpoint of the 9 point scale indicating that these subjects rated both specific and non-specific feedback as relatively supportive. Only the males provided with non-specific feedback on both goal dimensions rated the feedback as relatively non-supportive as was predicted. In contrast, subjects' average ratings on the CONTC measure were above the midpoint of the 9 point scale which in this case indicated that they regarded the feedback as relatively controlling, regardless of specificity or condition. One conclusion which may be drawn from this result is that the wording used to convey the feedback in both specific and non-specific feedback conditions was not clearly distinguishable as either controlling or informational/autonomy supportive. It is possible that the use of verbally administered feedback may make this difference more distinct. This point will be discussed further later.

Transforming the 8 item control of feedback scale into two separate scales of 3 items each did result in clarification of the meaning of the results.

Table 6

ANOVA: CONTS

Mean Ratings CONTS

Quality of Performance Feedback	Quantity of Performance Feedback: Specific	Quantity of Performance Feedback: Non-Specific
Specific	M= 2.90 F= 2.46	M= 3.26 F= 3.10
Non-Specific	M= 2.90 F= 4.16	M= 5.16 F= 2.90

Note: M=Male; F=Female

Analysis of Variance Summary Table

Dependent Variable = Mean Ratings CONTS

Source	DF	MS	F	p <
Quality Feedback	1	14.45	3.62	0.061
Quantity Feedback	1	5.00	1.25	0.267
Sex	1	3.20	0.80	0.373
Quality Feedback by Quantity Feedback	1	0.00	0.00	1.000
Quality Feedback by Sex	1	0.20	0.05	0.823
Quantity Feedback by Sex	1	13.34	3.34	0.072
Quality Feedback by Quantity Feedback by Sex	1	18.05	4.52	0.037
Residual	72	3.99		
Total	79	4.32		

Practice Session Quantity and Quality Performance

The 5 minute practice session was included to test for potential ability differences and to ensure that random assignment had been achieved. The quantity performance measure taken during the practice session was the total number of attachments completed by the end of the 5 minute time period. The quality performance measure taken during the practice session consisted of the average quality points earned over the models assembled during the 5 minute time period. The associated means and standard deviations are presented in Table 7 and in Table 8 along with each appropriate analysis of variance summary table. The analysis of variance performed on the number of attachments completed during the practice session revealed no significant main or interaction effects. The analysis of variance performed on the average quality points earned during the practice session revealed a significant main effect for specificity of quantity of performance feedback, $F(1,76)=4.560$, $p < .01$, and no other significant main or interaction effects. The proportion of variance accounted for by this effect was $\omega^2 = 0.05$. It should be emphasized that although this effect was significant, it occurred prior to the feedback specificity manipulation. The main goal of performing these analyses on the practice session performance dimensions was to ensure that random assignment had been achieved; however, the significant main effect would tend to indicate nonrandomness. The small amount of variance accounted for by the effect, and the fact that this seemingly significant effect occurred prior to any treatment, and prior to the setting of the goals, serve to reduce the seriousness of the violation of this assumption. In addition, the repeated measures analysis of variance used to analyze both the quantity and quality performance measures will control for potential ability differences by using each subject as his or her own control.

Table 7

ANOVA: Total Attachments in Practice Session

Mean Number of Attachments

Quality of Performance Feedback	Quantity of Performance Feedback: Specific	Quantity of Performance Feedback: Non-Specific
Specific	M= 66.05 S= 16.78	M= 67.75 S= 16.95
Non-Specific	M= 61.20 S= 17.09	M= 60.40 S= 12.82

Analysis of Variance Summary Table

Dependent Variable = Total Attachments in Practice Session

Source	DF	MS	F	p <
Quality Feedback	1	744.200	2.904	0.092
Quantity Feedback	1	4.050	0.016	0.900
Interaction	1	31.250	0.122	0.728
Residual	76	256.299		
Total	79	256.433		

Table 8

ANOVA: Average Quality Points Earned in Practice Session

Mean Quality Points Earned

Quality of Performance Feedback	Quantity of Performance Feedback: Specific	Quantity of Performance Feedback: Non-Specific
Specific	M= 2.78 S= 1.05	M= 2.25 S= 0.77
Non-Specific	M= 2.83 S= 2.39	M= 2.39 S= 0.74

Analysis of Variance Summary Table

Dependent Variable = Average Quality Points Earned in Practice

Source	DF	MS	F	p <
Quality Feedback	1	0.190	0.238	0.627
Quantity Feedback	1	4.560	5.704	0.019
Interaction	1	0.036	0.045	0.832
Residual	76	0.799		
Total	79	0.830		

Quantity Performance

A repeated measures ANOVA was utilized as a method to control for ability differences by using each subject as his or her own control. The repeated measures were total attachments in the initial work session and total attachments in the final work session. The mean attachments made in each work session are presented in Table 9 by condition. The results of the repeated measures ANOVA, presented in Table 10, indicate no significant differences between groups on the number of attachments made from trial one to trial two for the quantity of performance feedback variable, $F(1,76)=.01$, n.s. . This finding was non-supportive of both the traditional goal setting model and the control systems-goal conflict model. It is interesting to note the highly significant effect found for trials, $F(1,76)=32.78$, $p < .001$. The proportion of variance accounted for by this effect was $\omega^2 = .29$. The number of attachments made during the final work session were significantly higher than the number of attachments made during the initial work session for all conditions. This was non-supportive of the traditional goal setting model which predicted that performance quantity would be higher in the presence of specific quantity of performance feedback than when in the presence of non-specific quantity of performance feedback. Most notable, however, is the significant percent of variance accounted for by the effect of trials which was nearly 30 percent. As will be discussed later, it may be that providing any type of quantity of performance feedback, specific or non-specific, has an extremely positive effect on quantity performance when difficult, and specific quantity goals have been set.

Table 9

Repeated Measures ANOVA: Mean Attachments Work Session 1 and 2

		Session 1	Session 2
Quality Feedback	Specific		
Quantity Feedback	Specific	194.90	211.74
Quantity Feedback	Non-Specific	197.65	217.90
Quality Feedback	Non-Specific		
Quantity Feedback	Specific	176.80	207.85
Quantity Feedback	Non-Specific	191.27	217.50

Table 10

Repeated Measures ANOVA: Total Attachments Work Session 1 and 2

Analysis of Variance Summary Table

Dependent Variables = Total Attachments Work Session 1; Total Attachments Work Session 2

Source	DF	MS	F	p <
Within Cells	76	672.45		
Trials	1	22043.02	32.78	.001
Quality Feedback By Trials	1	970.23	1.44	.233
Quantity Feedback By Trials	1	9.02	.01	.908
Quality Feedback By Quantity Feedback By Trials	1	189.22	.28	.597

Quality Performance

A repeated measures ANOVA was utilized in order to control for ability differences by using each subject as his or her own control. The repeated measures were the average quality points earned in the initial work session and the average quality points earned in the final work session. The average quality points earned in each work session are presented in Table 11 by condition. The results of the repeated measures ANOVA, presented in Table 12, indicate a significant quality of performance feedback by trials effect on the average quality points earned measure, $F(1,76)=8.61$, $p< .004$. The proportion of variance accounted for by this effect was $\omega^2 = 0.098$. There were no other significant effects. This finding is supportive of the traditional goal setting model since following the presentation of specific quality of performance feedback the average quality points earned in trial 2 were significantly higher than in trial 1 as compared with the presentation of non-specific quality of performance feedback. The results of the repeated measures analysis were non-supportive of the control systems-goal conflict model as there was no significant interaction between the quantity of performance feedback variable, the quality of performance feedback variable, and trials. The goals did not conflict. The more notable finding in this case, that the quality of performance feedback specificity variable accounted for nearly 10 percent of the total variance, indicates strong support for the assertion that performance quality can be positively enhanced by providing specific quality of performance feedback.

Table 11

Repeated Measures ANOVA: Mean Quality Points Earned Work Session 1 and 2

		Session 1	Session 2
Quality Feedback	Specific		
Quantity Feedback	Specific	4.64	4.87
Quantity Feedback	Non-Specific	4.44	4.65
Quality Feedback	Non-Specific		
Quantity Feedback	Specific	4.53	4.27
Quantity Feedback	Non-Specific	4.49	4.36

Table 12

Repeated Measures ANOVA: Average Quality Points Earned Work Session 1 and 2

Analysis of Variance Summary Table

Dependent Variables = Average Quality Points Work Session 1;

Average Quality Points Work Session 2

Source	DF	MS	F	p <
Within Cells	76	10.66		
Trials	1	.09	.61	.437
Quality Feedback By Trials	1	1.21	8.61	.004
Quantity Feedback By Trials	1	.15	1.07	.304
Quality Feedback By Quantity Feedback By Trials	1	.20	1.45	.233

Task Interest

The task interest measure was a perceptual index of intrinsic motivation. Subjects responded to five, 7-point Likert scale items. The means and standard deviations for the task interest measure are presented in Table 13 along with the analysis of variance summary table. The higher the score, the higher the rated task interest, with a range of 1 to 7. The internal consistency measure for the task interest scale was $\alpha = .84$. The analysis of variance revealed a significant quality of performance feedback specificity by sex interaction effect, $F(1,72) = 5.02$, $p < .028$. The percent of variance accounted for by this effect was $\omega^2 = .05$. Males provided with specific quality of performance feedback made significantly higher average ratings on the task interest measure (4.95) than females provided with specific quality of performance feedback (4.35). In contrast, males provided with non-specific quality of performance feedback made significantly lower average ratings on the task interest measure (4.34) than females provided with non-specific quality of performance feedback. Although statistically significant, the actual difference between these means is less than one scale point indicating little practical significance of this result. More important in this case is the examination of the sample mean of 4.66 which indicates that as a whole, subjects felt the task was moderately to slightly above moderately interesting. The intrinsic motivation hypothesis was not supported in that varying the specificity of the performance feedback made no practical impact on the perceived functional significance of the feedback.

Table 18

ANOVA: Rated Task Interest

Mean Task Interest Ratings

Quality of Performance Feedback	Quantity of Performance Feedback: Specific	Quantity of Performance Feedback: Non-Specific
Specific	M= 5.10 F= 4.36	M= 4.80 F= 4.48
Non-Specific	M= 4.12 F= 4.84	M= 4.56 F= 5.06

Note: M=Male; F=Female

Analysis of Variance Summary Table

Dependent Variable = Rated Task Interest

Source	DF	MS	F	p <
Quality Feedback	1	0.03	0.02	0.876
Quantity Feedback	1	0.29	0.22	0.639
Sex	1	0.03	0.02	0.876
Quality Feedback by Quantity Feedback	1	0.88	0.68	0.412
Quality Feedback by Sex	1	6.50	5.02	0.028
Quantity Feedback by Sex	1	0.05	0.04	0.845
Quality Feedback by Quantity Feedback by Sex	1	0.51	0.40	0.531
Residual	72	1.29		
Total	79	1.28		

Task Satisfaction

The task satisfaction measure was also a perceptual index of intrinsic motivation. This measure consisted of subjects' responses to four, 7-point Likert scale items. The means and standard deviations for the task satisfaction measure are presented in Table 14 along with the analysis of variance summary table. The higher the score, the higher the rated task satisfaction, with a possible range of 1 to 7. The internal consistency measure for the task satisfaction scale was $\alpha = .77$. The analysis of variance revealed no significant main or interaction effects. It appears that in this case also, based on subjects' ratings on the task satisfaction measure, that varying the specificity of the performance feedback did not have the predicted effect on subjects' intrinsic motivation. Examination of the sample mean of 4.02 indicates that taken as a whole, subjects felt that the task was moderately satisfying. Thus, the intrinsic motivation hypothesis was not supported; varying the specificity of the performance feedback had no impact on the perceived functional significance of the feedback with the result of no effect on this measure of subjects' intrinsic motivation.

Table 14

ANOVA: Rated Task Satisfaction

Mean Task Satisfaction Ratings

Quality of Performance Feedback	Quantity of Performance Feedback: Specific	Quantity of Performance Feedback: Non-Specific
Specific	M= 4.27 S= 0.96	M= 3.80 S= 1.26
Non-Specific	M= 3.91 S= 1.30	M= 4.10 S= 1.15

Analysis of Variance Summary Table

Dependent Variable = Rated Task Satisfaction

Source	DF	MS	F	p <
Quality Feedback	1	0.020	0.014	0.906
Quantity Feedback	1	0.413	0.298	0.587
Interaction	1	2.195	1.581	0.213
Residual	76	1.388		
Total	79	1.369		

Free-Choice Task Persistence

The free-choice task persistence variable was a behavioral index of intrinsic motivation. Two measures were obtained to represent this variable: the total attachments made during the free-choice period and the total time engaged in building during the free-choice period. A potential third measure of intrinsic motivation concerns the number of subjects who continued to work during the free-choice period per condition. The number of subjects who continued to work during the free-choice period by condition is presented in Table 15. A chi square test performed on the number of subjects who continued to work during the free-choice period indicated a significant main effect for specificity of quality of performance feedback variable, $X^2_{obt} = 5.21$, $p < .05$ ($X^2_{crit} = 3.84$, $df = 1$). This finding can be interpreted as indicating some degree of support for the intrinsic motivation hypothesis; the number of subjects who continued to work during the free-choice period was significantly greater for subjects receiving specific quality of performance feedback compared to subjects receiving non-specific quality of performance feedback.

The means, standard deviations, and the analysis of variance summary tables for the free choice attachments measure and the free choice time engaged measure are presented in Table 16 and Table 17, respectively. The analysis of variance performed on the free-choice attachments measure revealed a significant main effect for the quality of performance feedback variable $F(1,76)= 3.619$, $p < .06$. The proportion of variance accounted for by this effect was calculated to be $\omega^2 = 0.03$. There were no other significant main or interaction effects. These results indicate that subjects who were provided with specific quality of performance feedback made more additional attachments during the 5 minute free-choice period than subjects who were provided with non-specific quality of performance feedback. This finding would indicate weak support for the intrinsic motivation hypothesis based on the fact that this behavioral measure of intrinsic motivation

accounted for only 3 percent of the total variance. In this case the finding that subjects provided with specific performance feedback on the quality dimension of the task displayed an increase in intrinsically motivated behavior as evidenced by increased free choice task persistence does deserve future investigation.

The analysis of variance performed on the free-choice time engaged measure (in minutes) also revealed a significant main effect for the quality of performance feedback variable, $\underline{F}(1,72)= 6.69$, $\underline{p} < .012$. The proportion of variance accounted for by this effect was calculated to be $\omega^2 = 0.06$. This indicates that subjects who received specific quality of performance feedback spent significantly more time continuing to build models during the free-choice period than subjects who were provided with non-specific quality of performance feedback. In addition, there was also a significant main effect of sex on the free-choice time engaged measure, $\underline{F}(1,72)= 5.37$, $\underline{p} < .023$. The proportion of variance accounted for by this effect was calculated to be $\omega^2 = 0.05$. This result indicates that overall, males spent significantly more time continuing to build during the free-choice period (1.81 minutes) than females (0.85 minutes). This may indicate that the task was more male orientated. As a result, males were more inclined to continue building during the free-choice period.

The significant main effect of quality of performance feedback specificity on the time engaged behavioral measure also appears supportive of the intrinsic motivation hypothesis. The fact that a modest 6 percent of the total variance was accounted for by this effect is somewhat promising. Given that the intrinsic motivation hypotheses were exploratory, the results of the behavioral measures presented above do encourage further study. The effect of feedback specificity may be having some impact on behavioral measures of intrinsic motivation.

Table 15

Frequency Count: Subjects Working During Free-Choice by Condition

Quality of Performance Feedback	Quantity of Performance Feedback: Specific	Quantity of Performance Feedback: Non-Specific
Specific	f= 12 (60%)	f= 9 (45%)
Non-Specific	f= 4 (20%)	f= 7 (35%)

Table 16

ANOVA: Total Attachments in Free-Choice Period

Mean Attachments Free-Choice Period

Quality of Performance Feedback	Quantity of Performance Feedback: Specific	Quantity of Performance Feedback: Non-Specific
Specific	M= 17.60 S= 25.58	M= 20.95 S= 26.47
Non-Specific	M= 6.50 S= 16.31	M= 12.20 S= 23.58

Analysis of Variance Summary Table

Dependent Variable = Total Attachments in Free-Choice Period

Source	DF	MS	F	p <
Quality Feedback	1	1970.113	3.619	0.061
Quantity Feedback	1	409.513	0.752	0.389
Interaction	1	27.613	0.051	0.822
Residual	76	544.420		
Total	79	544.218		

Table 17

ANOVA: Time Spent in Free-Choice Period

Mean Time Spent in Free-Choice Period*

Quality of Performance Feedback	Quantity of Performance Feedback: Specific	Quantity of Performance Feedback: Non-Specific
Specific	M= 2.44 F= 1.25	M= 2.92 F= 0.87
Non-Specific	M= 1.10 F= 0.20	M= 0.80 F= 1.10

*In Minutes

Note: M=Male; F=Female

Analysis of Variance Summary Table

Dependent Variable = Time Spent in Free-Choice Period

Source	DF	MS	F	p <
Quality Feedback	1	22.47	6.69	0.012
Quantity Feedback	1	0.68	0.20	0.653
Sex	1	18.05	5.37	0.023
Quality Feedback by Quantity Feedback	1	0.36	0.11	0.743
Quality Feedback by Sex	1	8.98	2.67	0.107
Quantity Feedback by Sex	1	0.18	0.05	0.817
Quality Feedback by Quantity Feedback by Sex	1	5.51	1.64	0.204
Residual	72	3.36		
Total	79	3.77		

Discussion

Included in the discussion of the results of the present study will be the following issues: success in providing the required structure for effective goal setting; efficacy of the feedback specificity manipulations; the results of the goal setting performance measures relative to the competing models; implications of the goal setting results and future research directions; the intrinsic motivation measures and meaning of the results; and implications of the exploratory research findings and potential future research directions.

In drawing conclusions from the results of a goal setting study, it is important to first examine whether the required components of successful goal setting, notably goal specificity, goal difficulty, goal acceptance, and knowledge of results or feedback, were in fact present. As will be shown, each of these components was present in the current study.

Concerning goal specificity, both the quantity goal and the quality goal were explicitly presented to subjects by means of the experimenter verbally setting each goal and by posting the goals in writing, in easy view of subjects throughout the course of the procedure. Although perceptions of goal specificity were not assessed quantitatively, the previously stated efforts to clearly present the simultaneous goals verbally and in writing were deemed to have successfully conveyed to subjects what was required to meet the goals. Thus, the component of goal specificity was judged to be adequately present in this experiment.

The goal difficulty component was assessed by subjects' ratings of the goal difficulty scale on two separate occasions. Subjects' ratings of the difficulty scale prior to the initial 15 minute performance session indicated they moderately agreed that the goals were difficult, and the measure taken at the mid-point of the task showed that the goals were perceived as significantly more difficult than they were at the first measurement. Further, the more objective indicator of goal difficulty, the proportion of subjects actually

attaining both goals, was 0.06. Taken separately, the proportion of subjects attaining the quantity goal was 0.29. The proportion of subjects attaining the quality goal was 0.18. Taken together, these indicators show that the goals, both combined and considered separately,were perceived as, and actually were, difficult.

Results of the analysis of subjects' ratings on the goal acceptance scale indicated high levels of goal acceptance in each group. As for the knowledge of results or feedback component, since the manipulation of the specificity of performance feedback was the main independent variable, and feedback cards were administered, it can be stated with confidence that this component of goal setting was present. To summarize, the required aspects for effective goal setting (goal specificity, goal difficulty, goal acceptance, and feedback), were present at acceptable levels in the current study.

One point which needs to be addressed concerns the ratings of the goal difficulty A and B scales. Especially for the goal difficulty A scale, subjects' ratings centered around the mid-point of the scale, the anchor of which was moderately agree. Such consistent mid-scale ratings may be interpreted in two ways. One is that the subjects may have accurately indicated their perceptions at the time of the first administration of the goal difficulty scale. Alternatively, consistent mid-point ratings on scales such as these can be an indicator that subjects did not adequately understand what was being asked by the items, thus choosing mid-point ratings due to their confusion. In this case, at the time of the first administration of the goal difficulty scale, the subjects had only heard about the goals, had not spent any time working towards them, but did have some experience actually performing the task during the practice session. This could explain the mid-point ratings since the subjects did not yet have any personal experience with the difficulty of the goals. However, as the repeated measures analyses indicated, the subjects rated both the quantity and the quality goals as significantly more difficult at the second administration of the goal

difficulty measure, after their direct experience during the initial work session. Presumably the subjects at this point had more definite perceptions about the difficulty of these goals, and they conveyed these perceptions with significantly higher ratings of goal difficulty compared with the first administration of the measure. Because of this, the danger in overinterpreting the meaning of the mid-point ratings does not seem too serious in this case. In contrast, an excess of mid-point ratings on the perceptual measures of intrinsic motivation (i.e., task interest and task satisfaction) appears more serious and will be addressed later.

With respect to the success of the manipulation of the quantity and quality of performance feedback specificity variables, the results were positive. Specific quantity and specific quality of performance feedback were rated by subjects as significantly more specific than non-specific quantity and non-specific quality performance feedback. One problem with the specificity of feedback manipulation was that some subjects expressed confusion about the specific quality of performance feedback. Some subjects reported that the presentation of specific quality of performance feedback in terms of average points earned by dimensions and average points earned over completed models was unclear. This type of feedback may have been more clearly presented in terms of total quality points earned by dimensions and overall rather than in terms of averages. Obviously the quality goal would likewise need to be stated in terms of point totals rather than averages. Nonetheless, the feedback specificity manipulations were both statistically and practically significant.

With regard to the main goal setting dependent measures of performance quantity and performance quality, the statistical tests of the traditional goal setting model versus the control systems-goal conflict model provided some interesting results. A discussion of the results of each of these measures now follows.

The repeated measures analysis of variance performed on the quantity performance measure of total attachments completed revealed no main or interaction effects. This means that for the quantity of performance measure, neither the traditional goal setting model nor the control systems-goal conflict model was supported. Manipulating the specificity of the quantity of performance feedback resulted in no differential effect in quantity performance. Further, the lack of an interaction effect indicated that the goals did not come into conflict in any of the treatment groups. Subjects' quantity of performance was significantly higher in all conditions during the final work session. It made no difference whether specific or non-specific quantity of performance feedback was provided at the mid-point of the task; subjects did not vary their rate of performance as a function of more or less specific feedback.

Further comment on the lack of effect for specificity of quantity of performance feedback is in order at this point. One possible explanation for the lack of effect would be that those subjects receiving non-specific quantity of performance feedback kept track of the number of models they had completed thereby self-administering the feedback. There is, however, anecdotal evidence indicating that this was not the case. Many of the subjects who were provided with non-specific quantity of performance feedback actually asked the experimenter to tell them how many models they had completed, both at the mid-point of the work session and at the end. The experimenter responded to such requests by stating that the performance information would not be available until the end of the procedure. This anecdotal information provides some support for the contention that subjects did not self-administer quantity of performance feedback.

The repeated measures analysis of variance performed on the performance quality measure yielded a main effect for the quality of performance feedback variable. This finding was supportive of the traditional goal setting model. In this case, subjects provided

with specific quality of performance feedback were more likely to adjust their performance on the quality goal dimension. The result was that their performance on the quality goal was significantly higher than subjects provided with non-specific quality of performance feedback. In fact, the significant percent of variance accounted for by this effect, nearly 10 percent, further strengthens the assertion that providing specific quality of performance feedback can positively enhance performance quality. The control systems-goal conflict model was not supported; absence of a significant interaction effect indicated that the goals did not come into conflict in any of the groups.

In further speculating on the meaning of the results of the goal setting part of this study, it appears that increasing or decreasing the specificity of quantity of performance feedback did not result in corresponding increases or decreases on the quantity of performance; quantity of performance increased significantly in both cases as evidenced by the high percent of variance (29%) accounted for by this effect. However, increasing the specificity of the quality of performance feedback did result in increased performance quality. This effect also accounted for a respectable percent of the total variance. The upshot is that when both the quantity and the quality dimensions of a task carry equal weight, the nature of the feedback provided on the quantity dimension of the goal appears to be less important than the specificity of the feedback provided on the quality dimension of the goal. Stated differently, the results of this study indicate that quality of performance is moderated by, and can be successfully improved by providing the most specific quality of performance feedback that is possible. Other studies have indicated that, with simultaneous quantity and quality goals, subjects may redefine the task in terms of performance quantity only (Bavelas & Lee, 1978). If this is the case, since performance quantity is such a simple and familiar construct, it may be that once the quantity goal is set it will take care of itself with minimal feedback. It appears that it may be easier for workers

to conceptualize "How much" than "How well" on a task. If this is true, then it implies that with simultaneous goals it may be fruitful to spend less effort and resources on administering feedback on the quantity goal dimension and more effort and resources focusing attention on the quality aspect of a task. The results of the present study indicate that such a strategy could improve performance quality with no decrement in performance quantity. Future research along these lines should explore the effectiveness of different formats for conveying specific feedback, and continue exploring the effect of varying feedback specificity on tasks of differing complexity (Wood, Mento, & Locke, 1987).

The results of the intrinsic motivation aspect of this study were mixed. The analysis of variance performed on the perceptual measures of intrinsic motivation, task interest and task satisfaction, showed no practically significant effects. However, the analysis of variance performed on the behavioral measures of intrinsic motivation, number of attachments and time spent building during the free-choice period, revealed a significant main effect for the quality of performance feedback variable. Subjects who received specific quality of performance feedback made significantly more attachments and spent a significantly greater amount of time continuing to build during the free choice period than subjects who received non-specific quality of performance feedback. The proportion of variance accounted for by the effects on the behavioral measures of intrinsic motivation were large. Another encouraging finding related to this line of research concerns the results of the non-parametric test performed on the number of subjects who continued to work during the free-choice period. The results of the chi square test indicated that a greater number of subjects who received specific quality of performance feedback continued to work during the free-choice period compared to subjects who received non-specific quality of performance feedback. Even though the results of the perceptual measures were minimal at best, the significantly greater number of subjects continuing to work who

received specific quality of performance feedback holds some promise for further pursuing the hypothesized link between feedback specificity and intrinsic motivation.

In speculating about why there were no practically significant effects of the feedback specificity manipulation on the perceptual measures of intrinsic motivation, while there were both statistically and practically significant effects on the behavioral measures, it may be useful to consider the results of the task satisfaction and task interest measures as well as the perceived control of feedback measures CONTC and CONTS. As was alluded to earlier, there was a predominance of mid-point ratings on the task interest and task satisfaction measures . In this case the explanation that the subjects did not adequately understand what was being asked by the items seems most reasonable. If these measures were to be used in future research, they would need to be revised so that they more clearly conveyed the concepts of task satisfaction and task interest. The same is true for the perceived control of feedback measures CONTC and CONTS. By all indications, these were not very successful measures as indicated by the lack of definitive results produced. Even though the reliabilities of these measures were acceptably high, this does not guarantee that they were valid. Subjects may have been confused by the semantic differential scales and lacked understanding of the meaning of some of the anchors. A combination of both of these reasons is more likely the case. The lack of any practically significant effects on the perceptual measures of intrinsic motivation lends no support for the hypothesized effect of feedback specificity on intrinsic motivation. The question remains, why were there practically significant effects for the behavioral measures of intrinsic motivation, but not for the perceptual measures of this construct?

Subjects appear to have been largely unaffected by the hypothesized controlling-informational/autonomy supportive distinction between specific and non-specific feedback as evidenced by the results of the perceptual measures of intrinsic motivation. However,

the main effects of quality of performance feedback on the behavioral measures of intrinsic motivation requires some explanation. It may be that the administration of specific quality of performance feedback served to direct attention towards a more detailed interest in certain aspects of the task itself, rather than an interest in the nature of the feedback. More specifically, the content of the specific quality of performance feedback,which broke quality performance down into six separate dimensions, may have generated a greater focus of attention towards the task and the associated facets of the task, and, in general, drew attention away from consideration of what the feedback meant personally to the individual. If this was the case, then subjects provided with specific quality of performance feedback may have been more task oriented than subjects in the other groups. This may have occurred because the specific quality of performance feedback reinforced some interesting facets related to the construction of the model, not emphasized in the other group, with the result of making the model appear more interesting to those provided with specific quality of performance feedback. Notably, subjects who were provided with non-specific quality of performance feedback often expressed frustration verbally about not knowing more precisely how they were faring on the quality dimension of the task or they actually asked the experimenter to give them more information on how they were doing. It may be that the difficulties inherent within the task interest and task satisfaction measures, which were stated earlier, prevented subjects from accurately portraying their impressions and feelings within the boundaries of paper and pencil measures. Instead, their actual behavior during the free-choice period appeared to have been a more accurate barometer of their true feelings about the task and the feedback received.

Although the current study employed written feedback, this may have been one downfall for the perceptual measures of intrinsic motivation; it may be useful to use verbally administered performance feedback in future studies. This may result in a more

successful controlling-informational/autonomy supportive distinction in the levels of feedback specificity provided, and a more effective reflection in the paper and pencil perceptual measures of intrinsic motivation. The use of verbally administered feedback has been supported in past intrinsic motivation research (Deci & Ryan, 1987; Harackiewicz & Larson, 1986; Pittman, Davey, Alafat, Wetherill, & Kramer, 1980; Ryan, Mims, & Koestner, 1983).

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Appendix A

Quantity and Quality Goals Presented to Subjects

The goals set for performing this task are:

1. Completely assemble 20 models in 30 minutes.

2. Average 5 of 6 possible quality points across the models you complete.

Quality points will be assessed on the following factors:

a) Sail Squareness
b) Sail Perpendicular
c) Structure Squareness
d) Structure Flatness
e) Joint Assembly
f) Leg Squareness

Point values that may be earned are:

1 = the quality is present

0 = the quality is absent

Appendix B

Goal Difficulty Measure

INSTRUCTIONS: Please respond to the following statements using the rating scales provided. Circle the number corresponding to the response you feel is appropriate. Please respond to every statement below.

1. It will be very difficult to complete the number of models the experimenter set as the goal.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
Moderately Agree

2. It will require a great deal of effort to complete the number of models the experimenter set as the goal.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
Moderately Agree

3. It will require a great deal of concentration to complete the number of models the experimenter set as the goal

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
Moderately Agree

4. It will be very difficult to earn the number of quality points the experimenter set as the goal.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
Moderately Agree

5. It will require a great deal of effort to earn the number of quality points the experimenter set as the goal.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
Moderately Agree

6. It will require a great deal of concentration to earn the number of quality points the experimenter set as the goal.

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
			Moderately Agree					

Appendix C

Goal Acceptance Measure

INSTRUCTIONS: Please respond to the following statements using the rating scales provided. Circle the number corresponding to the response you feel is appropriate. Please respond to every statement below.

1. I intend to complete the number of models the experimenter set as the goal.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
Moderately Agree

2. I will work hard to complete the number of models the experimenter set as the goal.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
Moderately Agree

3. I intend to earn the number of quality points the experimenter set as the goal.

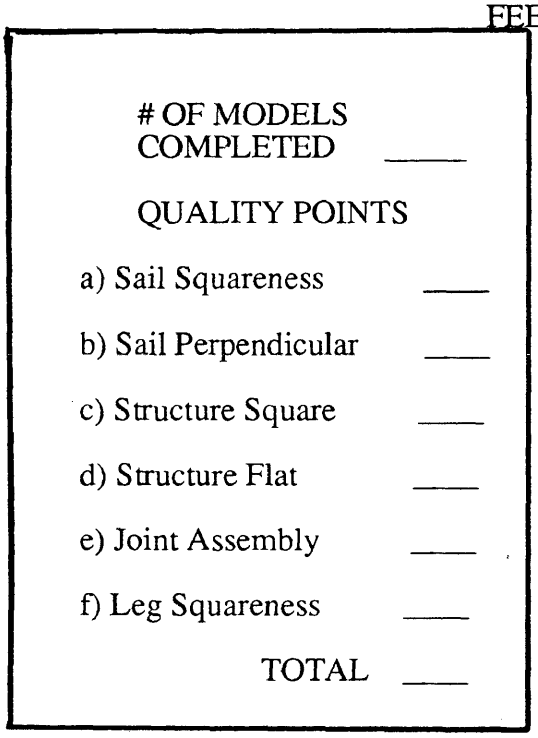
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
Moderately Agree

4. I will work hard to earn the number of quality points the experimenter set as the goal.

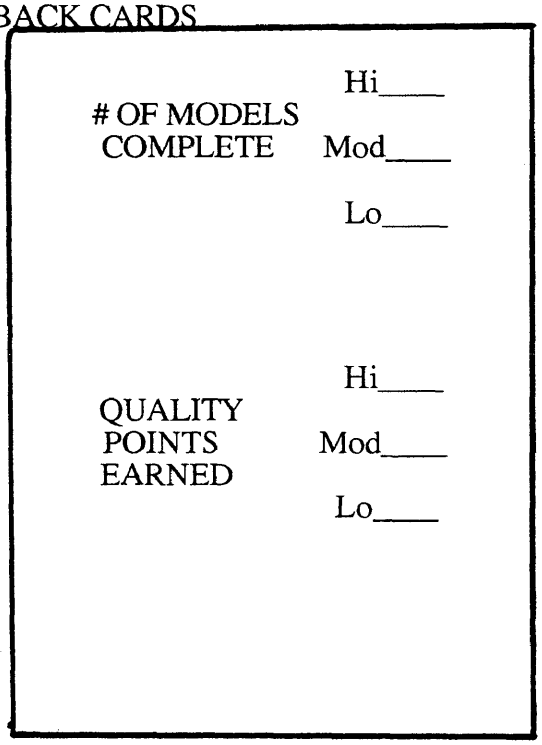
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
Moderately Agree

Appendix D

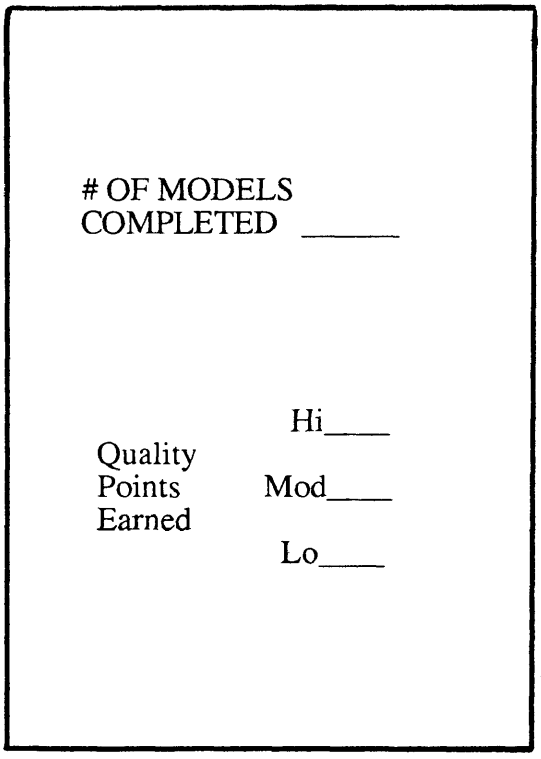
FEEDBACK CARDS



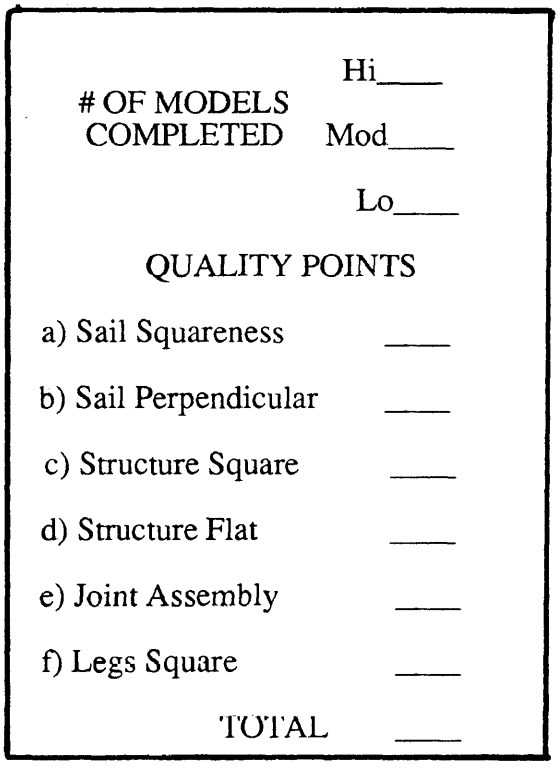
Specific + Specific



Non-Specific + Non-Specific



Specific + Non-Specific



Non-Specific + Specific

Appendix E

Rated Specificity of Feedback Measure

INSTRUCTIONS: Please respond to the following statements using the rating scales provided. Circle the number corresponding to the response you feel is appropriate. Please provide a response for every statement below.

1. At the mid-point of the model construction task the experimenter let me know exactly how many models I had completed.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
Moderately Agree

2. At the mid-point of the activity I was informed precisely how many models I had completed.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
Moderately Agree

3. At the mid-point of the activity the experimenter let me know exactly how many quality points I had earned.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
Moderately Agree

4. At the mid-point of the activity I was informed precisely how many quality points I had earned.

Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
Moderately Agree

Appendix F

Perceived Controllingness-Supportiveness of Feedback Measure

INSTRUCTIONS: For each pair below circle the number that corresponds best to your reaction to the following sentence.

The feedback given to me at the mid-point of the model construction task was:

Item #			
1)	Helpful	1 2 3 4 5 6 7 8 9	Not Helpful
2)	Not Useful	9 8 7 6 5 4 3 2 1	Useful
3)	Not Controlling	1 2 3 4 5 6 7 8 9	Controlling
4)	Constraining	9 8 7 6 5 4 3 2 1	Not Constraining
5)	Informative	1 2 3 4 5 6 7 8 9	Not Informative
6)	Regulating	9 8 7 6 5 4 3 2 1	Not Regulating
7)	Self-governed	1 2 3 4 5 6 7 8 9	Other-governed
8)	Evaluative	9 8 7 6 5 4 3 2 1	Not Evaluative

Appendix G

Task Interest Measure

INSTRUCTIONS: Please respond to the following questions using the rating scales provided. Circle the number corresponding to the response you feel is appropriate. Please respond to every statement below.

1. How interesting was the model construction task?

Not at All Interesting 1 2 3 4 5 6 7 Extremely Interesting
Moderately Interesting

2. How challenging was the activity?

Not at All Challenging 1 2 3 4 5 6 7 Extremely Challenging
Moderately Challenging

3. How involved were you in the activity?

Not at All Involved 1 2 3 4 5 6 7 Extremely Involved
Moderately Involved

4. How much concentration did the activity require?

No Concentration At All 1 2 3 4 5 6 7 Extreme Concentration
Moderate Concentration

5. How intriguing did you find the activity to be?

Not at All Intriguing 1 2 3 4 5 6 7 Extremely Intriguing
Moderately Intriguing

Appendix H

Task Satisfaction Measure

INSTRUCTIONS: Please respond to the following questions using the rating scales provided. Circle the number corresponding to the response you feel is appropriate. Please respond to every statement below.

1. How satisfying would you describe performing the model construction task to be?

Not at All Satisfying 1 2 3 4 5 6 7 Extremely Satisfying
Moderately Satisfying

2. How challenging would you describe performing the activity to be?

Not at All Challenging 1 2 3 4 5 6 7 Extremely Challenging
Moderately Challenging

3. How much of a sense of accomplishment did performing the activity give you?

No Sense of Accomplishment 1 2 3 4 5 6 7 Extreme Sense of Accomplishment
Moderate Sense of Accomplishment

4. How pleasant would you describe performing the activity to be?

Not at All Pleasant 1 2 3 4 5 6 7 Extremely Pleasant
Moderately Pleasant