The Effects of Goal Orientation and Type of Feedback on Perceived Competence and Performance

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THE EFFECTS OF GOAL ORIENTATION AND TYPE OF FEEDBACK ON
PERCEIVED COMPETENCE AND PERFORMANCE

A Thesis

Presented to

The Faculty of the Department of Psychology

Western Kentucky University

Bowling Green, Kentucky

In Partial Fulfillment

of the Requirement for the Degree

Master of Arts

by

Adam David Leezer

May 2003
THE EFFECTS OF GOAL ORIENTATION AND TYPE OF FEEDBACK
ON PERCEIVED COMPETENCE AND PERFORMANCE

Date Recommended

Director of Thesis

Dean, Graduate Studies and Research
Acknowledgements

I would like to gratefully acknowledge the supervision of my thesis advisor Dr. Adrian Thomas, as well as the comments and suggestions provided by my committee members Dr. Betsy Shoenfelt and Dr. Sam McFarland. I would like to thank my parents for their advice and encouragement throughout the course of this project, as well as their love and support through all my years of school. I would also like to thank Ashley who helped me a great deal during the data collection phase and throughout the project. WKU’s Research Committee provided funding for the creation of the computer program used in this study, and I am thankful for this support.
# Table of Contents

List of Tables ........................................................................................................... v

Abstract ................................................................................................................. vi

Review of Literature .............................................................................................. 1

The Present Study ................................................................................................. 19

Method .................................................................................................................... 23

Results ..................................................................................................................... 27

Discussion ............................................................................................................... 30

References ............................................................................................................. 40

Appendix A: Sample Screens ................................................................................. 44

Appendix B: Experimental Problems .................................................................... 46

Appendix C: Feedback Conditions ......................................................................... 47

Appendix D: Experimental Instructions ................................................................. 48

Appendix E: Goal Orientation Measure ................................................................. 49

Appendix F: Perceived Competence Measure ....................................................... 50
List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1</td>
<td>Racial Composition of Experimental Sample</td>
<td>23</td>
</tr>
<tr>
<td>Table 2</td>
<td>Means, Standard Deviations, and Reliability Estimates for Experimental Scales</td>
<td>27</td>
</tr>
<tr>
<td>Table 3</td>
<td>Task Performance Means, Standard Deviations, and Cell Sizes, Broken Down By Feedback Condition and Goal Orientation</td>
<td>28</td>
</tr>
<tr>
<td>Table 4</td>
<td>Perceived Competence Means, Standard Deviations, and Cell Sizes, Broken Down By Feedback Condition and Goal Orientation</td>
<td>29</td>
</tr>
</tbody>
</table>
Abstract

The theory of goal orientation holds that persons will generally be motivated by one of three goal orientations in an achievement setting: a learning orientation, a performance-prove orientation, or a performance-avoid orientation. These goal orientations create the mental frameworks that an individual uses to interpret and respond to achievement settings, and are associated with different cognitive, behavioral, and affective responses to feedback, task-difficulty, and task success/failure. In addition, different types of feedback can orient individuals to different aspects of a task, and result in differing feedback effects. The present study examined how different types of feedback affect the perceived competence and performance of persons with different goal orientations. College students ($n = 90$) completed a series of ten computer-simulated puzzle tasks and received either task feedback, normative feedback, or no feedback after each puzzle. After completion of the task, the student’s perceived competence and goal orientation were measured. Contrary to the hypotheses, no main effects of goal orientation or type of feedback were found for either performance or perceived competence. A series of planned comparisons was also conducted to test the effects of particular feedback conditions on participants with specific goal orientations. Of these three comparisons, only one was significant. Among participants receiving normative
feedback, those with a learning goal orientation performed significantly better than participants with either type of performance orientation. The prediction that task feedback would increase the performance and perceived competence of learning goal participants as compared to other types of feedback was not supported. Also, performance-prove participants did not perform significantly better or have higher perceived competence than performance-avoid participants in the no-feedback condition.
Performance feedback is an important part of most work and training environments. The successful use of feedback can increase the quality of work and the utility of training programs (Ilgen, Fisher, & Taylor, 1979; Martocchio & Dulebohn, 1994). Despite the obvious potential benefits of effective feedback, some individuals performances are actually harmed by the knowledge of their results; that is, receiving negative feedback can cause some individuals to attribute their failure to lack of ability, and reduce the effort they give to the task (Diener & Dweck, 1978). Individual difference variables have long been suggested to be a factor in this potentially contradictory result. In particular, there has been a strong interest in the individual difference variable of goal orientation. The goal orientation used by an individual has been found to effect outcomes in various achievement settings (i.e., classroom, training and work settings; Button, Mathieu & Zajac, 1996; Elliot & McGregor, 1999; VandeWalle, Cron, & Slocum, 2001). Likewise, it has long been known (Dweck, 1986) that individuals with the same perceived level of ability will perform at different levels on the same task. For that reason, an individual’s goal orientation has been theorized to be one of the variables involved in mediating the effects of perceived ability on task performance, as well as reactions to performance feedback (Dweck, 1999).

In addition to individual difference variables such as goal orientation, the type of feedback given is also a factor in determining whether feedback (especially negative feedback) will prove beneficial (Butler, 1993; Hoffmann & Strickland, 1995; Martocchio et al., 1994). Feedback that focuses a person’s attention on his or her performance as it
compares to other people can have very different effects than feedback that focuses on personal goals or on effective performance of the task itself. Due to the nature of the different thoughts, beliefs and strategies associated with different goal orientations, knowledge of a person’s goal orientation can help predict which type of feedback will be most effective (Butler, 1993). The focus of the present study was to investigate the effect that goal orientation and different types of performance feedback have on an individual’s perceived competence and performance on a computer-simulated puzzle task.

Goal Orientation: A Brief Overview

The construct of goal orientation emerged from a series of studies conducted by Dweck and her colleagues (Dweck, 1986; Dweck & Leggett, 1988; Elliot & Dweck, 1988). Nicholls (1979, 1984) also proposed a similar theory. A goal orientation creates the mental frameworks that an individual uses to interpret and respond to achievement settings. A person’s goal orientation has been found to predict problem-solving strategies used and perseverance in the face of difficulty, as well as long-term success at a task (especially a challenging one; Ames & Archer, 1988; Deiner & Dweck, 1980).

Goal orientation theory states that a person will pursue one of two goals in an achievement setting. First, a learning goal emphasizes understanding something new and increasing one’s level of competence at a given activity. Second, a performance goal emphasizes demonstrating one’s ability and gaining favorable judgments from others (or avoiding negative judgments; Dweck, 1988). These goals create a framework for an individual’s interpretation of events and outcomes in an achievement situation, and are associated with different cognitive, behavioral, and affective responses to feedback, task-difficulty, and task success/failure (Elliot & Dweck, 1988).
In general, a learning goal is associated with more adaptive responses and strategies, while a performance goal is usually seen as a maladaptive response pattern. Some evidence (Elliot & Harackiewicz, 1996), however, has suggested that some performance goals may be beneficial to task performance and self-regulation strategies. For example, performance goals may be preferable if the task is relatively simple and the performer is skilled in the task.

*The Origins of Goal Orientation Theory*

Dweck and her colleagues’ research on learned helplessness in children marked the beginnings of goal orientation theory by revealing two patterns of responses to failure (Diener & Dweck, 1978, 1980). Dweck presented fifth and sixth grade children a series of conceptual problems. Children were given hints and feedback so that they could correctly solve the first eight problems; however the final four problems were designed to be too difficult for children of that age. Children were encouraged to verbalize everything they were thinking while completing the task, whether task related or not. Dweck noticed that children reacted to the four “failure” problems in one of two ways, which she called the *helpless* reaction and the *mastery-oriented* reaction. Helpless children reacted by doubting their intelligence, lowering expectations, and decreasing their persistence and performance. They attributed their failure to internal or uncontrollable factors such as their level of ability, and discounted the string of successes they had just had. Students with a mastery-oriented pattern, however, did not seem to consider themselves to be failing. These children reacted to failure as if it were useful feedback and plunged in, issuing self-regulating instructions to themselves to improve their performance. Some mastery-oriented students even solved problems that were supposedly too difficult for
them. While students in the helpless groups saw their perceptions of their ability decrease with each failure, the students in the mastery-oriented groups did not see failure as indicative of a lack of ability.

Dweck theorized that perhaps the very different reactions of helpless and mastery-oriented children were due to the children having two different types of goals. She proposed that the helpless-response children were pursuing performance goals and were hoping to receive positive judgments and avoid negative judgments about their ability. The mastery-oriented children were pursuing a learning goal, so their failure was merely part of the process of learning. They wanted to increase their knowledge and learn what they could from the task. Dweck’s studies with children found these two types of goals to be fairly ubiquitous. While 15% of children did not fit into either category, the remaining 85% was split about evenly between the learning and performance goal orientations (Dweck, 1999).

Dweck’s studies also found goal orientation to affect problem-solving strategies used by students. In particular, when students who primarily adopted a performance goal encountered difficult problems on a test, they abandoned the effective problem-solving strategies they had been using earlier in the test, and many lapsed into completely ineffective strategies such as making random guesses. Even when the test questions returned to an easier level, the students with a performance goal orientation maintained the ineffective strategies, and were unable to solve types of problems they were able to solve earlier in the test. Students with learning goals maintained or improved their strategies when faced with these “failure” problems (Diener & Dweck, 1980). Students who adopted a learning goal orientation were more likely to use learning strategies that
were related to attending, processing, self-monitoring, and deep-processing of verbal information (Ames & Archer, 1988).

Nicholls (1979, 1984) formed a similar theory of goal orientation at about the same time. He posited that people hold one of two conceptions about the nature of ability and the criteria for judging one’s own ability. Nicholls’ two task conceptions differ in the degree to which effort and ability are differentiated in the person’s mind. The first, and less differentiated conception (which he called task involvement) is that ability is gauged by a person’s perception of how much he or she knows, and increases in knowledge lead to increases in competence. As a result, the act of putting forth effort to complete a challenging task is seen as a useful process to increase ability and is the source of their enjoyment. The second, and more differentiated conception (named ego involvement) is that ability is judged in reference to the ability of others in a normative reference group. Therefore, establishing one’s ability requires succeeding where others have failed, and putting forth the same or less effort to achieve the success. In this view, putting forth more effort than someone else to achieve the same level of performance indicates lack of ability, so therefore effort is not valued. Person’s who are ego-involved (which corresponds to a performance orientation) have been found to be less likely to hold the belief that effort is the primary cause of success, and are more likely to endorse such items as “If you have to work hard at some problems, you’re probably not very good at them” (Ames & Archer, 1988).

As a result, individuals who are ego-involved will choose an easy task over a moderately difficult one because success is guaranteed, or they will choose a nearly impossible task, in which failure is expected and acceptable (Dweck & Leggett, 1988).
With either outcome, their level of ability cannot be shown to be lacking. Individuals who are task-involved will choose tasks of moderate difficulty, and generally of a difficulty level similar to their perceived ability level. The combination of Nicholls’ and Dweck’s theories (as well as the research of many others) has formed the present conception of goal orientation theory. Dweck’s nomenclature (learning and performance goal orientations) will be used for the remainder of the current paper. However, research findings presented in the next section will result in the performance goal orientation being split into two separate orientations.

*Goal Orientation as a Three Factor Construct*

Although most of the initial research on goal-orientation viewed the construct as possessing two factors (learning and performance), recent research (Elliot & Harackiewicz, 1996; VandeWalle, 1997; VandeWalle et al., 2001) has shown that goal orientation may be better conceptualized as a three-factor construct. This research regards the learning goal as a separate, single type of goal orientation, but treats the performance goal orientation as encompassing two separate orientations. The first, *performance-prove* goal orientation, is the desire to demonstrate one’s competence and look good in front of others; the second, *performance-avoid* goal orientation, is the desire to avoid negation of one’s competence and avoid negative judgments from others (VandeWalle et al., 2001). A series of articles by Elliot and his colleagues suggested just how different the outcomes of the performance-avoid goal orientation are from the performance-prove goal orientation (Elliot & Church, 1997; Elliot & Harackiewicz, 1996; Elliot & McGregor, 1999; Elliot & Sheldon, 1997).
Elliot and Harackiewicz (1996) conceptualized the three goal orientation constructs from an approach/avoid viewpoint by grouping the learning goal orientation and the performance-prove goal orientation together as approach orientations since both are concerned with potential positive outcomes. The performance-avoid goal is concerned with avoiding negative outcomes, and therefore was seen as different from the other two concepts. This approach and avoid grouping was an attempt to integrate goal orientation theory with early motivation theories that recognized the approach and avoid nature of motivation goals (Atkinson, 1957; Lewin, Dembo, Festinger, & Sears, 1944). The results of this study found that a performance-avoid goal undermined intrinsic task interest and also reduced task enjoyment when compared with the two approach goals (learning and performance-prove). Elliot and Church (1997) retained the approach/avoid framework and found that pursuit of a performance-avoid goal hurt exam performance among a college student sample, while a performance-prove goal was found to be conducive to good performance. Elliot and McGregor (1999) replicated these findings and found that a learning goal was positively associated with retention of lecture material, a performance-prove goal was unrelated to retention, and a performance-avoid goal was negatively related to retention of lecture material. Performance-prove goals were found to facilitate exam performance in the short run, while learning goals facilitated performance over the course of an entire semester.

Elliot and Sheldon (1997) suggested that the performance-avoid orientation may cause the person to be overly sensitive to the possibility of negative outcomes, excessively anxious about negative feedback, and waste cognitive resources by being constantly on the lookout for possible negative outcomes. A meta-analysis by Elliot
(1994; cited in Elliot & Harackiewicz, 1996) revealed that distinguishing between the performance-prove and performance-avoid orientations was found to enhance the predictive power of the overall model and to improve the fit of the data to the hypothesized goal orientation models. Given these findings, as well as the increasing consensus among researchers that goal orientation is a three-factor construct, three factors of goal orientation will be used for the current study.

**Summary of Goal Orientation**

The above research findings document the influence that achievement goals have on behavior, cognitions, choice of problem-solving strategies, and reactions to failure. Although originally conceptualized as a two-factor construct, researchers (e.g., Elliot & Harackiewicz, 1996) have now suggested that there are actually three types of goal orientation. First, a learning orientation is associated with developing ability through effort, higher performance, more effective problem-solving strategies and continued effort in the face of failure (Ames & Archer, 1988; Nicholls, 1984). Second, a performance-prove orientation is associated with demonstrating one’s ability and looking good in front of others. Finally, a performance-avoid orientation is associated with avoiding negation of one’s ability in front of others. Although different in some respects, the performance-prove and performance-avoid orientations share a belief that effort should not be required if ability exists (Dweck, 1986; Nicholls, 1984). The performance orientations also exhibit ineffective problem-solving strategies and decreased performance in the face of failure (Ames & Archer, 1988). A performance-prove orientation has been found to lead to more adaptive outcomes than a performance-avoid orientation in achievement settings (Elliot & McGregor, 1999; Elliot & Sheldon, 1997).
Feedback

Ilgen et al. (1979) define feedback as “information received by an individual about his or her past behavior. It provides some information about the correctness, accuracy, or adequacy of the response” (p. 351). Feedback has long been recognized as a key element in direction and motivation of behavior in achievement settings (Ilgen et al.). The beneficial effects of feedback have also been well documented. In particular, providing individuals with timely, specific feedback can enhance performance, as well as promote goal setting in situations where no goals are present (Johnson, Perlow, & Pieper, 1993). Feedback has also been associated with increased perceived competence and task enjoyment (Sansone, 1986).

The relationship between feedback and positive outcomes is not simple, however. The positive effects associated with feedback in an achievement setting are dependant on the sign of the feedback (positive or negative), the perceptions of the person receiving the feedback, and the characteristics of the feedback itself. Positive feedback has been shown to be more accurately perceived and to lead to higher perceived competence and performance than negative feedback (Sansone, 1986). In addition, to have the greatest beneficial effects the feedback must be perceived as accurate, as coming from a credible source, and as providing information that is seen as useful by the recipient (Ilgen et al., 1979).

The beneficial effects of feedback also depend on type of information provided by the feedback itself. Three types of feedback are potentially available in an achievement setting: task information, which suggests strategies to improve performance; objective information, which indicates the degree to which performance is meeting
demands of the task; and *normative information*, which describes performance relative to some normative group (Butler, 1993). These different types of feedback can orient individuals to different aspects of the task and result in varying degrees of positive feedback effects. Feedback that provides correct solutions (task feedback) emphasizes the task itself without concern for personal outcomes relative to a normative group. Alternatively, feedback that provides information about performance compared to others (normative feedback) can emphasize personal outcomes without highlighting the optimal performance of the task (Sansone, 1986).

Previous research has shown that different types of feedback have different effects on performance and perceived competence. Johnson et al. (1993) conducted a study in which college students performed a highly complex computer simulation task over six trials, and were given either task feedback (number of errors made and instructions on how to avoid them in the future) or objective feedback (number of errors only) after each of the first four trials. The results showed that participants who received task feedback made fewer errors than those who received objective feedback. The authors concluded that this outcome was attributable to the task feedback directing the participant’s attention toward increasing competence versus objective feedback that merely stated whether or not errors were being made.

In a similar vein, Sansone (1986) conducted a study to examine the effects of different types of feedback on perceived competence and task enjoyment. Participants completed a puzzle task and were either given task feedback, normative feedback, task and normative feedback both, or no feedback after finishing the task. Participants receiving either task or normative feedback were able to determine their absolute
performance (raw score), and all participants received the same raw score. Participants were then given the opportunity to look through their responses, and compare them to the correct responses, and last, completed a questionnaire regarding task-enjoyment and perceived competence. The results indicated that, as hypothesized, participants who received normative feedback had the highest level of perceived competence. Task feedback increased perceptions of perceived competence compared to no-feedback, but not to the extent that normative feedback did. The researchers concluded that because the normative feedback provided the clearest picture of competence (absolute performance level and relative performance level), it resulted in the highest levels of perceived competence. Also as hypothesized, the normative-only and task-only conditions resulted in the highest levels of task enjoyment. Unexpectedly, however, when both task and normative feedback were provided perceived competence was increased but enjoyment was not. The researchers concluded that this outcome was due to the two types of feedback highlighting differing aspects of the task, and thus leaving the participant ambiguous as to which aspect was most important.

*Goal Orientation and Types of Feedback*

The goal orientation literature has demonstrated that individuals who adopt different achievement goals assess their performance by different standards (Butler, 1993), and thus it could be expected that different goal orientations would benefit from different types of feedback. The nature of the three goal orientations predicts (and research has suggested; Butler, 1993; Hoffmann & Strickland, 1995) which types of feedback match the needs of which orientations. Person’s with a performance-prove orientation tend to assess their performance through comparison to others and prefer
normative information. Persons with a performance-avoid orientation also prefer normative information, although they will prefer no feedback if they perceive themselves to be failing. Learning oriented persons prefer to gauge their improvement from task to task and prefer objective or task information (Hoffmann & Strickland, 1995).

To understand the feedback preferences of the different goal orientations, one can turn to the literature on feedback-seeking behavior. Butler (1993) conducted a study to examine the effect that an individual’s goal orientation and ability had on his or her choice of feedback when several feedback options were available. The researcher had participants perform a series of computer-based puzzles and offered a choice of five types of feedback after each puzzle: task (best solutions), objective (participant’s score for the problem), cumulative objective (total score so far), normative (percentile range compared to others for that problem), and cumulative normative (percentile range for problems so far). Performance on two practice problems was used to group participants into high or low ability categories, and thus actual ability level was used as a variable (as opposed to perceived competence level).

Butler found that not only did type of achievement goal have an effect on type of feedback chosen but also within the performance goal condition, ability level greatly affected this choice. Low ability participants operating under the performance orientation rarely sought task information, sought normative information early on, and continued to seek such information only as it confirmed their high ability. If feedback continued to indicate low ability, low-ability persons with a performance orientation reduced the effort they gave to the task. High-ability participants with a performance orientation requested more normative information than either the low-ability performance or learning
conditions, and were the only group who continued to prefer normative information into the later problems in the task. Persons in the learning orientation made the most frequent requests for task information (regardless of ability level), which was the only type of information that was relevant to promoting mastery.

Although performance-prove and -avoid orientations were not defined explicitly in this study, persons in the performance goal condition who indicated high ability behaved in a manner consistent with the performance-prove orientation (interest in their performance as compared to others) while low-ability performance goal participants seemed to be adopting a performance-avoid orientation (little interest in normative information, and effort reduction strategies). This is consistent with Nicholls' (1984) prediction that a performance-oriented person's perception of his or her ability would determine if he or she would be motivated to either approach or avoid success.

The interaction between goal orientation and type of feedback is not limited to mere preference of type of feedback; persons with different goal orientations differ in their affective reactions to feedback as well. Jagacinski and Nicholls (1987) studied the impact that social comparison (normative) information had on persons with either a learning or performance goal orientation (the distinction between the performance-prove and performance-avoid orientations was not made in this study). Similar to Butler (1993), the role of ability was examined in relation to feedback; however, in this study perceived competence was the variable of interest, not actual ability level. Participants were asked to imagine one of two tasks. For the learning orientation condition, participants were asked to imagine a task which they enjoyed doing for its own sake. For the performance orientation condition, participants were asked to imagine a task for
which they felt it was very important to be outstanding, and for which they would feel terrible if they were below average. Participants in both conditions were then asked to imagine that they had succeeded at the task with either very high or very low effort. The level of effort was intended to indicate the level of competence, with high effort indicating low ability. Half of the participants were then given social comparison information that indicated that other students required either much less or much more effort than they had required.

The results showed that participants in the learning and performance conditions had similarly high positive affect and competence levels when no social information was given. However, when social comparison information was given, it had major negative impacts on the affect and perceived competence for participants in the performance orientation/high effort condition. In the learning goal condition, social information did not significantly alter judgments of competence or affect, regardless of effort level. These results indicated that when persons are operating with a performance goal orientation, negative social information can lower the individual’s affect, which would be likely to affect performance as well (Jagacinski & Nicholls, 1987).

The Effects of Feedback on the Two Types of Performance Goals

The goal orientation research described earlier demonstrated that performance-prove and performance-avoid goal orientations are different in nature; however, these orientations are both associated with a differentiated conception of ability and effort (high effort indicates lack of ability), as well as a concern with the appearance of ability in front of others. For that reason one would expect (and research has found evidence) (VandeWalle et al., 2001) that after experiencing failure (i.e., negative feedback), the
performance-prove and performance-avoid goals would result in more similar and
maladaptive outcomes, and the learning goal orientation would result in more adaptive
outcomes. The benefits of having a performance-prove goal orientation seem to
deteriorate after reception of negative feedback, although this deterioration is not as
pronounced when one considers variables such as actual ability and perceived
competence level.

VandeWalle et al. (2001) examined the relationship between goal orientation and
task performance over the course of two achievement tasks, with performance feedback
presented after the first task. The study was conducted over the course of a semester in a
college psychology class, with the first task being the midterm exam and the second task
being the final exam. Feedback was in the form of exam grades and written comments.
As expected, for the first task a learning orientation as well as a performance-prove
orientation were associated with high performance. However, after receiving feedback,
persons with a performance-prove orientation deteriorated to a nonsignificant relationship
with performance, while a learning goal orientation remained positively associated with
performance. Persons with a performance-avoid orientation showed a nonsignificant
relationship with performance for the first task and deteriorated to a negative relationship
with performance for the second task. The authors suggested that the relationship
between the three goal-orientations and performance was mediated by self-regulation
variables (i.e., effort, self-efficacy, and goal-setting), which were found to be positively
associated with a learning orientation, nonsignificantly associated with a performance-
prove orientation (with the exception of effort, which was positively associated with a
performance-prove orientation) and negatively associated with a performance-avoid orientation.

VandeWalle, Brown, Cron, and Slocum (1999) found similar results in a longitudinal field study involving salespeople. Feedback of sales performance (as well as other’s sales performance) was constantly available throughout the 90-day study. As hypothesized, a learning goal orientation had a positive relationship with sales performance, a performance-prove goal orientation was unrelated to sales performance, and a performance-avoid orientation was negatively associated with sales performance. The authors suggested that the focus on continuous skill development that is associated with the learning goal orientation was responsible for the positive relationship with that orientation and performance even in the face of negative feedback.

Now the question is posed: why does the relationship between task performance and a performance-prove orientation seem to deteriorate in the presence of feedback, while a learning goal remains positively related to performance in spite of feedback? Research has suggested several different (yet related) reasons for the failure-induced performance deterioration of performance-prove oriented individuals. Primarily, goal orientation influences how persons interpret the feedback given to them. A learning goal orientation leads to viewing feedback as useful diagnostic information that can help improve performance, while a performance orientation leads to viewing feedback as judgmental information about oneself. As a result, a learning goal orientation would seem to be more likely to lead to gleaning the useful information from feedback, rather than avoiding its true message for self-preservation reasons (VandeWalle et al, 2001). Secondly, research suggests (Elliot, & Harackiewicz, 1996; Farr, Hoffmann, &
Ringenbach, 1993) both performance-avoid and performance-prove orientations do not allow a person to attend to as much positive information as a learning goal orientation (with performance-avoid being overly attentive to negative information). This inability to use feedback’s information, coupled with the fact that persons with either type of performance orientation tend to believe that ability is hard to develop, can cause even mildly negative feedback to decrease one’s belief in the value of continued effort (VandeWalle et al., 2001).

Summary of Feedback Literature

Feedback has been found to have positive effects on performance; however, characteristics of the feedback itself and the perception of the receiver affect whether feedback actually proves beneficial (Ilgen et al., 1979). Different types of feedback also have been found to mediate the relationship between feedback and variables such as task performance, perceived competence, and task enjoyment. Normative feedback has been found to increase perceived competence compared to task feedback (Johnson et al., 1993; Sansone, 1986). Persons with different goal orientations also generally prefer different types of feedback. Persons with a learning orientation tend to prefer task and objective information, while persons with either a performance-prove or a performance-avoid orientation generally prefer normative information (Butler, 1993). Negative social (normative) information can have deleterious effects on the perceived competence, and affect of persons with performance goal orientations (Jagacinski & Nicholls, 1987). Initial research suggested that a performance-prove goal orientation resulted in higher performance outcomes normally associated with a learning goal orientation (Elliot & Harackiewicz, 1996). Subsequent research, however, found that under negative feedback
conditions the performance of persons with a performance-prove orientation suffered while persons with a learning orientation suffered no ill effects. A performance-avoid orientation has been found to be generally maladaptive (VandeWalle et al, 2001). This deterioration may be attributable to the conception of ability (it is hard to develop), and the negative view of failure that is associated with performance goals.
The Present Study

In the present study the combined effects of goal orientation and type of feedback on task performance and perceived competence were examined. Primarily, participants classified as either having a learning, performance-prove or performance-avoid orientation were randomly assigned to one of three feedback conditions: normative feedback, task feedback (optimal problem solution), or no feedback. Participants were given feedback after each problem of a computer-simulated task, and their task performance and perceived competence were measured following completion of the task.

Although previous studies have examined the combined effects of these variables, no previous study has examined the differing effects of normative and task feedback on the three-construct goal orientation model. Also, studies similar in design to the present study (Butler, 1993; Hoffmann & Strickland 1995) have offered participants a choice of type of feedback, while the present study assigned the type of feedback. In a real-world feedback situation it is unlikely that a choice of type of feedback would be offered, thus one goal of this study was to measure the effects feedback has when no choice is available. In addition, previous studies that have examined effects of feedback on perceived competence (Jagacinski & Nicholls, 1987; Sansone, 1986) have not examined the distinction between the performance-prove and performance-avoid goal orientations.

Although the ultimate concern of the present research was the combined effects of goal orientation and type of feedback on the dependent variables, an initial goal of the research was to examine any main effects that goal orientation and feedback may have on task performance and perceived competence. Previous research has found that different
goal orientations have different relationships with task performance. Specifically, although a learning goal orientation has been consistently found to have a positive relationship with task performance (VandeWalle et al., 1999; VandeWalle et al., 2001), the relationship between performance goals and task performance has been found to be positive (performance-prove only; Hoover et al., 1999; cited in VandeWalle et al., 2001) negative (Ford, Smith, & Wiessbien, 1998), and nonsignificant (VandeWalle et al., 1999). Regarding the relationship between goal orientation and perceived competence, previous research (Hoffmann & Strickland, 1995) has found that a learning goal orientation led to higher perceived competence than either a performance-prove or a performance-avoid goal orientation. These findings support the first hypotheses.

Hypothesis #1a: There will be a significant main effect of goal orientation on task performance.

Hypothesis #1b: There will be a significant main effect of goal orientation on perceived competence.

Previous research has also shown that different types of feedback have different relationships with task performance and perceived competence. Task feedback that suggests optimal task performance has been found to lead to higher task performance than objective feedback, or no feedback (Johnson et al., 1993). In addition, normative feedback has been shown to lead to higher perceived competence than task feedback, although a positive relationship was found with perceived competence for both types of feedback (Sansone, 1986). These results suggest the following hypotheses.

Hypothesis #2a: There will be a significant main effect of feedback on task performance.
Hypothesis #2b: There will be a significant main effect of feedback on perceived competence.

Although the first two hypotheses suggest main effects of goal orientation and feedback, the interaction of goal orientation and feedback is the central interest of the present study. It is this interaction that suggests the remaining hypotheses, which are more specific in nature. Thus, a goal of the present research was to show that the similarities between the performance-prove and learning goal orientations may deteriorate under conditions of normative feedback. VandeWalle et al. (1999) found that when continuous normative feedback was present, a learning goal maintained a positive relationship with performance, while a performance-prove goal had a nonsignificant relationship with performance. These results suggest the logic of the third hypothesis.

Hypothesis #3: In the normative feedback condition, individuals with a performance-prove and a performance-avoid orientation will perform at a significantly lower level than individuals with a learning orientation.

Considering that persons with a learning goal generally wish to improve their competence, it would be expected that task information that can aid mastery would increase their performance during the task, and perceived competence following the task. Due to the fact that in previous research (Butler, 1993) a learning goal was associated with a disinterest in normative information and increased performance following receipt of task information, the following hypothesis is proposed:

Hypothesis #4: Task feedback will lead to higher performance and perceived competence for learning goal participants than either normative or no feedback.
Studies performed by Elliot and colleagues (Elliot & Harackiewicz, 1996; Elliot & McGregor, 1999) demonstrated that as long as the person’s ability is not called into question, a performance-prove orientation can lead to adaptive outcomes similar to a learning goal orientation. Thus, it was expected that adaptive outcomes would result if no feedback was given to potentially disrupt the positive conception of ability necessary for the performance-prove orientation. In the absence of feedback, the positive outcomes produced by the approach nature of the performance-prove goal would lead to outcomes more similar to the learning goal participants than the performance-avoid goal participants. As a result, the last hypothesis is proposed:

Hypothesis #5: In the no-feedback condition, performance-prove participants will have levels of perceived competence and performance significantly higher than the performance-avoid participants.
Method

Participants

One hundred undergraduate students participated in the study in exchange for extra credit in their psychology classes. Ten participants were removed because they did not complete all ten of the puzzle tasks, resulting in a final sample of 90 participants. Thirty students participated in each of the three feedback conditions. Of the final sample, 22 were male, and 68 were female, with an average age of 19.7 years ($SD = 2.8$). The majority of participants were Caucasian (84.4%). For a detailed breakdown of participants by race see Table 1.

Table 1.

<table>
<thead>
<tr>
<th>Race</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caucasian</td>
<td>76</td>
<td>84.4%</td>
</tr>
<tr>
<td>African American</td>
<td>8</td>
<td>8.9%</td>
</tr>
<tr>
<td>Latino/Latina</td>
<td>1</td>
<td>1.1%</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>3</td>
<td>3.3%</td>
</tr>
<tr>
<td>Native American</td>
<td>1</td>
<td>1.1%</td>
</tr>
<tr>
<td>Eastern European</td>
<td>1</td>
<td>1.1%</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>100%</td>
</tr>
</tbody>
</table>

Experimental Task

The task that was used in the present study was a computer-simulated version of Luchins’ (1942) water-jar task (See Butler, 1993; Hoffmann & Strickland, 1995), which presented three jars of different volumes to the participant (See Appendix A, Figure A1). Participants were given a target volume of water that they measured by filling jars, emptying jars into a sink or pouring the contents of one jar into the other jar. For
example, participants might be given jars with the following volumes: Jar A=21 oz, Jar B=127 oz and Jar C=3 oz. Participants might then be asked to measure a target volume of 100 ounces of water. The optimal solution is to fill Jar B, pour out some of the water into A until it is full, and then pour Jar B into Jar C twice. The amount left in Jar B equals 100 oz; 127 - 21 - 2(3) = 100. Alternative solutions requiring more moves were also possible, however students were instructed to try to complete each puzzle in the fewest number of moves possible. Of the ten problems that were presented in the current experiment (See Appendix B) the first five problems (after the practice problem) were able to be solved using the same equation (B - A - 2C). The last five problems also shared the same optimal solution (A - 2B +C). Participants were not informed that problems shared a common solution.

Procedure

Participants were randomly assigned to one of three feedback conditions (See Appendix C):

1) No Feedback;

2) Task feedback – the correct solution for the problem just completed to achieve the optimal number of moves;

3) Normative feedback – The person’s percentile rank within the distribution of scores from the first two conditions.

Subjects were given an informed consent form to read. The form explained the purpose and nature of the study, procedures of the study, potential discomforts and risks, and the right to refuse participation or withdraw from the study. If the subjects agreed to participate, they were asked to sign the consent form. Participants were then seated at a
computer, at which they completed the experimental task. The task instructions were attached to the consent document, and students were instructed to read the instructions to themselves while the researcher read them aloud. The instructions (See Appendix D) explained the task, the computer screen layout, and the use of the computer to solve the problems. After completion of the instructions, participants completed a practice problem which was included to familiarize them with the task. After completing the practice problem, the participants then completed the ten problems described above, and received feedback as per their experimental condition after each problem (See Appendix A, Figures A2, A3, & A4). The type of feedback remained constant throughout the task. Following completion of the puzzles, the participants were given paper and pencil versions of the perceived competence measure, goal orientation measure, and demographic questions. After completion of these measures the participants were debriefed and allowed to leave.

Measures

Task Performance. The total number of moves the participant used to solve the ten puzzle problems served as the measure of task performance. Since participants were instructed to solve the puzzles in the fewest number of moves possible, lower scores indicate higher performance.

Goal Orientation. Goal orientation was assessed with a 13-item instrument that was developed and validated by VandeWalle (2001). The instrument has three subscales: (a) four items that measure learning goal orientation (Appendix E, Items 1-4), (b) four items that measure the performance-prove orientation (Appendix E, Items 5-8), and (c) five items that measure the performance-avoid orientation (Appendix E, Items 9-13).
VandeWalle found the test-retest reliability estimates for the three subscales to be:
learning subscale, $r = .71$; performance-prove subscale, $r = .72$; and performance-avoid subscale, $r = .80$. A seven point Likert-type response scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), was used for each item. The goal orientation each participant was classified as having was determined by the subscale with the highest $z$-score.

**Perceived Competence.** Participants answered four questions regarding how competent they felt their performance was on the experimental task (See Appendix F). A seven point Likert-type response scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), was used for each item. The total score for the four questions was used as the participant’s perceived competence score.
Results

The means, standard deviations, and alpha reliability estimates from the present sample are included in Table 2 for each of the goal orientation subscales, as well as the perceived competence scale. For all of the analyses performed, a family-wise error rate of .05 was maintained.

Table 2.

*Means, Standard Deviations, and Reliability Estimates (α) for Experimental Scales.*

<table>
<thead>
<tr>
<th>Scale</th>
<th>Number of Items</th>
<th>M</th>
<th>SD</th>
<th>Reliability (α)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Subscale</td>
<td>4</td>
<td>18.84</td>
<td>4.42</td>
<td>.87</td>
</tr>
<tr>
<td>Performance-Prove Subscale</td>
<td>4</td>
<td>15.83</td>
<td>4.94</td>
<td>.77</td>
</tr>
<tr>
<td>Performance-Avoid Subscale</td>
<td>5</td>
<td>22.52</td>
<td>5.57</td>
<td>.80</td>
</tr>
<tr>
<td>Entire Goal Orientation Scale</td>
<td>13</td>
<td>57.20</td>
<td>8.49</td>
<td>.66</td>
</tr>
<tr>
<td>Perceived Competence Scale</td>
<td>4</td>
<td>18.43</td>
<td>5.45</td>
<td>.93</td>
</tr>
</tbody>
</table>

*Note. N = 90.*

A 3 (goal orientation) x 3 (feedback condition) repeated measures ANOVA was performed on the task performance data, with the number of moves on puzzles 1 through 10 serving as the within subjects factors. The main effect of goal orientation on task performance was nonsignificant $F(2,81) = 1.374, p = .259$. The main effect of feedback condition on task performance was also nonsignificant $F(2,81) = .494, p = .612$. Thus, hypotheses 1a and 2a were not supported.

A 3 (goal orientation) x 3 (feedback conditions) ANOVA was performed on the perceived competence scores, with the sum of the four perceived competence questionnaire questions serving as the dependant variable. The main effect of goal orientation on perceived competence was nonsignificant $F(2,81) = 1.021, p = .365$. The
main effect of feedback condition on perceived competence was also nonsignificant

\( F(2,81) = .181, p = .835 \). Thus, hypotheses 1b and 2b were also not supported.

Table 3.


<table>
<thead>
<tr>
<th>Feedback Condition</th>
<th>Goal Orientation</th>
<th>Learning</th>
<th>Performance-Prove</th>
<th>Performance-Avoid</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>( M )</td>
<td>( SD )</td>
<td>( n )</td>
</tr>
<tr>
<td>No Feedback</td>
<td></td>
<td>133.71</td>
<td>74.06</td>
<td>14</td>
</tr>
<tr>
<td>Task Feedback</td>
<td></td>
<td>123.70</td>
<td>48.68</td>
<td>10</td>
</tr>
<tr>
<td>Normative Feedback</td>
<td></td>
<td>86.17</td>
<td>26.38</td>
<td>12</td>
</tr>
</tbody>
</table>

*Note. \( N = 90 \).*

Based on hypotheses 3, 4, and 5, a set of planned comparisons were developed. Single degree of freedom F-tests were conducted to test the specific predictions of these hypotheses. The means, standard deviations and cell sizes used to compute these tests are presented in Table 3 for task performance and Table 4 for perceived competence. For Hypothesis 3, the F-test \( (F(1,81) = 48.41, p < .05) \) indicated that among participants who received normative feedback, those with a learning goal orientation performed the experimental task significantly better than participants with either performance-prove or performance-avoid goal orientations. The F-tests for Hypothesis 4 were not significant, indicating that neither the performance \( (F(1,81) = 3.12, p > .05) \) nor perceived competence \( (F(1,81) = .066, p > .05) \) for those with a learning goal orientation was
significantly higher in the task feedback condition than in the other two feedback conditions. The F-tests for Hypothesis 5 were also not significant, demonstrating that for participants in the no-feedback condition, neither the performance \((F(1,81) = 1.32, p > .05)\) nor perceived competence \((F(1,81) = 2.02, p > .05)\) was significantly higher for those with a performance-prove orientation or learning orientation, compared with those with a performance-avoid orientation.

Table 4.


<table>
<thead>
<tr>
<th>Feedback Condition</th>
<th>Goal Orientation</th>
<th>Learning</th>
<th>Performance-Prove</th>
<th>Performance-Avoid</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>n</td>
<td>M</td>
</tr>
<tr>
<td>No Feedback</td>
<td>18.64</td>
<td>5.06</td>
<td>14</td>
<td>19.78</td>
</tr>
<tr>
<td>Task Feedback</td>
<td>18.80</td>
<td>5.16</td>
<td>10</td>
<td>17.25</td>
</tr>
<tr>
<td>Normative Feedback</td>
<td>20.00</td>
<td>4.77</td>
<td>12</td>
<td>20.80</td>
</tr>
</tbody>
</table>

*Note. N = 90.*
Discussion

The present study sought to examine the main and combined effects of goal orientation and type of feedback on task performance and perceived competence. Although hypotheses 1 and 2 predicted that there would be a main effect of both goal orientation and type of feedback on perceived competence and performance, these predictions were not supported. In general, persons with different goal orientations did not perform significantly different on the experimental task and did not have differing levels of perceived competence upon completion of the task. The three feedback conditions also did not produce significantly different levels of performance and perceived competence for participants across those conditions. The fact that there were consistently nonsignificant effects of the independent variables on both performance and perceived competence is not surprising considering the high correlation between perceived competence and performance ($r = -0.59$, $p < .01$).

Hypotheses 3, 4, and 5 were more specific in nature and sought to predict the effects of a particular feedback condition on participants with different goal orientations. The prediction made by Hypothesis 3 was supported by the results. Among participants receiving normative feedback, those with a learning goal orientation performed significantly better than did participants with either a performance-prove or a performance-avoid orientation. The predictions offered by hypotheses 4 and 5 were not supported. Task feedback did not lead to higher performance or perceived competence than the other two feedback conditions for participants with a learning goal orientation. Also, the perceived competence and performance of performance-prove oriented
participants was not significantly higher than the performance-avoid participants in the no-feedback condition.

There are several possible explanations for the current study’s failure to produce an overall effect for goal orientation. The nature of the experimental task itself may have been to blame for the lack of significant results. Previous research that has shown a significant effect of goal orientation on performance or perceived competence has often involved tasks that were either performed over a long period of time (or several different sittings; VandeWalle et al., 1999; VandeWalle et al., 2001) or with highly complex tasks (Johnson et al., 1993). Hoover et al. (1999; cited in VandeWalle et al., 2001) noted that the learning goal orientation may have the most beneficial effects on performance when the task is dynamic, when new skills must be learned, or when feedback-seeking behavior is necessary. While the task used in the present study was not easy per se, it was relatively straightforward, did not require new skills to be learned, and did not require participants to elicit extra feedback.

Similar to the present study, Elliot and Harackiewicz (1996) used a simple puzzle task that was administered only once and found no difference in performance between the three goal orientations. However, that study did find that persons with a performance-avoid orientation exhibited a decrease in intrinsic motivation over the course of the task (something that was not measured in the present study). This finding suggests that the negative effects of a performance-avoid orientation may emerge only after the participant has had sufficient time to demonstrate his or her ability in the achievement setting. For example, VandeWalle et al. (2001) found that a negative relationship between a
performance-avoid orientation and task performance emerged only during a second performance event after an initial round of feedback was given.

It also must be noted that some subjects completed the task quickly and using the fewest number of moves possible, while other participants struggled with the tasks for a longer period of time. Some of these “high ability” participants seemed to figure out the existence of the pattern (as well as the pattern itself) by the second problem, while other participants never figured out that a pattern existed at all. Regardless of what feedback was offered, or what the individual’s goal orientation may have been, the participants’ mathematical ability and their ability to notice the pattern in the solutions may have played a much larger role in their overall performance than their goal orientation.

Hoffman & Strickland (1995) used a puzzle task similar to the present study, having participants furnish their SAT math scores as an approximation of mathematical ability; not surprisingly, they found that ability was a significant predictor of performance.

The lack of support for Hypothesis 2 and the lack of a main effect for feedback may also have been due to the characteristics of the experimental task. Previous research that has found a significant effect for feedback has often involved performance of a more complicated task than was used in the present study. Johnson et al. (1993) found a significant effect of feedback type on performance; however, participants in that study were performing a highly complex task -- specifically, simulating use of the crane arm of the space shuttle. Achieving high performance levels on that task required learning as well as proper use of the information that the feedback provided. This is not to say that the type of feedback given could not have affected performance of the task in the present experiment, only that the straightforward nature of the task (combined with the possible
strong effects of natural ability discussed above) may have prevented the feedback from having a significant main effect.

Also, the task feedback in the Johnson et al. (1993) study was more specific in nature, listing not only the specific mistakes the participant had made but also the best way to correct those mistakes. In the present study the level of specificity of the task feedback was limited by the fact that there was a pattern to the solutions. If the task feedback had been too specific, the existence of the pattern would have become obvious to some participants. However, had the nature of the task allowed for more specific task feedback, such feedback may have been more helpful to certain participants. A different task might have led to a stronger effect of feedback type overall and perhaps the increased performance of learning goal participants in the feedback condition that was predicted by Hypothesis 4.

The shared solutions between problems may have also limited the effectiveness of the feedback for another reason. The task and normative feedback, while possibly effective for participants in the middle to lower end of the performance distribution, may have been extraneous for participants who had already figured out the pattern to the solutions. Once the pattern was figured out, completing the task became a matter of simply repeating the same combination of steps over and over again, a process in which feedback would probably offer little aid. For the task feedback specifically, the instructions for the puzzles best solution became irrelevant once the pattern was figured out.

The normative feedback condition in the present study provided participants with their actual percentile ranking among students who had previously competed the task.
This is something that most previous research has not done, instead using bogus, all positive, or all negative normative feedback (Hoffmann & Strickland, 1995; Sansone, 1996). Such previous research has found that normative feedback can lead to higher levels of perceived competence than other types of feedback. One study that found such a result (Sansone, 1986) had participants play a trivia game in which no correct answer existed for any question. Thus, performance was experimentally controlled so that all participants were led to believe they had answered 5 of 11 questions correctly. Also, all participants receiving normative feedback were informed that they had performed better than 80% of participants. In such a situation where the normative feedback is relatively positive for all participants, the overall perceived competence reported by the participants may be more likely to be influenced by feedback (if not actually created by the feedback). However, in the present study the normative feedback received by the participants was both positive and negative, potentially canceling out the increase in perceived competence that may have resulted from only positive normative feedback.

Also, participants who had performed poorly (requiring dozens of moves to solve problems) certainly had an idea that their competence at the puzzle task was less than average, while those who seemed to complete the task quickly and with little effort most likely knew that their competence at the task was high. Regardless of whether or not normative feedback was offered or not, some participants had an idea of their relative competence simply from the ease in which they performed the task, potentially reducing the impact of the normative feedback condition overall. These factors likely contributed to the high degree to which perceived competence mirrored actual performance, and the lack of a significant effect of feedback type on perceived competence.
Despite the lack of a significant effect of goal orientation or feedback overall, the feedback participants received did have a significant effect among participants sharing a certain goal orientation. Hypothesis 3 predicted and found that among participants receiving feedback that compared their performance to other participants (normative feedback), those with goal orientations that lead them to be concerned about their performance as it relates to others (performance-prove and -avoid) had lower performance than persons with a learning goal orientation. The original logic behind Hypothesis 3 was that being overly concerned about negative normative information, participants possessing the two performance orientations would have lower performance and perceived competence when receiving normative feedback. This was not the case. Rather than harm the performance of the performance-oriented participants, the normative feedback condition improved the performance of participants with a learning goal compared to the other feedback conditions (See Table 3) leading to the significant result that supported Hypothesis 3.

Previous research has found that providing negative normative feedback lowers the perceived competence of performance-oriented persons to a much greater degree than those with a learning goal orientation. (Jagacinski & Nicholls, 1987). The fact that Hypothesis 3 was supported is consistent with the idea that learning oriented persons are more concerned with their own task competence than with the performance of other persons and thus less affected by any negative effects normative feedback may have. Sansone (1986) found that positive normative feedback led to higher levels of perceived competence than did task feedback, and concluded that this finding was due to normative feedback providing the most clear depiction of performance. While task feedback
provides an idea of how to improve performance, normative feedback provides an idea of
the person’s absolute skill at the task, as well as his or her skill relative to others. In the
present study, the higher performance of learning oriented participants in the normative
feedback condition may have been due to the clear picture of performance that such
feedback provides combined with the lack of concern with negative normative feedback
that a learning orientation allows.

The previously discussed ease in pattern recognition some participants displayed
may also have been to blame for the lack of a significant result for Hypothesis 4. The
logic behind Hypothesis 4 suggested that the instructive nature of the task feedback
would increase the performance and perceived competence of participants with a learning
goal orientation compared to the other participants because of their interest in improving
their competence at the task. However, some participants discovered the pattern in the
solutions rather quickly, which prevented the task feedback from having such an
instructive quality. Also, the fact that a learning goal highlights improving competence
does not mean that persons with such an orientation would be motivated to perform as
highly as possible in an experimental setting. Although the task feedback was available
to the learning goal participants, they may have not been motivated to use the information
the task feedback was giving them to solve the puzzles in fewer moves.

Hypothesis 5 expected that performance-prove participants would perform
significantly better and have higher perceived competence than performance-avoid
participants in the no-feedback condition. The logic behind this expectation was that
without feedback to call their ability into question, the performance-prove participants
would display a greater motivation to excel at the task than participants possessing the
generally maladaptive performance-avoid orientation. The fact that this prediction was not supported may have been due to some of the factors previously discussed. Mathematical ability certainly played a important role in the participant’s performance in the no feedback condition. Also, as was previously discussed, a lack of actual feedback did not prevent participants from guessing their level of ability from the effort they required to solve the puzzles. Hypothesis 5 may have anticipated the participants’ goal orientation to play a larger role in their performance than can be expected over the course of such a brief task when no feedback is present.

Limitations and Suggestions for Future Research

The lack of an estimate of mathematical ability in the present study is a limitation that may have greatly changed the nature of the results had such an estimate been obtained. Throughout the previous discussion mathematical ability, as well as the ability to notice patterns, surfaced repeatedly as a possible source of extraneous variance. Future researchers that employ mathematical puzzles such as the one used in the present study, should be careful to control not only for the effects of ability but also for the ability in solving puzzles. Future research may also be able to use tasks that are not as influenced by specific abilities, but rather require only more general skills such as reading or speaking.

Another potential limitation of the present study was the brevity of the experimental task. Short tasks may work well toward understanding differences in feedback seeking behavior, but a longer task may be necessary for feedback to display an overall effect on task performance. It is likely that given a longer version of the water-jar
task, or given similar tasks over the course of several sittings, the participants’ goal orientation would begin to have a significant main effect on their performance.

A potential limitation of the present study can be found in the nature of the no-feedback condition. The no feedback condition simply told the participant “Good Job!” upon completion of each problem of the task (See Appendix A, Figure A2). It is possible that this simple phrase may have served as “praise” feedback rather than it’s intended purpose, which was no feedback at all. In fact, a study by Butler (1987) offered children four types of feedback, one of which was praise (which consisted only of the phrase “very good”) and another of which was no feedback at all. The study found that offering children praise feedback had an impact on motivation, interest and performance more similar to that of normative feedback than the no-feedback condition. Although it is debatable whether the words “good job” had an impact on the participant’s performance or perceived competence in the present study, such an impact could change the overall nature of this study to one comparing the effects of three different types of feedback, rather than comparing the effects of two types of feedback to a control of no feedback.

Future research is needed to examine the higher performance found for learning oriented participants in the normative feedback condition. Since no previous study has examined the effects of goal orientation and real normative feedback in a performance situation, definitive conclusions are difficult to draw. Replication of this finding might suggest that normative feedback actually does provide the clearest picture of a person’s performance (Sansone, 1986) and thus is most helpful for learning oriented persons. Further examination of this finding also might provide insight into whether or not
normative feedback can improve the performance of learning oriented participants on
tasks that are more dynamic and complex than the one used in the present study.

Many of the studies that have found differences between person’s of different
goal orientations in regard to feedback have focused feedback seeking behavior and
feedback preference (Butler, 1993, 1987; VandeWalle et al., 2001; VandeWalle &
Cummings, 1997). While these are important aspects of feedback, more research is
needed to glean just what effects differing feedback types have on different goal
orientations. The present researcher intended to provide some answers to that question,
and the results did suggest that an effect of feedback and goal orientation on perceived
competence and performance exists. However, the exact nature of that effect remains
unclear.
References


Appendix A
Sample Screens

Figure A1. Sample Screen – Water Jar Puzzle Task

![Figure A1. Sample Screen – Water Jar Puzzle Task](image)

Figure A2. Sample Screen – No Feedback Condition

![Figure A2. Sample Screen – No Feedback Condition](image)
Figure A3. Sample Screen – Task Feedback Condition

You completed the Practice problem in (4) number of moves. The shortest solution is:

Fill the 100 oz Jar.
Pour the 100 oz Jar into the 20 oz Jar.
Fill the 5 oz Jar.
Pour the 5 oz Jar into the 100 oz Jar.

Targeted, OK
Number of moves: 3
Fill Jug, Empty Jug, Pour into

Figure A4. Sample Screen – Normative Feedback Condition

You completed the Practice Problem in (4) moves. You performed as well or better than 100% of WKU students.

Targeted Amount: 85
Number of moves: 3
Fill Jug, Empty Jug, Pour into
## Appendix B

### Experimental Problems

<table>
<thead>
<tr>
<th>Problem Number</th>
<th>Jar A</th>
<th>Jar B</th>
<th>Jar C</th>
<th>Target Amount (T)</th>
<th>Optimal Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice Problem</td>
<td>100</td>
<td>20</td>
<td>5</td>
<td>85</td>
<td>$A - B + C = T$</td>
</tr>
<tr>
<td>1</td>
<td>14</td>
<td>163</td>
<td>25</td>
<td>99</td>
<td>$B - A - 2C = T$</td>
</tr>
<tr>
<td>2</td>
<td>18</td>
<td>43</td>
<td>10</td>
<td>5</td>
<td>$B - A - 2C = T$</td>
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<td>9</td>
<td>43</td>
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<td>22</td>
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<td>4</td>
<td>31</td>
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<tr>
<td>5</td>
<td>23</td>
<td>49</td>
<td>4</td>
<td>18</td>
<td>$B - A - 2C = T$</td>
</tr>
<tr>
<td>6</td>
<td>121</td>
<td>12</td>
<td>5</td>
<td>102</td>
<td>$A - 2B + C = T$</td>
</tr>
<tr>
<td>7</td>
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<td>18</td>
<td>10</td>
<td>46</td>
<td>$A - 2B + C = T$</td>
</tr>
<tr>
<td>8</td>
<td>64</td>
<td>14</td>
<td>4</td>
<td>40</td>
<td>$A - 2B + C = T$</td>
</tr>
<tr>
<td>9</td>
<td>57</td>
<td>11</td>
<td>7</td>
<td>42</td>
<td>$A - 2B + C = T$</td>
</tr>
<tr>
<td>10</td>
<td>127</td>
<td>21</td>
<td>19</td>
<td>104</td>
<td>$A - 2B + C = T$</td>
</tr>
</tbody>
</table>
Appendix C

Feedback Conditions

- Participants in the no feedback condition saw the words “Good Job!” after completing the problem.

- Participants in the task feedback saw a screen displaying feedback similar to the following after each problem:

  You completed the previous problem in ___ number of moves. The shortest solution is:

  Fill the 100 oz jar.
  Pour the 100 oz jar into the 20 oz jar.
  Fill the 5 oz jar.
  Pour the 5 oz jar into the 100 oz jar.

- Participants in the normative feedback condition saw a screen displaying feedback similar to the following after each problem:

  You solved the previous problem in ___ moves. You performed as well or better than ___% of WKU students.
Appendix D

*Experimental Instructions*

The following directions were part of a handout given to the participants. Participants were instructed to read along with the instructions while the researcher read them aloud. While the instructions were being read, the practice problem was visible on the computer screen in front of the participant:

Please do not start working on the practice problem until I have finished the instructions. For this experiment you will be completing a series of ten puzzles (plus one practice puzzle). For each puzzle you will be asked to pretend that three jars are placed next to a sink. They will be three “measuring” jars that will each be able to hold a different volume of water. Your job will be to fill one of the jars with a “target amount” using three types of moves that will be available to you: fill a jar, empty a jar into the sink, or empty one jar into another jar. The computer screen will display the current volumes of all the jars, at all times. Please do not try to solve the problems in your head, let the computer be your calculator. In front of you is one practice problem to show you with how to use the computer to solve the puzzles, and to familiarize you with the task.

There are three jars on the screen in front of you. Please notice that the amount of water the jar can hold is displayed above each jar, and the amount of water currently in the jar is displayed below each jar. Below the jars is the “target amount” that you are to measure, and the number of moves you have completed so far. If you wish to fill a jar, using the mouse, click on the button that says ‘Fill Jar,’ and then select the jar you wish to fill from the menu that pops up. If you wish to empty a jar into the sink, click on the button that says ‘Empty Jar,’ and select which jar you wish to empty. If you wish to pour one jar into another, click on the button that says ‘Pour Into,’ and then select the jars you want to pour the water from and into. If you pour a larger jar into a smaller jar, the difference between the two jars will remain in the larger jar. Obviously, you cannot fill already full jars, or empty already empty jars.

Remember your goal is to fill one of the jars with the ‘target amount’. Try to achieve the ‘target amount’ in the fewest number of moves that you can. Each time you fill, empty or pour a jar, it will count as one move. The computer will display the number of moves you have completed so far on the current problem. Once the ‘target amount’ is achieved you will move on to the next problem. You may now work on the practice problem.
Appendix E

*Goal Orientation Measure (VandeWalle, 2001)*

**Instructions:** People have different ideas about the purpose of college. Read each statement below and select the number that reflects how much you agree with that statement.

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1. I prefer challenging and difficult classes so that I’ll learn a great deal.
2. I truly enjoy learning for the sake of learning.
3. I like classes that really force me to think hard.
4. I’m willing to enroll in a difficult course if I can learn a lot by taking it.
5. It’s important that others know that I am a good student.
6. I think that it’s important to get good grades to show how intelligent you are.
7. It’s important for me to prove that I am better than others in the class.
8. To be honest, I really like to prove my ability to others.
9. I would rather drop a difficult class than earn a low grade.
10. I would rather write a report on a familiar topic so that I can avoid doing poorly.
11. I am more concerned about avoiding a low grade than I am about learning.
12. I prefer to avoid situations in classes where I could risk performing poorly.
13. I enroll in courses in which I feel that I will probably do well.
Appendix F
Perceived Competence Measure

1. I am good at solving this type of problem.

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<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Sort of Disagree</th>
<th>Neither Agree nor Disagree</th>
<th>Sort of Agree</th>
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2. I would do well at solving additional problems of this type.

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<th>Disagree</th>
<th>Sort of Disagree</th>
<th>Neither Agree nor Disagree</th>
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3. I would rate my problem-solving ability at this task as being high.

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<th>Disagree</th>
<th>Sort of Disagree</th>
<th>Neither Agree nor Disagree</th>
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4. This type of problem is difficult for me.

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<th>Disagree</th>
<th>Sort of Disagree</th>
<th>Neither Agree nor Disagree</th>
<th>Sort of Agree</th>
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