

COMMUNICATION MEDIUM: EFFECTS ON AFFECT, SELF-EFFICACY, AND GOALS

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## **Abstract**

As organizations continue to decentralize, leaders will have to rely upon other forms of communication (e.g., telephone, video conferencing, email) to perform tasks normally done in face-to-face settings. Email is emerging as the most popular form of communication as a replacement for face-to-face communication. However, email is not entirely capable of conveying the same message as face-to-face interaction. Email is considered a lean form of communication due to the loss of non-verbal cues, the distance between the individuals, and time between messages. While email is a satisfactory replacement for some messages, research has yet to investigate its usefulness in providing performance feedback. As leaders begin to use email as a means of providing feedback, it is necessary to investigate the impact this form of communication has on the goals individuals set, self-efficacy, and affect. The study sampled 94 undergraduate students. The participants were randomly assigned to either receive positive or negative feedback via email or face-to-face interaction. Upon completion of the task, participants created goals to help them improve in the task and completed all other measures. Results indicate that it does not matter whether participants receive face-to-face or email feedback in respect to differences in their reported affect, efficacy, or the goals they set.

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## **CHAPTER 1 - Introduction**

Leaders in the workplace are responsible for guiding subordinates in an appropriate manner to achieve the goals of the organization. Traditionally, leaders have done this through face-to-face interaction in both formal and informal appraisals. Often overlooked in these exchanges are the important nonverbal cues exchanged between the leader and subordinate that help to clarify the message the leader is trying to convey. Current trends in organizations show leaders are relying more and more on different technologies, specifically email, to communicate with their subordinates (Avolio, Kahal, & Dodge, 2000; Dawley & Anthony, 2003; Markus, 1994). While the message content being delivered may be the same, the perceived meaning of the message may be dependent upon the communication medium.

Email is a timely and efficient manner for subordinates and leaders to communicate. It is an almost instantaneous and a relatively accessible form of communication that can be used in urgent and casual organizational situations (Dawley & Anthony, 2003). Despite the perceived advantages and commonness of email, many of the important cues conveyed in face-to-face conversation are lost in email. Nonverbal communication is an important facet in supporting verbal messages. The facial expressions, tone of voice, and hand gestures that can be used to express the degree of significance of the message are lost in email communications and cannot be substantially supplemented in any fashion.

While it is probable that important aspects of a message are left out in email communications, there is also the possibility that this form of communication may be more effective in certain situations. The absence of additional information to process (i.e., hand gestures, facial expressions) may make it easier for the subordinate to interpret the core meaning of the message. Without distractions, the feedback the leader is providing to the subordinate may become clear, concise, and easily manageable. Also, the reduced level of emotion may allow the subordinate to remain emotionally balanced and clear-minded when receiving the feedback. Reducing the amount of information and emotion to process may result in a more efficient and effective plan of action, ultimately leading to increased performance and fulfillment of the supervisor's expectations.

## **Self-Efficacy**

Social cognitive theory (SCT) presents an understanding of human behavior that accounts for numerous variables a person encounters in their daily lives to explain behavior. SCT is similar to many other cognitive learning theories, but SCT adds a mechanism to explain the driving factor of human behavior. According to SCT, an individual's beliefs in his or her ability to accomplish the task at hand, known as self-efficacy, is what motivates people to take part in a task, persist through difficulties, and take future actions. Self-efficacy is the belief in one's capabilities to produce designated levels of performance that exercise influence over events that affect their lives (Bandura, 1997). People are constantly striving to exercise control over their lives and the events that directly impact them, and it is by exerting influence on aspects of their lives over which they have some control that people are able to achieve desired results and avoid undesired ones (Bandura, 1997).

Efficacy is crucial in determining the manner by which people approach novel tasks, as well as tasks to which they may be more accustomed. Due to the importance of efficacy, people are continuously seeking ways to help build efficacy. Bandura (1997) stated that efficacy comes from four sources: mastery experiences, vicarious experiences, social persuasion, and physiological and emotional stress. Mastery experiences, or performing the task and learning from mistakes and accomplishments, is the most effective method for increasing an individual's efficacy. The next source of efficacy is vicarious experiences. A person can learn and build upon his or her own personal beliefs by watching someone similar to him- or herself perform a task. Efficacy can also be gained through social persuasion, which comprises both verbal persuasion and situational persuasion. Verbal persuasion is the vocalization of belief in the person by others, and situational persuasion is the structuring of situations appropriate to increase success and learn from failures. The final manner by which efficacy is built is the interpretation of physiological and mood states. How a person deals with their body's responses to the situation impacts their ability to cope with the task (Bandura, 1997).

Self-efficacy pertains to a specific task that an individual is facing in their life and the amount of control they believe they have over the task. Therefore, self-efficacy affects the individual at four levels (Bandura, 1997). First, efficacy affects how the person feels. Whether an individual believes that they are capable of accomplishing the task shapes their mood, attitude, and feelings. Second, efficacy impacts the manner in which a person thinks; as capability in the

task increases, the comfort in the task increases and the course of action to accomplish the task and overcome obstacles becomes more inherent. Behavior is the third variable that is influenced by efficacy. Efficacy influences choices made when facing a challenge and whether to quit or try again when faced with failure. Finally, efficacy impacts how motivated a person is in performing a task. The more capable a person believes him or herself to be, the more effort they are going to put into accomplishing the task (Bandura, 1997).

### **General Self-Efficacy**

In addition to task-specific efficacy, many lines of research have examined a more general view of self-efficacy. General self-efficacy is, “an individuals’ perception of their ability to perform across a variety of different situations” (Judge, Erez, & Bono, 1998, p. 170). General self-efficacy is more stable and trait-like than task-specific self-efficacy, which is more likely to change based on circumstance (Chen, Gully, & Eden 2001). While task-specific efficacy may fluctuate based on success and failure, general self-efficacy, being more stable, has a different impact on how individuals deal with success and failure. Individuals with high general self-efficacy will attribute success to their own ability, while attributing failure to unfavorable conditions or bad luck. On the other hand, individuals with low general self-efficacy will attribute success to luck and failure with their lack of ability. Therefore, for this study three levels of efficacy (i.e., general self-efficacy, categorical self-efficacy and task-specific efficacy) will be measured and examined for each hypothesis. This will allow for comparisons between the levels of efficacy and optimize the potential for changes in efficacy based on the feedback.

General self-efficacy has also been found to predict performance. High general self-efficacy is predictive of high performance because the general efficacious feelings spillover for that specific task (Shelton, 1990). These feelings affect how willing an individual is to persist and how much effort they exert. Yeo and Neal (2006) found the relationship between general self-efficacy and performance was mediated by task-specific self-efficacy. Therefore, it is important to see how each level of efficacy affects an individual’s plan for performance, or the goals they set.

## **Self-Efficacy, Goals, and Feedback**

Self-efficacy is specific to the task a person is performing, and therefore the feedback received for a task will affect the individual's efficacy to perform that task in the future. After receiving feedback, the individual's self-efficacy will moderate how the feedback is interpreted and affect subsequent behavior (Bandura, 1997; Nease, Mudgett, & Quinones, 1999). For example, a person with high self-efficacy, when faced with failure, will be more willing to cope with the feedback and learn from their mistakes so they can use the experience to better their future performance. However, people with low self-efficacy receiving the same feedback will likely quit or reduce their efforts in future performance. Also, the feedback provided about task performance affects the future self-efficacy of the individual only as long as the feedback is perceived as credible and accurate (Nease et al., 1999). In these circumstances positive feedback should increase an individual's level of efficacy due to the previous success in the task.

*Hypothesis 1:* There will be a positive relationship between level of feedback and subsequent self-ratings of efficacy.

In organizational settings employees are routinely provided feedback and asked to create performance goals along with the necessary work-related behaviors to achieve these goals. Often these exchanges occur during semiannual or annual appraisals that are conducted in hopes of improving the employees' overall job performance. Goal difficulty and goal specificity are the two characteristics of goal setting most frequently associated with increased performance (Lee, Bobko, Earley, & Locke, 1991). Individuals who set difficult but obtainable goals and have a specific strategy for obtaining their goals outperform individuals who set easy or unspecified goals.

Goal difficulty and goal specificity are the two most fundamental elements to successful goal setting, however it is as important to include support elements such as goal rationale, supervisory support and feedback, organizational facilitation and support, and performance review, while avoiding negative effects of stress, conflict, and other dysfunction that results as part of the goal setting process (Lee et al, 1991). The Locke and Latham (1984) Goal Setting Questionnaire add these support elements, while also looking at goal difficulty and specificity. Lee et al., found that the Goal Setting Questionnaire was positively related to performance and job satisfaction and negatively related to complaints and anxiety. Additionally, goal self-efficacy, goal rationale, and goal clarity were all related to goal attainment. Finally, Lee et al. found that

the relationship between many of the support elements of goal setting were dependent upon feedback delivered to the individual. Therefore, it can be expected that the goal difficulty and specificity of individual's goals would correlate positively with the Goal Setting Questionnaire and there should be positive relationships between goal difficulty, goal specificity, the Goal Setting Questionnaire and feedback type.

The employee's self-efficacy on the task impacts the goals they set for themselves and the course of action they plan on following to obtain their goals (Knight, Durham, & Locke, 2001). Accordingly, people with higher self-efficacy will set more challenging goals while their counterparts will set lower-level goals (Bandura, 1997; Ilies & Judge, 2005). However, motivation or high efficacy without feedback to create well-defined or demanding goals is inadequate and may result in frustration and lowered performance (Lee, Bobko, Earley, & Locke, 1991). Thus, it is important that employees receive feedback so they can determine how they are performing and create clear, difficult goals with a detailed plan for achieving their goals (Locke, Shaw, Saari, & Latham, 1981).

Hypothesis 2a: Participants with high self-efficacy will create more challenging and specific goals than participants with lower levels of self-efficacy.

Hypothesis 2b: Participants with an initial low level of self-efficacy who receive positive feedback will set more difficult goals than low efficacy/negative feedback individuals, but will have lower goals than high efficacy individuals.

Hypothesis 2c: Participants with initially high levels of self-efficacy who receive positive feedback will set more difficult goals than all other individuals.

While the research on feedback, efficacy, and goal setting has been well established, the effects of media delivery methodology have yet to be studied. This paper attempts to add to the literature by examining two forms of communication and the consequences each has on efficacy and the goals individuals set. Also, this paper examines what role affect has on efficacy following feedback and the resulting goals individuals set.

### **Media Richness Theory**

Media Richness Theory (MRT) is based on the principle that humans select a form of communication that allows them to communicate in an efficient and effective manner (Sheer & Chen, 2004). Communication media are described as being either rich or lean, which is

determined by four factors: (1) the availability of instant feedback, (2) the use of cues such as presence, tone, and gestures, (3) the use of natural language to convey the message, and (4) the personal focus of the medium. If the communication medium uses multiple factors it is described as being rich, while a communication medium with few of these factors is considered lean. The richest form of communication is face-to-face and the leanest form is email (Sheer & Chen, 2004; Daft, Lengel, & Trevino, 1987).

MRT, as originally proposed by Daft and Lengel (1984), emphasizes efficiency as the driving factor in deciding which communication medium leaders utilize. Following this reasoning, leaders who have to explain a vague task will use rich forms of communication to ensure their message is conveyed. For less complex or everyday tasks, the leader will use a leaner form of communication.

Providing feedback to subordinates encompasses more than just providing methods for improvement. Leaders can use these opportunities to gain trust, build relationships, and manage self-impressions with their subordinates. In a sample of 110 organizational managers, Sheer and Chen (1984) found that managers faced with the task of providing difficult or negative feedback found the task to be more complicated and preferred leaner methods of providing feedback. However, when delivering positive feedback managers found the task to be easier and took the opportunity to use richer media to boost their self-image and relationship with the subordinate.

Daft et al. (1987) also found that managers were perceived as more efficient when they correctly matched their communication medium with the equivocality of the task. The subordinates' perception of effectiveness was based on their feelings of how well the manager was able to explain the task through the medium used. Managers were perceived as efficient when they selected rich media (face-to-face) to explain vague tasks and lean media (written documents) to explain ordinary everyday tasks.

The task of providing feedback can vary in terms of equivocality. If the feedback is nothing more than a simple correction to a task, then lean forms of communication may be appropriate. However as the feedback and subsequent required course of action increases in complexity, managers should use richer forms of communication. While these are the optimal situations, managers faced with the task of delivering difficult feedback may select to use inappropriate media such as email to deliver the feedback (Markus, 1994). This allows managers

the opportunity to distance themselves from the negative message and avoid awkward situational circumstances that may arise.

Similar to media richness theory, social presence theory (SPT) examines the relationship between media choice and task. Specifically, SPT states that the physical presence of individuals engaged in communication affects the attitudes and behavioral outcomes of the individuals involved in the communication (Short, Williams, & Christie, 1976). SPT, like MRT, examines how appropriate the medium choice is for the task, while also examining the proximity, emotions, and nature of the communicators and message (Short et al., 1976; Rice, Hughes, & Love, 1989.) Research has found that communication media rated according to SPT are similar to those rated using MRT, such that face-to-face communication has the highest social presence and written communication has the lowest (Rice et al., 1989).

### **Emotional Ties to Performance**

The emotional connections leaders establish with their subordinates can offer guidance for how to act in ambiguous situations as well as being an inspirational tool to motivate subordinates. Leaders who use appropriate emotions in communication with their subordinates are more capable of creating similar emotions in their subordinates, and creating desired behaviors to reach a specific goal. For example, Lewis (2000) found that depending on the emotion expressed by a leader, subordinates would take personal responsibility for the situation and change their emotions to be more congruent with their leader's emotions.

The emotions that are created by the feedback are also found to impact the goals that people set. Receiving feedback creates an affective response that impacts the short term emotional state of the individual and the goals they set in response to the feedback (Ilies & Judge, 2005). Ilies and Judge found that negative feedback resulted in reduced goal difficulty, and that after receiving positive feedback goal difficulty increased.

These findings are not surprising when you consider the relationship between self-efficacy and affect. Situational affect, created from feedback for example, and the goals people set are moderated by self-efficacy. Individuals with higher self-efficacy are better at interpreting emotional arousal, dealing with it, and using it to motivate themselves to accomplish the task at hand. However, individuals with lower self-efficacy often interpret their emotions negatively, which results in panic and lower performance and motivation (Bandura, 1997).

Efficacy has been shown to moderate the relationship between affect and goals when receiving performance feedback. However, the possible effects of the medium used to deliver the feedback have never been examined. Media richness theory in combination with social presence theory, may potentially explain differences in any effects associated with changes in an individual's self-efficacy, affect, and goals they set to improve in a task.

Numerous explanations are possible for differences exhibited when feedback is delivered electronically versus face-to-face. The first possible explanation is that face-to-face communication is a richer form of communication that includes the presence of both individuals. These circumstances allow all forms of communication to be apparent to the parties, which means the communication is richer and has a stronger social presence. Therefore, miscommunications can be addressed as they occur, and both individuals have the opportunity to engage the other in continuous communication. The abundance of communication cues, direct communication, and the clarity of the message should result in more specific goals. The added presence of the leader may legitimize the feedback, which should result in increased difficulty of goals set.

On the other hand, based on MRT and SPT, leaders who provide feedback through email, a leaner form of communication, may not be completely conveying their intended message. The absence of tone, hand gestures, and clarification may leave the subordinate confused and incapable of fully comprehending the message. Also, the potential time lag between messages can create other feelings of confusion and uncertainty. The resulting goals may not align with the feedback or the goals of the leader and may be less specific. Furthermore, the lack of the leader's presence may be interpreted as a lack of importance in the feedback resulting in less difficult goals.

Hypothesis 3a: Participants who receive performance feedback through email will set less difficult goals than participants who receive feedback face-to-face.

Hypothesis 3b: Participants who receive performance feedback through email will set less specific goals than participants who receive feedback face-to-face.

The richness of the medium and the presence of the individual providing the feedback can be hypothesized to impact the individual's affect, and consequently affect their goals. Gaddis, Connelly, and Mumford (2004) found that both positive and negative emotions expressed by a leader providing an evaluation affected the subordinates' goals and task

performance. When leaders expressed positive affect, subordinates, despite their initial performance, performed better on subsequent tasks than subordinates exposed to negative affect.

Also, Bono and Ilies (2006) found that leaders who were positive or charismatic created similar feelings in their followers. Therefore it appears that the presence of the leader, the opportunity for immediate two-way communication, and additional sources of nonverbal communication may create a perception of importance and provide clarity and direction for improvement. The benefits of rich communication should result in challenging and specific goals when the feedback is provided in a positive manner.

However, when the emotions displayed by the leader are negative and the feedback provided is portrayed negatively, individuals perform poorly and set less challenging goals (Gaddis, et al., 2004). The emotional connection between the individuals may create a cognitive strain on the recipients' resources. This strain may be the result of the additional communication cues, as well as the necessity of having to cope emotionally with the message (Gaddis, et al., 2004; Frijda, 1993, Weiss & Cropanzano, 1996). In addition, subordinates remember, in greater detail, more interactions with their supervisors when the interactions are negative than they remember when the interactions are positive (Dasborough, 2006). Therefore, the participants in the email group should be less impacted by the affect in the messages than the participants in the face-to-face group because email is a less rich form of communication.

Hypothesis 4: Communication medium will moderate the relationship between feedback and affect, such that, participants who receive positive, face-to-face feedback will express more positive affect than participants who receive positive, email feedback or any form of negative feedback. Conversely, participants who receive negative, face-to-face feedback will express more negative affect than participants who receive negative feedback through email or any form of positive feedback.

## **CHAPTER 2 - Method**

### **Participants**

Ninety-four participants from the General Psychology pool at Kansas State University voluntarily participated in the study to complete the requirements of the course. The average age of the participants was 19 years. The sample included 37 females and 57 males.

### **Materials**

#### *Measures*

##### *General Self-Efficacy Measure*

The General Self-Efficacy Scale by Jerusalem and Schwarzer (1993) consists of 10 items (Appendix A). Items measure the individual's overall self-efficacy on a four-point Likert scale (1=*not true at all*; 4=*exactly true*). A sample item is, "I can solve most problems if I invest the necessary effort." The measure was found to be reliable with a Cronbach's alpha of .83 for the pre-experiment measure and a Cronbach's alpha of .88 for the post-experiment measure.

##### *Computer Game Self-Efficacy Measure*

Computer self-efficacy was a modified version of the Personal Efficacy Belief Scale (Riggs & Knight, 1994). The scale measures the efficacy of an individual to perform a specific task on ten items (See Appendix B). For this experiment the scale was modified for a categorical level of self-efficacy, the individual's computer game efficacy. A sample item from this scale is, "I am an expert at computer games." Responses were indicated on a Likert-type scale and range from 1 (*strongly disagree*) to 6 (*strongly agree*). The scale consisted of six items that were reverse scored (2,3,4,6,8,10). The measure was found to be highly reliable. The Cronbach's alpha for the pre-experiment measure was .91 and for the post-experiment measure the Cronbach's alpha was .89.

### ***Task-Specific Self-Efficacy Measure***

An additional modified version of the Personal Efficacy Belief Scale (Riggs & Knight, 1994) was used to measure the participant's task level self-efficacy (See Appendix C). The scale consisted of ten items, of which six items were reverse scored (2,3,4,6,8,10). A sample item from this scale is, "I have confidence in my ability to play Zork." ("Zork" is the name of the game used as the task in the study.) Responses are on a Likert-type scale and range from 1 (*strongly disagree*) to 6 (*strongly agree*). The task-specific efficacy measure was also found to be highly reliable with a Cronbach's alpha of .89.

### ***Affect Measure***

The PANAS (Watson, Clark, & Tellegen, 1988) measures two dimensions of affect, positive affect and negative affect (See Appendix D). The questionnaire consists of 20 items, 10 items each for positive affect and negative affect, which the participant rates using a five-point Likert-type scale (1 = *very slightly or not at all*; 5 = *extremely*). The 20 items are affective descriptors (e.g., strong; afraid) used to determine how respondents are feeling at the present moment. The coefficient alpha for the pre-experiment measure of current moment positive affect was .89. For the post-experiment measure of current moment positive affect coefficient alpha was .91. The measures of current moment negative affect were also reliable, with a coefficient alpha of .80 for the pre-experiment measure and a coefficient alpha of .88 for the post-experiment measure.

### ***Perceptions of Goals***

The participants' perceptions about goals were measured using selected items of the Goal Setting Questionnaire (Locke and Latham, 1984). Items were selected to measure the participants' understanding of the game, how helpful the training was, and how their score is calculated. These questions were asked in relationship to their own goals for the game. It was then asked how their goals would improve their enjoyment of the game, their overall performance, and how accomplishing their goals would make them feel. The scale consisted of eight items measured on a six-point Likert-type scale (1=*Strongly Disagree*; 6=*Strongly Agree*) (See Appendix E). A sample item from this scale is, "I feel proud when I get feedback indicating that I have reached my goals." Previous work by Lee, Bobko, Early, and Locke (1991) found that the measure could be divided into ten subscales, so the factor structure of the scale was analyzed

to ensure the items were measuring a single construct. A principle-components analysis forcing a single factor (Table 2-1) was used to analyze the factor structure of the selected items. All of the items with the exception of Item 1 loaded on the single factor with a factor loading above the cutoff of .40. An item-by-item analysis also found that the reliability of the scale could be improved from an alpha of .83 to .85 by dropping Item 1. Since Item 1 did not load above the minimum cutoff of .40 and the scale would be more reliable without it, it was decided to remove Item 1 from further analyses. Therefore, the scale was entitled “Perception of Goals Measure” and it consisted of seven items, measuring a single construct, with a Cronbach’s alpha of .85.

**Table 2-1 Summary of Confirmatory Factor Analysis Results for selected items from the Goal Setting Questionnaire Using Principal Component Analysis (N = 94)**

| Item  | Factor Loadings<br>Perception of<br>Goals Measure |
|---|---|
| Q11.4: I have specific, clear goals to aim for.   | <b>.81</b>  |
| Q11.2: The goals I set for Zork are challenging but reasonable (neither too hard nor too easy).     | <b>.78</b>  |
| Q11.7: I usually feel that I have suitable or effective action plan or plans for reaching my goals. | <b>.74</b>  |
| Q11.8: I feel that the training was good enough so that I am capable of reaching my goals.          | <b>.73</b>  |
| Q11.6: I feel proud when I get feedback indicating that I have reached my goals.                    | <b>.72</b>  |
| Q11.3: I understand exactly what I am supposed to do in Zork.                                       | <b>.70</b>  |
| Q11.5: Trying for goals makes playing Zork more fun than it would be without goals.                 | <b>.64</b>  |
| Q11.1: I understand how my performance is measured in Zork.   | .37   |
| Eigenvalues   | 3.89  |
| % of variance   | 48.58   |

*Note:* Factor loadings over .40 appear in bold.

### ***Goal Difficulty and Goal Specificity***

Goal difficulty and goal specificity (Appendix F) were analyzed using an open-ended item asking participants what their overall goals for the game were, and how they planned to accomplish these goals. This question was given to the participants after they received feedback based on their first attempt at Zork.

Goal specificity was scored based on an assessment of the actions subjects planned on making to achieve their overall goal. The specificity of the goal was classified on a scale ranging from 1 (low in specificity) to 5 (high in specificity). Goals were seen as being specific if they included a description of how goals would be achieved. For example, “making a better map so I don’t get lost and don’t waste time and moves” was rated as being high in specificity. A goal of “do better” was seen as being low in specificity. Two trained raters independently rated each response to the scale, and interrater reliability for goal specificity was  $r = .79$ . Discussing the issues and coming to a consensus resolved disagreements. After independent coding and resolution of disagreements, an overall score for goal specificity was computed for each response.

Goal difficulty was scored based on an assessment of the goals the participants set for their third trail of the game. The difficulty of the goal was classified on a scale ranging from 1 (low difficulty) to 5 (high difficulty). The most difficult goal a participant could set was to win the competition, and as such, this goal was given a rating indicating high difficulty. A goal that was considered low in difficulty could be a single statement of, “get a higher score.” Again, two trained raters independently rated each response to the scale, and interrater reliability for goal difficulty was  $r = .90$ . Disagreements were discussed and resolved so that an overall score for goal difficulty could be computed for each response.

### ***Demographics***

The participants’ gender, age, and year in school was collected (Appendix G).

### ***Feedback Accuracy***

A single item, “The feedback I received was an accurate representation of my performance,” was administered to determine if the participants believed the performance feedback they received after completion of the task to be an accurate representation of their performance.

### *Materials*

Zork (<http://www.infocom-if.org/games/zork1/zork1.html>), a DOS-based computer game, was used as the experiment task. Zork is an adventure game, in which the player is trying to collect treasure and advance through levels. To play Zork the player types text commands to manipulate the game and must solve simple problems to advance to other areas. The participants were given a “cheat sheet” with basic commands for playing the game and the instruction manual to aid their performance. Since Zork is a DOS-based text game with no visual cues, it is recommended that players draw a map to track their movements. Participants were provided with a pencil and piece of paper to draw their map and shown an example of a map from the instruction manual.

### *Procedure*

The participants were asked to complete the PANAS, general self-efficacy, computer-efficacy, and demographic measures. After completing the measures, the participants were shown the game. The introductory screen of Zork was displayed on the computer monitor so the participants could see the game they were going to play. The experimenter, using a memorized script (Appendix H), described the premise of game, the basic commands, and how to play the game. The experimenter also provided the participant with the game manual and cheat sheet and explained to the participant that they could use these materials freely while playing the game. Finally, the participants were given a sheet of paper and told to draw a map of the places they went in the game, how they got there, and objects or creatures they came into contact with.

After explaining to the participants how to play the game, the experimenter told the participant that they would play the game a total of three times. It was explained that the first trail would be a ten-minute training session where they could ask questions and the experimenter could ensure they could operate the game. The next two sessions were explained to be part of a contest for all the participants in the study and would be fifteen minutes each. The participants were told that they were playing for a fifty-dollar prize that would be awarded to the participant with the highest overall score at the end of experiment. It was explained to the participants that the score for the competition would be a combination of their score from the game (which they were told to ignore), the number of moves they made, and the other objects and locations they

found. Participants were asked to record objects and locations on their map so the experimenter could calculate their score.

Using this combination as the overall score provided the experimenter with potential ambiguity when providing the participant with their final score, since there was no quantifiable indication of their final score. The experimenter explained that the second trial (the first trial after the training) was going to be used to provide feedback to the participant about their performance in comparison to their peers and to provide them with some additional advice to improve their performance for the competition. The final trial was described as the trial used to obtain their final score for use in the competition.

After the training, the participants were told to start playing the game. After their fifteen-minute period the experimenter randomly assigned each participant into experimental conditions defined by the two factors. Participants either received face-to-face feedback, that was positive or negative, or email feedback, that was positive or negative. The positive and negative feedback (Appendix I) were identical regardless of whether the participants received the feedback face-to-face or email. The feedback included the percentile that the participant's performance fell into, along with advice on how to improve their performance, and their overall chances of winning the competition.

To standardize the face-to-face feedback the work of Gaddis, et al. (2004) served as a model for the experiment. Gaddis, et al. described how differentiations in tone, posture, and verbal and non-verbal communication could be used to emphasize the nature of the feedback. Thus, the positive or negative nature of the feedback could be stressed when used in unison with appropriate tone, posture, and non-communication. The experimenters were trained to provide the positive face-to-face feedback in a seated position, using a relaxed and uplifting voice while maintaining a smiling face. To provide the negative feedback, the experimenters were trained to use a firm and serious facial expression, maintaining a flat and authoritative voice, while seated. Standardizing the behavior when delivering face-to-face feedback was used in an attempt to ensure that the two experimenters were providing the same verbal and non-verbal message to the participant, thus reducing any potential differences in behaviors or messages being delivered to the participant.

After receiving either the positive or negative feedback, both groups were asked to complete the general-efficacy, computer game-efficacy, Zork-efficacy, PANAS, as well as the

goal setting forms and measure. Upon completion of these measures, the participants were debriefed (Appendix J). Participants were told the \$50 prize would be determined by a random drawing of all the participants. Participants were asked if they had any questions and given credit for their participation in the study.

## CHAPTER 3 - Results

The descriptive statistics and correlations between variables are reported in Table 3-3. Fidelity of the feedback was first examined using the single item, “The feedback I received was an accurate representation of my performance.” Participants responded to this item on a six point Likert-type scale with one indicating that they strongly disagreed with the feedback and six indicating that they strongly agreed that the feedback was an accurate representation of their performance. The overall item statistics ( $M = 4.37$ ,  $SD = 1.22$ ) revealed that the participants found the feedback to be an accurate indication of their performance, but there were some question about the accuracy. Further examination found that there were no significant differences in the perception of accuracy between positive or negative feedback,  $F(1, 92) = 3.91$ ,  $p > .05$  (Table 3-1). Also, there were no significant differences between the face-to-face or email group  $F(1, 92) = 1.22$ ,  $p > .05$  (Table 3-2). Based on these findings, it was determined that the feedback was an acceptable manipulation and differences between the groups were the result of the experimental conditions.

**Table 3-1 ANOVA Summary Table for Feedback Accuracy between Positive and Negative Feedback**

| Source  | SS      | df | MS    | F     |
|---------|---------|----|-------|-------|
| Between | 5.628   | 1  | 5.628 | 3.912 |
| Within  | 132.340 | 92 | 1.438 |       |
| Total   | 137.968 | 93 |       |       |

\*  $p < .05$

**Table 3-2 ANOVA Summary Table for Feedback Accuracy Between Face-to-Face Feedback and Email Feedback**

| Source  | SS      | df | MS    | F     |
|---------|---------|----|-------|-------|
| Between | 1.798   | 1  | 1.798 | 1.215 |
| Within  | 136.170 | 92 | 1.480 |       |
| Total   | 137.968 | 93 |       |       |

\*  $p < .05$

### Hypothesis 1

*Hypothesis 1:* There will be a positive relationship between level of feedback and subsequent self-ratings of efficacy.

The first hypothesis stated that there would be a positive relationship between the feedback level (i.e., positive or negative feedback) and self-efficacy ratings. Three levels of efficacy were measured to examine unique effects on the individual's general efficacy, computer specific efficacy, and task-specific efficacy. General self-efficacy ( $r = .29, p < .01$ ), computer game efficacy ( $r = .46, p < .01$ ), and task-specific efficacy ( $r = .71, p < .01$ ) were all positively related to feedback level (Table 3-3). These findings indicate receiving positive feedback results in higher levels of general, categorical, and task-specific efficacy.

To further analyze these findings, the effects of the feedback level were examined for potential differences in the participant's post-experiment efficacy. An analysis of covariance was conducted for the effects of feedback level on the participant's general self-efficacy and computer game efficacy. The participant's pre-efficacy measure was used as the covariate to control for their respective pre-treatment levels of efficacy. General self-efficacy,  $F(1, 89) = 5.74, p < .05$ , after controlling for the pre-experiment efficacy measure, varied significantly depending upon the feedback (i.e., either positive or negative) that the participants received (Table 3-4). Based on comparison of the means, participants who received negative feedback ( $M = 2.81$ ) reported lower general self-efficacy scores than participants who received positive feedback ( $M = 3.13$ )

**Table 3-3 Descriptive Statistics and Intercorrelations Between Measures**

| Variable                         | Mean | SD   | 1     | 2       | 3      | 4      | 5      | 6       | 7      | 8      | 9      | 10     | 11     | 12    | 13     |
|----------------------------------|------|------|-------|---------|--------|--------|--------|---------|--------|--------|--------|--------|--------|-------|--------|
| 1. Feedback Method               | .50  | .50  |       |         |        |        |        |         |        |        |        |        |        |       |        |
| 2. Positive or Negative Feedback | .50  | .50  | -.021 |         |        |        |        |         |        |        |        |        |        |       |        |
| 3. Pre Positive Affect           | 3.16 | .68  | .003  | -.060   |        |        |        |         |        |        |        |        |        |       |        |
| 4. Pre Negative Affect           | 1.40 | .42  | .063  | -.154   | .099   |        |        |         |        |        |        |        |        |       |        |
| 5. Post Positive Affect          | 3.00 | .81  | -.061 | .499**  | .452** | -.021  |        |         |        |        |        |        |        |       |        |
| 6. Post Negative Affect          | 1.51 | .59  | .052  | -.333** | .156   | .631** | -.072  |         |        |        |        |        |        |       |        |
| 7. Pre General Efficacy          | 3.06 | .50  | .028  | .175    | .384** | -.223* | .193   | -.167   |        |        |        |        |        |       |        |
| 8. Post General Efficacy         | 2.97 | .55  | -.006 | .294**  | .219*  | -.249* | .364** | -.304** | .716** |        |        |        |        |       |        |
| 9. Pre Computer Efficacy         | 3.84 | .98  | -.050 | .242*   | .296** | -.205* | .403** | -.037   | .330** | .296** |        |        |        |       |        |
| 10. Post Computer Efficacy       | 3.65 | .98  | -.074 | .464**  | .205*  | -.173  | .563** | -.235*  | .293** | .331** | .839** |        |        |       |        |
| 11. Post Task-Specific Efficacy  | 3.41 | .89  | .074  | .710**  | .033   | -.239* | .575** | -.407** | .270** | .397** | .439** | .686** |        |       |        |
| 12. Perception of Goals Measure  | 3.51 | .69  | .081  | .228*   | .044   | -.214* | .539** | -.279** | .201   | .380** | .218*  | .387** | .511** |       |        |
| 13. Goal Specificity             | 3.18 | 1.07 | -.050 | .010    | -.039  | -.134  | .013   | -.046   | -.079  | -.119  | -.097  | -.090  | .060   | .224* |        |
| 14. Goal Difficulty              | 3.52 | .80  | -.013 | .201    | -.086  | .116   | .174   | .062    | -.181  | -.176  | -.046  | .111   | .160   | .240* | .392** |

N = 94

\*  $p < .05$ , \*\*  $p < .01$

**Table 3-4 Feedback Type X Communication Mode Analysis of Covariance for General Self-Efficacy**

| Source                            | SS      | df | MS     | F         |
|-----------------------------------|---------|----|--------|-----------|
| Pre-measure General Self-Efficacy | 12.916  | 1  | 12.916 | 91.434*** |
| (A) Communication Mode            | .013    | 1  | .013   | .092      |
| (B) Feedback Type                 | .811    | 1  | .811   | 5.744*    |
| A * B                             | .235    | 1  | .235   | 1.666     |
| Error                             | 12.572  | 89 | .141   |           |
| Total                             | 856.710 | 94 |        |           |

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Similar findings were found for differences between participant's post-experiment computer efficacy scores. An analysis of covariance was conducted for the effects of feedback level on the participant's computer self-efficacy, using the pre-experiment computer efficacy measure as a covariate to control for their respective pre-treatment levels of computer efficacy. Computer game efficacy varied significantly,  $F(1, 89) = 28.92, p < .001$ , depending upon the level of feedback participants received (Table 3-5). Based on comparison of the means, participants who received positive feedback ( $M = 4.10$ ) reported higher levels of computer efficacy scores than participants who received negative feedback ( $M = 3.20$ ).

**Table 3-5 Feedback Type X Communication Mode Analysis of Covariance for Computer Self-Efficacy**

| Source                             | SS       | df | MS     | F          |
|------------------------------------|----------|----|--------|------------|
| Pre-measure Computer Self-Efficacy | 50.203   | 1  | 50.203 | 225.088*** |
| (A) Communication Mode             | .078     | 1  | .078   | .348       |
| (B) Feedback Type                  | 6.450    | 1  | 6.450  | 28.919***  |
| A * B                              | .174     | 1  | .174   | .779       |
| Error                              | 19.851   | 89 | .223   |            |
| Total                              | 1342.780 | 94 |        |            |

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Finally, there were significant differences between task-specific efficacy scores depending upon the feedback participants received,  $F(1, 90) = 97.15, p < .001$  (Table 3-6). There were similar differences in the means between groups based on the feedback the participants received. Participants who received positive feedback ( $M = 4.04$ ) had higher levels of task-specific efficacy than participants who received negative feedback ( $M = 2.78$ ).

**Table 3-6 Feedback Type X Communication Mode Analysis of Variance for Task-Specific Efficacy**

| Source                 | SS       | df | MS     | F       |
|------------------------|----------|----|--------|---------|
| (A) Communication Mode | .592     | 1  | .592   | 1.536   |
| (B) Feedback Type      | 37.467   | 1  | 37.467 | 97.147* |
| A * B                  | 1.387    | 1  | 1.387  | 3.597   |
| Error                  | 34.710   | 90 | .386   |         |
| Total                  | 1166.060 | 94 |        |         |

\*  $p < .001$

Hypothesis 1 was supported. There was a positive relationship between level of feedback and subsequent self-ratings of all three levels of efficacy. Participants who received positive feedback reported, on average, higher levels of efficacy than participants who received negative feedback for general self-efficacy, computer efficacy, and task-specific efficacy. Furthermore, participants' efficacy for all three levels were significantly different depending upon whether they received positive or negative feedback.

## Hypothesis 2

Hypothesis 2a: Participants with high self-efficacy will create more challenging goals with greater specificity for achieving their goal than participants with lower levels of self-efficacy.

To examine the relationship between self-efficacy and goal difficulty regression was used for all three levels of efficacy. Post experiment general self-efficacy was not a significant predictor of goal difficulty,  $r = -.18, p > .05$ . Post computer efficacy was not a significant predictor of goal difficulty,  $r = .11, p > .05$ . Finally, task-specific efficacy was not a significant

predictor of goal difficulty,  $r = .16, p > .05$ . The results indicate that no matter the level of efficacy analyzed, higher levels of efficacy did not predict participants setting more difficult goals.

Regression was also used to analyze potential relationships between efficacy and goal specificity. General self-efficacy ( $r = -.12, p > .05$ ), computer efficacy ( $r = -.09, p > .05$ ), and task-specific efficacy ( $r = .06, p > .05$ ) were not significant predictors of participants setting more specific goals. Based on the actual stated goals of the participants, it appears that higher levels of general efficacy, computer efficacy, and task-specific efficacy are not predicative of setting more challenging goals or more specific goals.

The Perception of Goals Measure was meant to measure the participant's general feelings towards goals and their ability to accomplish their goals. To determine the relationship between the Perception of Goals Measure and the other goal measures the correlations were examined. Goal difficulty ( $r = .24, p < .05$ ) and goal specificity ( $r = .22, p < .05$ ) both were significantly related to the Perception of Goals Measure. The significant, positive relationship between the written goals and the Perception of Goals Measure should be expected because the written goals assessed specific constructs included in the Perception of Goals Measure. The Perception of Goals Measure assesses the respondents' perceptions of their goal difficulty and specificity in addition to other aspects of goal orientation.

Regression was used to explore the relationship between the different levels of efficacy and participants' general feelings about goal setting using the Perception of Goals Measure. General self-efficacy ( $r = .38, p < .001$ ), computer efficacy ( $r = .39, p < .001$ ), and task-specific efficacy ( $r = .51, p < .001$ ) were all significant predictors of goal setting behaviors in the participants. Higher levels of efficacy, after receiving performance feedback, was predictive of higher dedication to goals, better plans for achieving goals, and setting difficult goals according to the Perception of Goals Measure.

Hypothesis 2a is therefore partially supported. Based on the open-ended responses given by participants, self-efficacy does not appear to be predictive of goal difficulty or specificity. However, based on the Perception of Goals Measure it appears that higher levels of self-efficacy is predicative of higher levels of goal setting in terms of difficulty, specificity, and importance.

Hypothesis 2b: Participants with an initial low level of self-efficacy who receive positive feedback will set more difficult goals than low efficacy/negative feedback individuals, but will have lower goals than high efficacy individuals.

Hypothesis 2c: Participants with initially high levels of self-efficacy who receive positive feedback will set more difficult goals than all other individuals.

The relationship between goal difficulty and general self-efficacy was hypothesized to be differently affected depending on the type of feedback the participants received, either positive or negative. Hierarchical regression (Table 3-7) was used to test for moderating effects of positive/negative feedback on the relationship between efficacy and goal difficulty. Before conducting the analysis the data were centered to control for problems associated with multicollinearity. In step one of the equation participant's general self-efficacy scores were entered as well as the type of feedback they received. The interaction between general self-efficacy and feedback type was computed and entered in the second step. General self-efficacy,  $\beta = -.22, p < .05$ , and feedback type,  $\beta = .24, p < .05$ , were both significantly related to the difficulty of the goals set. However, the interaction term was not significant,  $\beta = .05, p > .05$ . Therefore, it does not appear that feedback type moderates the relationship between initial levels of general self-efficacy and goal difficulty and Hypothesis 2b and 2c cannot be supported at the general self-efficacy level.

**Table 3-7 Summary of Hierarchical Regression Analysis for Variables Predicting Goal Difficulty**

| Variables                 | $\Delta R^2$ | $\beta$ | p    |
|---------------------------|--------------|---------|------|
| Step 1                    | .09*         |         |      |
| (A) General Self-efficacy |              | -.223   | .031 |
| (B) Feedback Type         |              | .240    | .021 |
| Step 2                    | .002         |         |      |
| A*B                       |              | .052    | .692 |

\* $p < .05$ .

The participant's pre-experiment levels of computer self-efficacy were also analyzed in relation to the difficulty of their set goals based on the feedback they received. Hierarchical regression (Table 3-8) was used to test for moderation by entering computer self-efficacy and the feedback type in the first step and the interaction between the two variables in the second step.

Before conducting the analysis the data were centered to control for problems associated with multicollinearity. The feedback the participants received was predictive of the difficulty of the goals participants set,  $\beta = .23, p < .05$ . Computer self-efficacy was not predictive of more difficult goals,  $\beta = -.10, p > .05$ , nor was the interaction between computer self-efficacy and feedback type significant,  $\beta = .07, p > .05$ . Therefore, it does not appear that feedback type moderates the relationship between initial levels of general or computer self-efficacy and goal difficulty and Hypothesis 2b and 2c cannot be supported at either self-efficacy level.

**Table 3-8 Summary of Hierarchical Regression Analysis for Variables Predicting Goal Difficulty**

|        | Variables                  | $\Delta R^2$ | $\beta$ | p    |
|--------|----------------------------|--------------|---------|------|
| Step 1 |                            | .050         |         |      |
|        | (A) Computer Self-efficacy |              | -.101   | .342 |
|        | (B) Feedback Type          |              | .225    | .035 |
| Step 2 |                            | .002         |         |      |
|        | A*B                        |              | -.072   | .653 |

\* $p < .05$ .

### Hypothesis 3

Hypothesis 3a: Participants who receive performance feedback through email will set less difficult goals than participants who receive feedback face-to-face.

An analysis of variance was used to determine if there were differences in the degree of difficulty in the goals set by participants depending on if the participants received feedback either face-to-face or through email. Analysis revealed that there was no difference,  $F(1, 92) = 0.16, p > .05$ , between the participants who received feedback either face-to-face or through email in the difficulty of the set goals (Table 3-9). Therefore, Hypothesis 3a cannot be supported.

**Table 3-9 ANOVA Summary Table for Goal Difficulty between Face-to-Face and Email Feedback**

| Source  | SS       | df | MS   | F    |
|---------|----------|----|------|------|
| Between | .011     | 1  | .011 | .016 |
| Within  | 59.447   | 92 | .646 |      |
| Total   | 1225.000 | 93 |      |      |

\*  $p < .05$

Hypothesis 3b: Participants who receive performance feedback through email will set less specific goals than participants who receive feedback face-to-face.

An analysis of variance was used to determine if goal specificity would significantly differ depending on how participants received their performance feedback. The results indicate that there was no significant difference in goal specificity,  $F(1, 92) = .232, p > .05$ , between participants who received feedback face-to-face or through email (Table 3-10). Based on these findings, Hypothesis 3b cannot be supported.

**Table 3-10 ANOVA Summary Table for Goal Specificity between Face-to-Face and Email Feedback**

| Source  | SS       | df | MS    | F    |
|---------|----------|----|-------|------|
| Between | .266     | 1  | .266  | .232 |
| Within  | 105.660  | 92 | 1.148 |      |
| Total   | 1057.000 | 93 |       |      |

\*  $p < .05$

An analysis of variance was also used to examine potential difference in responses to the Perception of Goals Measure depending upon how participants received feedback. Based on the results of the analysis, there was no significant difference,  $F(1, 92) = 0.61, p > .05$ , between participants who received feedback face-to-face or through email (Table 3-11). The findings of

the Perception of Goals Measure responses coupled with the findings based on the written goals given by the participants indicate that it does not matter how participants receive their feedback when it comes to goal difficulty and specificity.

**Table 3-11 ANOVA Summary Table for Perception of Goals Measure between Face-to-Face and Email Feedback**

| Source  | SS       | df | MS   | F    |
|---------|----------|----|------|------|
| Between | .293     | 1  | .293 | .609 |
| Within  | 44.298   | 92 | .481 |      |
| Total   | 1199.594 | 93 |      |      |

\*  $p < .05$

#### Hypothesis 4

Hypothesis 4: Communication medium will moderate the relationship between feedback and affect.

The moderating effect of communication medium was tested according to the method provided by Baron and Kenny (1986). It was predicted that the effects of feedback on affect would vary as a function of the communication medium. First negative affect was used as the dependent variable. A 2X2 ANOVA was used to test for potential differences between groups, with moderation determined by a significant interaction (Table 3-12). Results indicate that there was a significant main effect for feedback type,  $F(1, 90) = 11.18, p < .001$  (Positive Feedback,  $M = 1.31$ , Negative Feedback,  $M = 1.70$ ), but not for communication medium,  $F(1, 90) = 0.21, p > .05$ . The interaction was also nonsignificant,  $F(1, 90) = 0.14, p > .05$ . Similar results were found when positive affect was used as the dependent variable (Table 3-13). There was a significant main effect for feedback type,  $F(1, 90) = 30.55, p < .001$  (Positive Feedback,  $M = 3.40$ , Negative Feedback,  $M = 2.60$ ), but not for communication medium,  $F(1, 90) = 0.31, p > .05$ . The interaction was also nonsignificant,  $F(1, 90) = 2.09, p > .05$ . Based on the results Hypothesis 4 cannot be supported.

**Table 3-12 Feedback Type X Communication Mode Analysis of Variance for Negative Affect**

| Source                 | SS      | df | MS    | F       |
|------------------------|---------|----|-------|---------|
| (A) Communication Mode | .067    | 1  | .067  | .207    |
| (B) Feedback Type      | 3.618   | 1  | 3.618 | 11.178* |
| A * B                  | .046    | 1  | .046  | .144    |
| Error                  | 29.133  | 90 | .324  |         |
| Total                  | 245.890 | 94 |       |         |

\*  $p < .001$

**Table 3-13 Feedback Type X Communication Mode Analysis of Variance for Negative Affect**

| Source                 | SS      | df | MS    | F       |
|------------------------|---------|----|-------|---------|
| (A) Communication Mode | .067    | 1  | .067  | .207    |
| (B) Feedback Type      | 3.618   | 1  | 3.618 | 11.178* |
| A * B                  | .046    | 1  | .046  | .144    |
| Error                  | 29.133  | 90 | .324  |         |
| Total                  | 245.890 | 94 |       |         |

\*  $p < .001$

## CHAPTER 4 - Discussion

The significant relationships found with the Pearson correlations between the levels of efficacy and positive feedback are interesting in that the strength of the relationship increased as the specificity of the measure increased. This finding may lend credence to previous findings that state general efficacy is a more stable construct and less vulnerable to the effects of feedback (Chen, Gully, & Eden, 2001; Chen, Gully, Whiteman, & Kilcullen, 2000). Additionally, this supports the original proposition of Bandura (1997) that efficacy is a task-specific construct. The increase in strength of relationship as the measure becomes more specific shows that efficacy is a task-specific construct and crucial to an individual's beliefs and perceptions of their own abilities for that task. Taken in sum, these findings provide evidence that supports efficacy to be a general and specific construct that seemingly is on a continuum that varies with the specificity of the task.

Furthermore, Bandura (1997) stated that in the beginning stages of learning a new task, feedback is critical to the individual's perceptions of their own ability to accomplish that task in future trials. This insight may explain why the relationship between feedback and the task-specific efficacy measure was stronger than the other two efficacy measures. Seeing as the individuals had no experience playing the game before this experiment, the majority of their expectations and beliefs came from the feedback they received after playing the game. Logically, the feedback that the participants received would significantly impact their own perceptions of their task-specific efficacy. Also, it should be expected that the task-specific efficacy and feedback relationship would be stronger than the other two efficacy relationships, because the participants would have previous experiences and other sources of feedback as a basis for their computer game efficacy and general efficacy.

Hypothesis 2a was not supported. Participants who reported having high self-efficacy did not create more challenging or specific goals than participants with low self-efficacy. This is contrary to previous work examining the relationship between goal setting and self-efficacy, which has found that high efficacy is associated with more difficult and specific goals (Locke, Frederick, Lee, & Bobko, 1984; Thomas & Mathieu, 1994). For example, Locke, et al. (1984) found that higher levels of self-efficacy lead to more difficult and specific goals and their

participants were more committed to these goals. The present experiment found no significant relationship between self-efficacy at any level and goal difficulty or goal specificity, based on the actual goals the participants set.

One possible explanation for the contrasting findings of this study and previous research was the use of written goals to assess specificity and difficulty. Since this was the first exposure to Zork for the participants, it is likely their familiarity with the game was not strong enough to allow significant differences in the goals set to emerge. This assertion is somewhat supported by the results of the Perception of Goals Measure. There was a significant positive relationship for all three levels of efficacy and the Perception of Goals Measure. This would suggest that participants who have higher levels of efficacy place greater importance on setting goals and accomplishing those goals, and as such have better strategies for accomplishing their goals. These findings are more in line with previous work of Locke, et al. (1984) and other researchers who have found that higher levels of efficacy lead to more difficult and specific goals. Using a more familiar task, such as Tetris or some other game most people are accustomed to, may have resulted in significant differences for all three goal measures.

It is also interesting to note that the more specific the level of efficacy, the stronger the relationship between the variables. This finding also supports Bandura's (1977, 1997) claim that efficacy is a task-specific construct. As the measure of efficacy becomes more specific to the task, the importance and specificity of the goals associated with the same task become more aligned and positively related to the task-specific efficacy measure. This relationship is not surprising since it would make sense that the higher the task-specific efficacy of the individual, the more capable that individual is going to feel setting goals for that specific task.

Additionally it was hypothesized that participant's initial level of efficacy would result in more or less difficult goals depending upon the feedback the participant received. Previous research (Bandura, 1997; Nease, Mudgett, & Quinones, 1999; Renn & Fedor, 2001) has found that efficacy affects how people receive and interpret feedback, and as a result how they subsequently set goals. Typically, individuals with high efficacy will set more difficult goals when they receive positive feedback, whereas individuals with low self-efficacy will set less difficult goals (Renn & Fedor, 2001). However, there was no support for this hypothesis as there was no change in the relationship between efficacy and goal difficulty when the type of feedback was taken into account.

While Hypothesis 2b and 2c could not be supported at either the general or computer level of efficacy, it was interesting to find that some of the Betas were significant while the corresponding zero-order correlations were not significant. For the analysis of general self-efficacy and feedback type on goal difficulty, both general self-efficacy ( $\beta = -.22, p < .05$ ) and feedback type ( $\beta = .24, p < .05$ ) were significantly related to goal difficulty. However, the zero-order correlations between general self-efficacy ( $r = -.18$ ) and feedback type ( $r = .20$ ) were not significantly related to goal difficulty. A similar pattern was found for the analysis using computer self-efficacy. The relationship between feedback and goal difficulty was again significant ( $\beta = -.22, p < .05$ ), but nonsignificant for the zero-order correlation ( $r = .20$ ). The results of both of these analyses are examples of suppression. According to Aneshensel (2002) suppression occurs when the addition of a third variable increases the magnitude of the association between the dependent and independent variables. Additionally, Aneshensel states that in extreme cases the presence of a relationship between the independent and dependent variable will be absent. Based on the zero-order correlations it appears that pre-general efficacy, pre-computer efficacy, and feedback type all have a nonsignificant relationship with goal difficulty. However, the introduction of the third variable, general or computer self-efficacy, creates significant relationships between the independent and dependent variables, but many of the relationships do not change in a pattern consistent with suppression effects. Since the meaning of these results is uncertain, the results should be interpreted with caution.

Like the previous analysis using goal difficulty as the dependent variable, the lack of support for the hypothesis may be the result of using the participants' written goals and their lack of familiarity with the game to construct specific goals. Greater familiarity and understanding of Zork may have allowed the participants to construct more concrete goals that were specific to the game. Therefore, while this study does not support a moderating effect of feedback type on efficacy and goal difficulty, future research which allows participants to perform a task they are more familiar with may show the effect feedback type has on the relationship between efficacy and goal difficulty.

Hypothesis 3a and Hypothesis 3b tested for potential effects the communication medium would have on goal difficulty and goal specificity. Due to the leanness and the lower social presence associated with email compared to face-to-face communication it was hypothesized that participants who received email feedback would set less specific and difficult goals. In the same

way the results of Hypothesis 2a, Hypothesis 2b, and Hypothesis 2c found no differences based on the written goals of the participants, there were no differences in the written goal difficulty and goal specificity of the participants dependent upon how they received the feedback. Meaning that for both goal difficulty and goal specificity there were no differences between the face-to-face or email feedback groups. Again this may be due to the participants' lack of familiarity with the game and their inability to create detailed goals. Contrary to the last analysis of Hypothesis 2a, there were no differences in the results using the Perception of Goals Measure instead of the written goals.

The sum of the results for Hypothesis 3 suggest that there are no differences in goal difficulty or specificity based on the method in which people receive feedback. These findings also hold for the Perception of Goals Measure, which did have significant relationships with efficacy. Therefore, it appears that goal difficulty, goal specificity, and the Perception of Goals Measure do not differ depending on how participants receive feedback. While email is a leaner form of communication, for the experiment the participants may have received all the information they needed to form goals regardless of their quality. Furthermore, the correlations show no significant relationships between feedback mode and any of the variables of interest. Thus, feedback mode as it was constructed for the purposes of this experiment, did not have a significant impact on efficacy, goal difficulty or specificity, or affect. While further research is needed to support these findings, it appears that delivering feedback either through face-to-face communication or email may be equally effective under these circumstances.

Finally, it was hypothesized that communication medium would moderate the relationship between feedback and affect. Social presence and media richness allow for emotional cues between the communicators to be expressed and interpreted, and as a result the emotions and mood of the individuals often become congruent. Therefore, it was believed that depending upon the method used to deliver the feedback changes could be expected in the relationship between the feedback type and affective response. Results found that there was a main effect for feedback type; meaning that there was a difference in affect depending upon whether the participants received positive or negative feedback. There was no effect on affect based on how the participants received feedback and the interaction was not significant. Like the previous hypotheses that tested the effects of communication medium on the variables of interest there was no effect on affect, and communication medium did not affect the relationship between

feedback type and affect. Again it appears that it does not matter how performance feedback is delivered in this scenario, it only matters what the feedback message states.

### **Practical Implications**

A practical implication of this study is that supervisors may be able to provide their employees feedback either through face-to-face or email communication without adverse or differing effects on their employees. This would allow supervisors to give their subordinates feedback in the most convenient and efficient manner, even if not always appropriate. Typically supervisors provide feedback in a manner that is supposedly appropriate based on the difficulty or importance of the task. These results show that individuals perceive both face-to-face and electronic feedback similarly and as a result set similar goals and have similar feelings about the importance of those goals. This may allow supervisors more leeway in how they provide feedback than previously believed. However, this is only one study examining potential differences that occur depending upon how individuals receive feedback. Additionally, there are no actual measures of differences in performance after receiving the feedback. Further research is needed to ensure individuals do perceive feedback in a similar manner despite the mode of communication and that there are no differences in the consequent performance.

### **Limitations**

The first limitation of this study is the method that the electronic feedback was delivered to the participants. The participants who received their feedback through email were given their feedback moments after they finished their second round of Zork, with the experimenter in the room. The close proximity of the experimenter and immediacy of the feedback may have decreased the realistic conditions which electronic feedback is typically delivered. In most situations employees receiving feedback through email would not receive feedback with their supervisor standing over their shoulder or immediately after completing a task. In this regard the email feedback may have been higher in social presence than normal feedback delivered through email. The higher social presence, due to the presence of the experimenter, may have caused more emotional arousal than is typical of feedback delivered through email. Increasing the emotional arousal and immediacy of the feedback may have caused the electronic feedback to be

more similar to the face-to-face feedback, explaining the lack of differences between the email and face-to-face feedback groups.

Ensuring the sample would read and respond to the feedback in a timely and accurate manner was important for the experiment. Since the participants were undergraduate students there was a concern that having them leave the laboratory and read and respond to the measures on their own would not occur at an acceptable rate. Future experiments should present the electronic feedback in a more realistic manner, where the participants receive feedback at their own computers on their own time. This may result in differences in efficacy, affect, and goal setting behaviors between participants who receive feedback either face-to-face or through email.

The second limitation of the study was not measuring the task-specific efficacy before conducting the experiment. Task-specific efficacy was not measured prior to the experiment because the task, Zork, was something the participants were unfamiliar with and therefore should have had little to no efficacy. Measuring task-specific efficacy prior to the experiment would have allowed for comparisons between the changes in efficacy at each level. These changes could have been examined to see where feedback causes the most significant changes in different levels of efficacy. Having a pre-measure of task-specific efficacy would have also allowed for a baseline measure when conducting analyses to see if the changes in task-specific efficacy were significant beyond participant's initial levels of task-specific efficacy.

The final limitation of the study was the task used. Zork was unfamiliar to participants and allowed for a degree of ambiguity when providing feedback to the participants. However, the lack of familiarity and understanding of the game may be to blame for the lack of results in the actual stated goals of the participants. Despite the training and resources available to the participants, the stated goals of the participants did not differ significantly in difficulty ( $F(1, 92) = 3.86, p > .05$ ) or specificity ( $F(1, 92) = 0.01, p > .05$ ) depending upon the type of feedback the participants received. This was the only variable that did not differ dependent upon feedback received. This may be the result of a lack of understanding in the purpose of the game and the overall objectives. The training and resources made it possible for the participants to have an understanding and ability to play the game, but the limited amount of time the participants had to play the game may have restricted the quality of the goals the participants created on their own. With another task or increased experience with the game may have resulted in better goals and significant relationships with the other variables of interest.

## **Future Research**

Future experiments should be conducted by delivering the electronic feedback in a more realistic manner. For the purpose of this experiment it was not practical for the participants to leave and respond to the final measures on their own. However, future researchers should attempt to have the electronic feedback delivered in a more realistic way to see if this new method results in differences between feedback groups. The absence of the experimenter may reduce the effects of emotional connection or immediacy of the feedback, and result in differences in affect, efficacy, or the goals for the email group. This would also be a more realistic scenario of how email feedback would be received and handled in an organization.

Also, future experiments could measure the variables, and specifically the measures of efficacy, an additional time before conducting the final trial and again after the final trial. The current study found that there were changes in the variables after one trial, but the changes were not due or related to the method that the feedback was delivered. It is possible that multiple trials are needed before the participants' efficacy would be affected. Other lines of research suggest multiple trials are needed for changes in efficacy to occur. For example, Nease, Mudgett, and Quinones (1999) found that changes in efficacy occurred after multiple trials and finally stabilized. Adding additional trials to the current study may result in further changes in the variables of concern, and ultimately differences between the face-to-face group and the email group. Due to the leanness and the reduced social presence of email, changes in efficacy may reduce or cease after the second trial because it may be seen as repetitive or the individual may stop caring. Conversely, the face-to-face feedback group may continue to be affected by the feedback due to the presence of the experimenter and emotional connection between the individuals.

Additionally, personality variables could be measured to determine if people have preferences for receiving email or face-to-face communication based on aspects of their personality. Possible variables to research may include extroversion, introversion, anxiety, and avoidance, to list a few. For example, it would be interesting to see if extroverted individuals have a preference for receiving face-to-face feedback because they enjoy the social interaction. Conversely, introverted people may prefer email feedback because they want to minimize their social interactions with others. This may provide another explanation for why individuals choose to use certain types of communication types despite the availability of other methods.

The final avenue for research may include the addition of performance measures after the feedback. While there were no differences in efficacy, affect, and goals between the face-to-face and email group, the differences may occur in the subsequent performance. Self-efficacy and goals are meant to guide the behavior of an individual and affect their performance. Performance may be impacted at different rates due to the presence of the experimenter, the immediacy of the feedback, and the ability to ask additional questions or for further insight, with the face-to-face group may have larger changes in performance due to the aforementioned reasons.

### **Summary and Conclusions**

The purpose of the current study was to test for potential differences in self-efficacy, goals, and affect based on how individuals receive performance feedback. Two methods of feedback were used to test the hypothesis that leaner communication forms, in the case of this study email, would result in less change in the variables of interest than richer forms of communication, in this case face-to-face communication. Based on the results of the study it does not appear that the form of communication used to deliver performance feedback affects self-efficacy at any level, goal difficulty or specificity, or affect. While further research is needed, and the limitations of this study need to be addressed, it appears that supervisors can use either email or face-to-face communication to deliver feedback to their subordinates with similar outcomes.

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## **Appendix A - General Self-Efficacy Measure**

Think about your general abilities. When answering the following questions, answer in reference to your own personal skills and abilities.

Response Format

1 = Not at all true 2 = Hardly true 3 = Moderately true 4 = Exactly true

1. I can always manage to solve difficult problems if I try hard enough.
2. If someone opposes me, I can find the means and ways to get what I want.
3. It is easy for me to stick to my aims and accomplish my goals.
4. I am confident that I could deal efficiently with unexpected events.
5. Thanks to my resourcefulness, I know how to handle unforeseen situations.
6. I can solve most problems if I invest the necessary effort.
7. I can remain calm when facing difficulties because I can rely on my coping abilities.
8. When I am confronted with a problem, I can usually find several solutions.
9. If I am in trouble, I can usually think of a solution.
10. I can usually handle whatever comes my way.

## **Appendix B - Computer Game Self-Efficacy Measure**

Think about your ability to play a computer game. When answering the following questions, answer in reference to your own personal computer game skills and ability to play computer games.

### Response Format

1 = Strongly Disagree 2 = Disagree 3 = Disagree Somewhat

4 = Agree Somewhat 5 = Agree 6 = Strongly agree

1. I have confidence in my ability to play computer games.
2. There are some tasks required when playing computer games that I cannot do well.
3. When my performance is poor, it is due to my lack of ability.
4. I doubt my ability to play computer games.
5. I have all the skills needed to play computer games very well.
6. Most people are better at computer games than I am.
7. I am an expert at computer games.
8. My time playing computer games in the future will be limited because of my lack of skills.
9. I am very proud of my computer game skills and abilities.
10. I feel threatened when others watch me play computer games.

## **Appendix C - Task-Specific Self-Efficacy Measure**

Think about your ability to play a computer game. When answering the following questions, answer in reference to your own personal computer game skills and ability to play computer games.

### Response Format

1 = Strongly Disagree 2 = Disagree 3 = Disagree Somewhat

4 = Agree Somewhat 5 = Agree 6 = Strongly Agree

1. I have confidence in my ability to play Zork.
2. There are some tasks required when playing Zork that I cannot do well.
3. When my performance is poor, it is due to my lack of ability.
4. I doubt my ability to play Zork.
5. I have all the skills needed to play Zork very well.
6. Most people are better at Zork than I am.
7. I am an expert at Zork.
8. Playing Zork in the future will be limited because of my lack of skills.
9. I am very proud of my skills and abilities in Zork.
10. I feel threatened when others watch me play Zork.

## Appendix D - The PANAS

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you feel this way right now, that is, at the present moment. Use the following scale to record your answers.

1 - very slightly or not at all 2 - a little 3 - moderately 4- quite a bit 5 - extremely

\_\_\_\_\_ interested

\_\_\_\_\_ irritable

\_\_\_\_\_ distressed

\_\_\_\_\_ alert

\_\_\_\_\_ excited

\_\_\_\_\_ ashamed

\_\_\_\_\_ upset

\_\_\_\_\_ inspired

\_\_\_\_\_ strong

\_\_\_\_\_ nervous

\_\_\_\_\_ guilty

\_\_\_\_\_ determined

\_\_\_\_\_ scared

\_\_\_\_\_ attentive

\_\_\_\_\_ hostile

\_\_\_\_\_ jittery

\_\_\_\_\_ enthusiastic

\_\_\_\_\_ active

\_\_\_\_\_ proud

\_\_\_\_\_ afraid

## **Appendix E - Perception of Goals Measure**

When answering the following questions, answer in reference to your stated goals.

1. I understand how my performance is measured in Zork.
2. The goals I set for Zork are challenging but reasonable (neither too hard nor too easy).
3. I understand exactly what I am supposed to do in Zork.
4. I have specific, clear goals to aim for.
5. Trying for goals makes playing Zork more fun than it would be without goals.
6. I feel proud when I get feedback indicating that I have reached my goals.
7. I usually feel that I have suitable or effective action plan or plans for reaching my goals.
8. I feel that the training was good enough so that I am capable of reaching my goals.

## **Appendix F - Goal Difficulty and Goal Specificity**

Think about the feedback that was provided to you concerning your performance in Zork. Based upon your performance, the feedback, and your belief in your own abilities please list any goals you have for your second attempt playing Zork. Also, describe how you hope to achieve these goals. For example, goals can be described in terms of moves, a score, number of rooms or objects discovered, or higher overall performance compared to your peer group.

## Appendix G - Demographics

Age \_\_\_\_\_

Please Circle One

Year in School:

Freshman

Sophomore

Junior

Senior

5th Year

Sex:

Male

Female

## **Appendix H - Experiment Script**

### *Introduction*

The purpose of the study is to examine individual's beliefs in their abilities to play computer games, and specifically computer games that involve a series of puzzles. The computer game you will play today is called Zork. In Zork you will have to enter a series of commands that take you through a series of rooms, passageways, and scenarios. The objective is to gather useful objects that help you advance to other stages in the game. During the game a score is computed based on objects you find, the number of moves you make, and your overall performance. At the end of the experiment the participant with the highest score will receive \$50.

### *Instructions*

Before you play the game you will be asked to complete a series of surveys. The surveys measure your current mood and personal beliefs about your general abilities. After completing the surveys you will be given some basic information for playing Zork. Any questions you have will be addressed during this time. After the practice session you will be given 15 minutes to play the game during which time you should try to achieve the highest possible score. After playing, you will be provided feedback about your performance. Finally, you will be asked to complete a final set of surveys. If you have any questions during the experiment please feel free to ask the experimenter.

## **Appendix I - Feedback**

### *Negative Feedback*

Based upon on your score and the number of moves it took you to achieve the score, it appears that you performed poorly. Compared to other participants in your peer group your score places you in the bottom quarter, or around the 25<sup>th</sup> percentile. Based on this performance you would need to vastly improve your score to have a chance of winning the prize for having the highest overall score. To improve your score you may want to make a more detailed map. A better map will help you keep track of where you have been and eliminate unnecessary moves. Another way to improve your score would be to look around in all directions before moving, this may help you find new passages or items that add to your score and help you advance in the game. I am sure with these tips you can improve your performance and have a chance to win the competition.

### *Positive Feedback*

Based upon on your score and the number of moves it took you to achieve the score, you performed very well. Compared to other participants in your peer group your score places you in the top 10%, or above the 90<sup>th</sup> percentile. Based on this performance you have a good chance of winning the prize for having the highest overall score. To improve your score you may want to make a more detailed map. A better map will help you keep track of where you have been and eliminate unnecessary moves. Another way to improve your score would be to look around in all directions before moving, this may help you find new passages or items that add to your score and help you advance in the game. I am sure with these tips and you can improve your performance and have a chance to win the competition.

## **Appendix J - Debriefing**

Ask them what they think the purpose of the study was. Then tell the participant that the study is attempting to examine how people respond emotionally, their personal beliefs, and goals they set in response to positive or negative feedback depending on how the feedback is delivered, either face-to-face or through email. Since the feedback was fictional the \$50 prize winner will be determined through a random drawing of all the participants. It is important that you (the participant) do not tell anyone about the experiment because of the deception and knowledge by any potential participant may affect the outcome. Thank you for your participation and if you have any questions feel free to email Jason Brunner at the email provided on the sheet.