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**Pygmalion goes to school: The effects of goal setting, the
self-fulfilling prophecy and self-efficacy on trainee performance**

Benton, James Michael, Ph.D.

City University of New York, 1991

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A

PYGMALION GOES TO SCHOOL:
THE EFFECTS OF GOAL SETTING, THE SELF-FULFILLING PROPHECY
AND SELF-EFFICACY ON TRAINEE PERFORMANCE

by

JAMES M. BENTON

A dissertation submitted to the Graduate Faculty in Psychology in partial fulfillment of the requirements for the degree of Doctor of Philosophy, the City University of New York.

1991

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Abstract

PYGMALION GOES TO SCHOOL:
THE EFFECTS OF GOAL SETTING, THE SELF-FULFILLING PROPHECY
AND SELF-EFFICACY ON TRAINEE PERFORMANCE

by

James M. Benton

Adviser: Professor Walter Reichman

This study examined the effectiveness of motivation techniques for increasing performance in a skill training program. A PC based software program, Typing Tutor IV, provided structured training to increase subjects' typing skills. Improvements in performance were defined as increases in typing speed and accuracy, the dependent variables of the study. Subjects were 106 college students at a large urban university. Motivation was manipulated by the use of goal setting and the self-fulfilling prophecy (SFP), alone and in combination. The moderating effects of self-efficacy on motivation, defined as a generalized "can do" personality orientation, were also examined. Two levels of goal setting were employed: 1) "do your best"; and, 2) a difficult, specific goal. The SFP was tied to the situation, not the person. It was invoked by informing subjects that the training program had proven highly effective in increasing the typing skills of most users. A

total of 5 experimental conditions were examined, each comprised of equal numbers of high and low self-efficacy subjects, identified via the self-efficacy scale (Sherer, et al., 1982). The five conditions were: 1) SFP alone; 2) "do your best" goal setting (which also served as the control condition); 3) SFP plus "do your best"; 4) difficult, specific goal; and, 5) SFP plus a difficult, specific goal.

No significant main effect was found across the experimental conditions. There was a significant main effect for self-efficacy on typing accuracy ($F=4.17$, $p<.05$). Three first order effects were found: 1) subjects in condition 2 (do your best) showed significantly greater improvements in typing speed than subjects in condition 1 (SFP alone) ($F=2.88$, $p<.10$); 2) subjects in condition 3 (SFP plus do your best) also showed significantly greater increases in typing speed than subjects in condition 1 ($F=3.95$, $p<.10$); and, 3) subjects in condition 5 (SFP plus difficult & specific goal) showed significantly greater increases in typing accuracy than subjects in condition 2 ($F=3.48$, $p<.10$). This provides some indication that use of the self-fulfilling prophecy alone results in less effective training outcomes than either simple goal setting, or the combination of the self-fulfilling prophecy with goal setting. However, these differences are only significant at the $p<.10$ level. Therefore, little weight is ascribed to

these findings. They are reported as an indication of trends in the data, and a guide for future research.

Significant simple main-effects were found for typing speed among high self-efficacy subjects between several conditions. Subjects in condition 3 showed greater speed increases than subjects in condition 1 ($F=7.44$, $p<.05$), and subjects in condition 2 also showed greater speed increases than subjects in condition 1 ($F=8.27$, $p<.01$). It appears that when high self-efficacy subjects are told a task is easy they do not perform as well as when they are given a simple goal ("do your best").

Contrary to the majority of reported studies, neither goal setting nor the SFP were effective in improving the performance of subjects. This led to the conclusion that the goal setting and SFP manipulations used were inappropriate to the subjects and/or situation. But, the current literature provides no guidance on how to tailor these manipulations to the situation and subjects. Self-efficacy, measured via the self-efficacy scale, does provide a partial explanation and measure of the psychological processes underlying behavior in a training situation involving the self-fulfilling prophecy and basic (do your best) goal setting. But it accounts for only a small amount of the difference between conditions.

It is suggested that future research focus on how and

why goal setting, and the self-fulfilling prophecy, work most effectively. Specific guidelines on their use need to be developed in order to make them more easily and effectively applicable as motivation techniques in organizations.

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As I wrote this dissertation there were many times when I was ready to give up. It seemed there was no way I could ever complete a dissertation that met the demands of myself and 5 readers. But, I did complete the dissertation, and I'm proud. Thank you to everyone who helped.

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INTRODUCTION

Motivation is considered essential for effective training results and job performance. One way to view this concept is that without motivation there is no commitment to learning. Without commitment learning does not take place. Over the years a number of theories of motivation have been formulated. When subjected to scientific research most have failed, in one way or another, to provide effective techniques that can be readily applied in the work place to improve employees' performance. Those that are generally considered effective (e.g. goal setting and Organizational Behavior Modification) tend to be difficult to use effectively.

For the purpose of this discussion, theories of motivation are broken down into three general approaches: need theories; cognitive theories; and, the reinforcement approach. Luthans and Kreitner (1985) label the cognitive and need theories as the internal approaches to motivation, and the reinforcement approach as the external approach. The internal approach attributes behavior to conscious mental processes (e.g. emotions, motives, etc.). The external approach attributes behavior to environmental consequences (e.g. rewards and punishments).

The internal approach has long been the accepted model to explain people's behavior in organizations. This was originally characterized by the expectancy motivation theories of Vroom (1964) and Porter & Lawler (1968), and more recently by attribution theory (Mitchell & Wood, 1980; Spector, 1982). The external approach has only begun to appear in the management literature within the last ten years. It has not yet gained the widespread acceptance, among managers and trainers, enjoyed by the internal approach.

The aim of this study was to identify a very simple and widely applicable motivation technique that can be applied to organizational training programs to increase the learning of the students through heightened motivation. The Industrial & Organizational Psychology literature contains a number of studies demonstrating complex, and often difficult means of increasing motivation. However, there is a lack of simple and straightforward motivation methods that can be readily applied in organizations by managers and trainers, without the constant supervision of a trained Psychologist.

The following review discusses the major motivation theories of the last 40 years. Their strengths and weaknesses are reviewed, illustrating the weakness shared by all: There is not a single, empirically proven,

motivation technique that can be simply and easily applied, by managers and trainers, with consistently positive results. To this end the current study compares the use of the proven, but still problematic, motivation theory of goal setting with a relatively new and unproven approach to motivation known as the self-fulfilling prophecy.

HISTORY OF MOTIVATION THEORY

Need Theories

The basic precept of the needs theorists is that people exert effort in order to fulfill their needs. These needs are generally unconscious, and our striving to fulfill them is unconscious as well. Maslow's Need Hierarchy (1943) is the best known need theory. It states that people have a hierarchy of five groups of needs, ranging from simple to complex. The simplest needs must be satisfied before the higher order needs can be considered. The most basic needs are for shelter and food, the key elements necessary for survival. Progressing up the hierarchy, people experience the need for safety or security, love or belonging, esteem, and finally the need for self-actualization. Seemingly if we could tap employees' unfulfilled needs (especially for esteem and self-actualization) we could increase their motivation. Unfortunately, Maslow does not provide any research to support his theory, and the few studies that have examined the validity of his needs hierarchy have produced inconclusive results (Wahba & Bridwell, 1976). Despite the humanistic appeal of this theory, there is no evidence that Maslow's Need Hierarchy drives human behavior in either organizations, or the world at large.

Another potentially promising explanation was Herzberg's motivation-hygiene theory of work behavior. Hygiene factors prevent dissatisfaction but do not produce motivation. They include such aspects of the work place as company policies, supervision, salary, interpersonal relations, and working conditions. Motivation factors are, as the name implies, aspects of the work place that increase employee' motivation. These are such things as achievement, recognition, responsibility, advancement, and the nature of the work itself. These are fairly specific statements and easily testable, but most researchers have found little empirical support for them:

"Herzberg himself does provide a great deal of support for his theory using a critical-incident method of research (subjects recall incidents when they were satisfied and dissatisfied). But, when more rigorous research methodologies are used, the theory is generally not supported (Dunnette, Campbell, & Hakel, 1967; Hulin & Smith, 1967; Lindsay, Marks & Gorlow, 1967). Some researchers claim that even the critical-incident method, if properly used, does not support the two-factor theory (Schwab, DeVitt, & Cummings, 1971; Schneider & Locke, 1971)" (Luthans & Kreitner, 1985).

Thus, Motivation-Hygiene Theory also fails to provide a usable theory of motivation.

Alderfer's (1972) ERG model of behavior represents one of the more recent attempts to explain the internal causes of behavior. It is based, loosely, on Maslow's Need Hierarchy. Alderfer proposes three core needs -

existence, relatedness and growth - on a flexible continuum. Unlike Maslow's fixed hierarchy of needs, which supposes that people are always striving to fulfill their highest order unfulfilled need, Alderfer says that if a person's attempts to satisfy higher order needs are frustrated, he will fall back and remain at a lower level of functioning, not striving to fulfill higher order needs. There is too little positive research supporting this theory for it to be considered a valid explanation for human behavior. In fact, there is a fair amount of research demonstrating that the theory does not work (Raushenberger, Schmitt, and Hunter, 1980).

McClelland's Need for Achievement Theory (1955) is not based on Maslow's hierarchy. Need for achievement, abbreviated as N'Ach, is a learned need developed in childhood. People with a high level of N'Ach, as measured by McClelland's N'Ach scale, are presumed to be more motivated to put effort into their jobs. Research shows limited support for this theory. People who measure high on the N'Ach scale do tend to stay on the job longer (Rhode, Sorenson, and Lawler, 1976). But there are so many other factors, such as personal ability and the nature of the job, that determine success that the theory has not proven to be an effective way to create better performing employees.

Luthans & Kreitner (1985) conclude that:

"At best, based upon the available research evidence, the [needs] theories of work motivation turn out to be explanations of job satisfaction and not motivation...."

In other words, the needs theories of motivation do not help us understand how to motivate employees so they will learn and work more effectively.

Cognitive Models

The Cognitive models propose that people have inner, unconscious needs (like the needs theories) which work in conjunction with the person exercising conscious control over the satisfaction of these needs. Prominent among these is Adams' equity theory (1965) which is based on the principle of social comparison. Briefly, it states that a person's level of effort on the job is based on a comparison of the ratio of inputs (efforts) and outputs (rewards) of others to his own ratio of inputs and outputs. There is an underlying assumption that people can quantify their inputs and outputs. If the ratio of others' inputs and outputs to one's own are perceived as equal, then a state of equity exists and the person will continue to perform at the same level.

However, if inequity is perceived then the person's performance may be affected. There are two types of

inequity: underpayment and overpayment. A state of "underpayment" exists when a person believes they are receiving lesser outcomes, than others, for the same or greater inputs. "Overpayment" exists when a person feels they are receiving greater outcomes, than others, for the same or less input. Inequity can be changed by actual changes in performance, or by changes in cognitions.

Research (Campbell & Pritchard, 1983) tends to show that either performance or cognitive changes do occur, as predicted, in the underpayment condition. However, the overpayment condition has not been satisfactorily proven to exist. In addition, the theory provides no way of predicting which means of reducing inequity will be chosen; underpayment may not result in reduced performance, only an alteration of cognitions. Therefore, equity theory does provide some clues as to the causes of dissatisfaction and performance decrements, but it provides no usable method for increasing the motivation and performance of workers in an "equitable" situation.

Another currently popular cognitive model of behavior is Attribution Theory. Heider (1958) originally developed this as a theoretical model of how people attribute causes to other peoples' behavior. Another person's behavior can be attributed to factors of the environment (e.g. "he fell because the sidewalk was icy"), internal factors of the

individual enacting the behavior (e.g., "he fell because he's a klutz"), or a combination of internal and external factors (e.g., "he fell on the ice because he wasn't watching where he was going; he was watching that girl walking the other way").

The same principles also apply to an individual's perceptions of his/her own behavior. A person can attribute the reason for a given behavior to either internal causes or external causes. People tend to be fairly consistent in the type of attributions they make. Those who attribute most of their behaviors and resultant outcomes to external influences are considered to have an "external locus of control". People who attribute most of their behaviors and outcomes to themselves (i.e. internal causes) have an "internal locus of control".

Research on this theory has revealed consistent results. Individuals with an internal locus of control make better managers than individuals with an external locus of control: They perform better (Anderson, Hellriegel & Slocum, 1977; Anderson & Schneier, 1978), are more considerate of subordinates (Pryer & Distenfanso, 1971), are more satisfied with their jobs and are more likely to use a participative management style (Mitchell, Smyser & Weed, 1975).

Attribution theory is among the few internal explanations for motivation and behavior that is consistently borne out by research; it predicts some elements of managerial success. However, for purposes of managing and training employees, it provides no explanation of the best way to motivate them to learn and perform optimally.

Two of the most popular cognitive models of work motivation are the expectancy theories developed by Vroom (1964) and Porter & Lawler (1968). Georgopolous, Mahoney, and Jones (1957) first introduced the application of expectancy theory into the work place. But Vroom (1964) is generally credited with its popularization.

A number of later researchers have added their own modifications and extensions to this model: Graen (1969); Campbell, Dunnette, Lawler, and Weick (1970); House (1971); and Lawler (1971). However, the basics of the theory remain unchanged and most research tends to focus on five elements of, what may be referred to as, general expectancy theory. Due partly to the intuitive logic of this theory it has been one of the most popular and widely researched motivation theories in I/O Psychology for over 20 years (Muchinsky, 1983; Wahba & House, 1974).

The four core components of the theory, and their product, are respectively: job outcomes, valence, instrumentality, expectancy, and force.

Job outcomes. Job outcomes are work related rewards provided an employee by his organization. These can include anything that is positively valued by the individual, such as raises, promotions, praise, and so on.

Valence. Valence is the value placed on a particular job outcome by an employee. This is rated on a scale ranging from -10 to +10, depending upon the degree of satisfaction perceived to be provided by an outcome. Each possible job outcome has a unique valence.

Instrumentality. Instrumentality is the employee's perception of the relationship of job performance to job outcomes. For example, if a person believes that the outcome of pay is completely conditional on job performance then this outcome would have a very high instrumentality. Instrumentalities are regarded as a probability and are rated on a continuous scale ranging from 0 to 1.0. An instrumentality of 0 represents no relationship between performance and outcomes; an instrumentality of 1 represents a perfect correlation between job performance and outcomes. Each job outcome has a unique instrumentality.

Expectancy. Expectancy is the employee's perception of the relationship between effort and job performance. Expectancy, like instrumentality, is regarded as a probability and is rated on a continuous scale ranging from 0 to 1.0. An expectancy of zero represents no perceived relationship between effort and performance; an expectancy of 1 represents a direct relationship between effort and performance. Unlike instrumentality and valence there is only one expectancy value generated for a given job.

Force. Force is the amount of effort or motivation possessed by an employee in a particular job. The greater the amount of force the greater the amount of motivation. Force is generally defined as the product of Valence x Instrumentality x Expectancy -- using the formula:

$$Force = E(VI)$$

The expectancy theorists also contend that rewards for increased performance will lead to satisfaction. This is in contrast to most other motivation theorists who believe that satisfaction causes increased performance. This model has received some research support (Porter & Lawler, 1968; Lawler, 1971; Kuhn, Slocum, & Chase, 1971; Schuster, Clark, & Rogers, 1971; Jorgenson, Dunnette, & Pritchard, 1973). However, the focus on the complex interactions of a variety of concurrent, unobservable,

internal processes such as role perceptions, expectations, traits and abilities, makes it difficult to empirically establish if the interaction of these factors determine employee motivation. For example:

"...even though a person places a high value on the reward and perceives a high correlation between the effort and reward and thus puts out a lot of effort, this still may not lead to high performance. This circumstance may arise because the person just does not have the necessary ability or traits to perform well or perceives his or her role wrongly and thus performs poorly" (Luthans & Kreitner, 1985).

The difficulty of thoroughly researching expectancy theory is illustrated by a review of 6 representative studies of expectancy theory (e.g., Schwab, D.P., 1973; Kopelman, R.E., 1976; Pritchard, et al., 1976; James, et al., 1977; Kennedy, C.W., 1980; Kennedy, et al., 1983). None of these studies examined all five variables comprising the complete theory. Only expectancy and valence were generally examined. In this author's opinion expectancy theory represents a complex interaction between all five variables. To examine only a portion of the theory at one time is not a true study of the theory.

Going beyond research to implementation, Pinder (1977) points out several potential problems:

1. In order to increase motivation practitioners usually use extrinsic rewards as positive job outcomes. But, according to Deci (1975), tying extrinsic rewards directly

to performance may undermine intrinsic motivation. This leads to a decrease in intrinsic satisfaction derived from the job which may ultimately result in performance decrements.

Another problem, not mentioned by Pinder, with the use of rewards that are contingent upon performance lies with the currently weak state-of-the-art of performance appraisal (Heneman, 1975; Landy & Farr, 1980); in many jobs it is not possible to accurately measure performance and develop an equitable formula for linking performance to rewards.

2. Validity coefficients between composites of the five variables comprising expectancy theory and hard criteria of effort or performance average 0.40. This indicates that the theory is accounting for only 10% to 15% of the variance in performance. The remainder is unexplained variance due to inter-individual and inter-organizational differences. This may be due to the theory's requirement that the variables be measured on true ratio scales for accurate calculations. Current empirical methods have not yet been able to satisfy this requirement.

3. Employees' needs and values must be determined in order to create conditions that enhance motivation. This can be construed as an invasion of privacy that is not justified.

Thus, given the current state of research, expectancy theory provides an intuitively appealing but as yet incompletely validated approach to motivation. It is currently impossible to effectively harness expectancy theory to motivate people. This is too bad, because expectancies are clearly an important aspect of any training/learning situation; peoples' expectations for success influence their effort and performance. In fact, the following chapter, on the self-fulfilling prophecy, discusses ways to harness these expectations to increase motivation.

Goal setting theory (Locke, 1968) has attracted a good deal of attention and research, due largely to a combination of its elegant simplicity and empirical support. The basic premise of goal setting is that conscious goals bear directly on task performance. Commitment to a goal is positively related to its difficulty, so more difficult goals tend to lead to higher task performance. In addition, the more specific the goal the more directed will be the individuals' behavior (Terborg, 1977). Finally, the person needs to receive feedback about task performance in order to exert the level of work necessary to attain the goal. Specifically, research on goal-setting has produced the following criteria (Goldstein, 1986):

1. Specific, hard, or challenging goals result in better performance than specific easy goals or do your best goals.
2. Goal setting works best when goals are stated in specific rather than vague terms.
3. The goals must be matched to the person's ability so they are likely to achieve the goal.
4. Feedback on the degree to which the goal is being met is necessary.
5. The individual must accept the goal that is being set.

Research on goal setting tends to support the basic premises of the theory. A review by Latham and Yukl (1975a) of a number of field studies of goal setting found that nearly all the studies substantiated the theory. Latham and Baldes (1975) found that goal setting was an effective means for improving the performance of people working on independent tasks: Their subjects were truck drivers whose job was to haul logs to lumber mills. The more logs they hauled each trip the fewer trips they made. A within-subjects design was used. In condition 1 the drivers were told to "do their best" in loading the trucks. In condition 2 the drivers were given a specific and difficult goal -- to load their trucks to 94% of the legal limit. Feedback was provided by use of a loading scale. Performance in condition 2 was significantly better than in condition 1.

Latham and Yukl (1975b) found that goal setting can be an effective method of improving the performance of

work groups. This study examined two groups of subjects: (1) 24 (academically) uneducated logging crews, and (2) 24 educated logging crews. Three types of goal setting were used: 1) crews were told to "do their best"; 2) crews were assigned specific goals; and, 3) the crews participated in setting their own goals. The best performance was achieved by the uneducated crews in the participative goal setting condition. However, no significant differences in performance were found among the educated crews. This adds another facet to goal setting theory; participation appears to increase goal acceptance, and accordingly performance. But, the same goal setting paradigm does not work for all people.

Other research has revealed further individual differences in the effectiveness of goal setting. Ivancevich and McMahon (1977) found that blacks tend to want more feedback and participation in setting goals, whereas whites want more difficult goals. Other researchers (Erez, 1977; Kim & Hamner, 1976) have found that while feedback is critical for optimal performance there are individual differences in people's ability to use the feedback. When specific goals are used goal setting should be tailored to each individual in order to be most effective. But, this is difficult, time consuming and often not feasible in many training situations.

Second, some research has shown that while both the setting of difficult goals and a commitment to those goals improves the effectiveness of goal setting, difficulty and commitment are inversely related (Erez & Zidon, 1984). A person's commitment to a goal decreases as the goal becomes more difficult. Given this inverse relationship, it may often prove difficult to maximize motivation via goal setting. Third, in this author's opinion, in some situations where goals are imposed, goal setting may be viewed by participants as manipulative or coercive, which may in turn undermine motivation.

Several researchers have reported completely negative results when using goal setting (e.g., Erez, et al., 1985; Siry, 1987; Miller & McAuley, 1987). Even well known I/O Psychologists (e.g., Latham & Yukl, 1975b; Erez, et al., 1985) are not always able to make goal setting work. A possible cause of these negative results is the specific procedure(s) used to set the goals. Latham, Erez, & Locke (1988) found that the way the goal is presented to subjects (e.g., "tell" vs. "tell and sell") can significantly influence the effectiveness of goal setting.

Currently, there are several problems with the application of goal setting which detract from its overall effectiveness: 1) the same goal setting paradigm does not work for all people; 2) different groups (e.g., Black and

White) require different levels of feedback, participation, and goal difficulty to perform optimally; 3) specific goals result in better performance than general goals, but they must be tailored to each individual in order to be most effective; and, 4) even experienced practitioners do not obtain consistently positive results using goal setting. Thus, it appears that goal setting generally works, but it is not equally effective in all situations nor for all people.

A possible source of these problems may be the atheoretical nature of goal setting. All that the theory states is that conscious goals bear directly on task performance. There is no indication of the specific psychological, situational or individual variables that mediate goal setting's effectiveness. Therefore, no guidance is provided in developing effective manipulations. "Locke and his associates are careful to point out that their model is meant to concentrate on the goals component [of motivation] and is not overly concerned with what influences the establishment and acceptance of goals in the first place" (Campbell & Pritchard, 1976). Despite this, goal setting has proven to be a generally effective motivation technique. Further research will help to enhance its effectiveness.

While such research is progressing, it is also reasonable to search for alternate motivation techniques that currently provide broad and easy applicability. To this end, the current study examines the use of both goal setting and an alternate motivation technique (the self fulfilling prophecy).

The Reinforcement Approach

Drive Theory (Hull, 1943) is an early motivation theory which provides some basis for the modern reinforcement approaches to behavior. It was enthusiastically received and actively researched for 20 years following its introduction. Drives are aversive internal states (e.g. thirst, hunger) which organisms act to eliminate. These drives account only for the arousal of behavior, not its direction. The behavior most likely to occur, in response to a drive, is the one with the strongest association to the stimuli present at that moment. For instance, if an animal has learned to run to food when hungry, this running behavior will be dominant when the animal is hungry and given food. Increasing the animal's drive level, via food deprivation, will result in a more vigorous running response.

Animal research reveals this drive-activity relationship to be quite complicated. The relationship

varies depending upon a number of factors: type of deprivation (e.g., food, water) (Campbell, 1964), species (e.g., rat, rabbit, hamster) (Campbell, et al., 1966), and measurement procedures (e.g., fine vs. gross body movements) (Strong, 1957). Ideally, a good theory provides a general explanation for a range of behaviors and situations. Given the discrepancies cited, Drive Theory does not provide a good general explanation. At best, it accounts for increased responsiveness to environmental stimuli, due to deprivation. But, the type and level of behavior elicited is unpredictable.

In terms of human behavior, Drive Theory provides little explanatory power. Most human behaviors do not appear to be related to deprivation. Drive Theory provides nothing applicable, to the work place, for the purposes of controlling and increasing human performance.

The relative failure of the preceding approaches to completely explain motivation has led some organizational researchers to turn to B.F. Skinner's work on operant conditioning. This is a reinforcement, or behavior modification approach. Laboratory research has shown this technique to be highly effective in controlling the behaviors of children and developmentally disabled adults (Luthans & Kreitner, 1985). The basic principle employed is that behavior that leads to rewarding consequences will

be reinforced, while behavior that leads to no outcome or to negative (punishing) consequences will be suppressed (Decker & Nathan, 1985). Reinforcement is any outcome that increases the likelihood of the preceding behaviors being repeated.

Behavior modification, when used in organizations is referred to as Organizational Behavior Modification or OBM. This is "the application of the principles of behavioral psychology and the methodologies of behavior modification...to the study and control of individual or group behavior within organizational settings" (Frederiksen & Lovett, 1980).

According to Goldstein (1986) the use of behavior modification in industry stems directly from its use in clinical settings as a method for changing maladaptive behavior. The approach can be broken down into five basic steps:

1. An assessment is performed to specify where problems exist and to help in the determination of precise behaviors that require elimination, modification, or development.
2. Reinforcers, appropriate to the situation and to the individual, are selected.
3. The implementation of the actual program consists of a variety of different procedures dependent on the behavior of the trainees.
4. Desired responses are immediately and continuously reinforced. Once the behavior is established, intermittent programs of reinforcement are instituted.
5. Evaluation procedures are employed to determine the degree of change.

Despite the seeming simplicity of designing and implementing an OBM program, the majority of early studies exploring the effectiveness of the OBM approach to training were so poorly designed that it was impossible to conclude that this approach was truly effective. The five basic steps outlined by Goldstein were rarely followed. McGehee & Tullar (1978) conducted a comprehensive review of the OBM training literature from 1967 to 1976. They concluded that "No scientific evidence of its effectiveness in industrial training was found". In fact, only two (one-shot case) studies of its effectiveness were found (Nord, 1970; Feeney, 1972), and these suffered from a number of methodological and design problems.

Overall, the early reported studies that employed OBM techniques were so badly designed that the effectiveness of the technique was unproven. Only in the past 10 years have methodologically sound studies (e.g., Komaki, et al., 1980) appeared that show the OBM approach can be effective when properly applied.

Despite its early methodological problems OBM has attracted a great deal of attention, as a motivation technique, due to its apparent simplicity in application. Despite this apparent simplicity OBM actually requires a great deal of time and training on the part of the facilitator; he must be constantly alert to the occurrence

of desired behaviors and know how to effectively reinforce these behaviors when they occur. Arguably, this aspect of OBM prevents its easy application, in a variety of organizational settings by non-Psychologists.

CONCLUSION

The preceding review illustrates the wide range of motivation techniques available to the practitioner. Unfortunately, all of these techniques suffer from theoretical and/or practical problems which limit their application in organizations. Even in the case of the more promising theories, such as goal setting and OBM, a great deal of research still needs to be conducted to discover when, and how, these theories are best applied. To this end the present study examined the application of two relatively straightforward techniques -- goal setting and a relatively new motivation theory (the self-fulfilling prophecy) -- to increasing performance in a training program that could be used in organizations.

MOTIVATION AND THE SELF-FULFILLING PROPHECY

Expectancy Theory provides a promising but as yet unproven model of work motivation. In this author's opinion the major shortcoming in the study and implementation of expectancy theory is its complexity. It is almost impossible to: 1) concurrently measure all five variables of the theory; and, 2) develop a true ratio scale for these variables. However, a basic proposition of expectancy theory -- that expectancies contribute to motivation and performance -- is very appealing; this statement is borne out by the expectancy theory literature which tends to focus on expectancies as much, or more, than the other four variables. Therefore, it make sense, based on this trend in the research literature, to extricate the variable of expectancy from the rest of the theory. This provides a simple and easily understandable theory of work motivation

The theory of the Pygmalion effect, or the self-fulfilling prophecy (SFP), focuses solely on the influence of expectations on behavior and performance. The SFP includes the key principle of expectancy theory -- the role of expectations -- independent of the complex interaction model which makes expectancy theory difficult to both research and use. The SFP, unlike expectancy

theory, provides a model of motivation that is readily researchable and usable.

The self-fulfilling prophecy was first identified by Merton (1948). It is defined as peoples' tendency to act in accordance with their perceptions of others' expectations of them, as well as their own expectations. The SFP did not become well known until Rosenthal & Jacobson (1968) applied it to the classroom, labeling it the Pygmalion effect. They discovered that the expectations held by teachers, regarding students' performance, greatly affected the students' performance; elementary school students who were randomly identified to teachers as "late bloomers" actually gained in intellectual performance (measured via grades) over the school year.

Although questions have been raised about the adequacy of this research, further studies suggest that expectancy effects do operate in a variety of teaching and learning situations. A comprehensive review, of the occurrence of the self-fulfilling prophecy in the classroom (Cooper, 1979), suggests that teachers tend to give more criticism to low expectation students in order to control, or limit, their interactions with them. In contrast, high expectation students receive both praise and criticism in ways that improve their performance.

The self-fulfilling prophecy has also been shown to operate in such diverse areas as the development of sex role stereotypes, and interpersonal attraction (Snyder, et al., 1977). Sex role stereotypes develop in children at a very young age in response to adults' expectations. Boys are expected to act aggressively and adults unconsciously reward them for aggressive behavior. Girls are expected to be gentle and nurturing so adults unconsciously reward them for those behaviors. In terms of interpersonal attraction, when we find someone attractive we ascribe positive stereotypes to them: interesting, kind, poised, sexy, etc. We also respond to that person in a manner that causes them to behave according to our expectations. Thus, in both child rearing and interpersonal relations the self-fulfilling prophecy leads to the fulfillment of our expectations. In fact, the self-fulfilling prophecy occurs in such a wide variety of situations that it may unconsciously influence many of our behaviors and resultant outcomes.

Dov Eden has adapted the notion of the Pygmalion effect to the area of organizational interventions. Eden (1986) hypothesizes that the effectiveness of an OD (or similarly a training) intervention is relatively unrelated to the type of intervention used. Rather, expectations, which he terms the "Self-Fulfilling Prophecy", are the

major influence on the success of an intervention. An intervention's success is in direct (positive) proportion to the expectations for improved performance it arouses. Attempts to control or minimize expectations, for methodological purposes, may inhibit the effectiveness of the intervention. In this conceptualization the intervention and the client's/student's expectations are equally important for producing effective change, and it is a mistake to try to separate the effects of the two.

This hypothesis is consistent with the expectancy theory of motivation (Vroom, 1964) which may be conceptualized as stating that the higher the (student's) expectations that investment of energy in a training program will work, the greater will be the effort invested. In other words, high (but realistic) expectations for success will motivate students to work to make the training a success.

There have been a limited number of studies examining the effects of expectations in relation to training programs. One such study, done in the context of an organizational development intervention, was the Pygmalion at Sea Project (Crawford, Thomas and Fink, 1980). This was an attempt to improve the performance of (12) low-performing seamen, working in unskilled and relatively

unmotivating jobs, and identified as having discipline problems.

The intervention attempted to improve performance by training both the seamen and their supervisors. The supervisors were taught specific behavior modification techniques to improve the performance of the "problem" sailors. This training included the generation of expectations among the supervisors, by the trainers, that the correct application of these procedures would lead to a performance improvement in the problem sailors.

High expectations were also generated among the problem sailors via two methods: 1) They were told by their Commanding Officer that they had the potential to become good sailors; 2) they were given specific "tricks", by the trainers, for dealing more effectively with their supervisors. And, the trainers generated the expectation, among the sailors, that if these techniques were correctly applied, they would become good sailors. The generation of expectations by both the CO and the trainers was predicted to result in performance improvements.

The researchers performed a 9 week follow up. They found that during this period job performance increased, and cited rule infractions decreased significantly, for

the problem sailors, in comparison to a matched control group.

Ostensibly this study demonstrated that the SFP can be used in a training program to improve training effectiveness, as measured by on-the-job performance. There are however, three problems with this study. First, the effects of the training and the raising of expectations cannot be separated. It is impossible to determine the cause(s) of the improved performance of the sailors. Second, the sample size (N=12) was extremely small. And third, the aberrant behavior patterns of the subjects are not common to most members of any organization. These three problems make both the internal and external validity extremely low.

Eden & Shani (1982) conducted a modified re-creation of the Rosenthal & Jacobson study (1968), using military personnel as subjects. "One hundred and five trainees in a 15-week combat command course were matched on aptitude and randomly assigned to high, regular, and unspecified instructor expectancy conditions". Eden & Shani studied the use of the SFP by manipulating the instructors' expectations about the students' aptitudes for learning. They found this did affect students' performance (i.e. grades), as predicted by the SFP theory.

Empirically, there are no problems with this study. However, it does not provide a practical method for practitioners to apply the SFP to the improvement of training performance. The greatest performance, or learning, was among those students whose instructors held high expectations regarding their abilities. To apply this method to improve the performance of all students would require that instructors always be told that all their students are of superior aptitude. Clearly, this is not realistic. It would be difficult to make instructors believe that all of their students, in every training program, possess superior aptitude. Instructors would (probably) quickly realize that the abilities of this "high aptitude" group varied widely, and they would see that a deception was being perpetrated. At this point the use of the SFP would cease to be effective.

Sutton and Woodman (1989) conducted a similar study in the work place. They investigated the use of the SFP in a retail store. Supervisors were led to believe that (several hundred) newly hired sales associates had either "exceptional" sales potential, or unidentified (nonexceptional) potential. Employees were actually randomly assigned to these two categories. The study was conducted over a 3 month period, with monthly checks made on employees' job performance.

At the conclusion of the study it was found that high expectations for performance, on the part of the supervisors, did not result in higher levels of subordinate performance. This negative finding is in marked contrast to the largely positive findings typically reported. The authors conclude that the SFP is not universally applicable to all situations. More research is required to understand the complex interaction between supervisors' expectations and subordinates' behavior.

Eden & Ravid (1982) examined the effects of increasing the self-efficacy of trainees by manipulating their expectations for success. Subjects in the experimental condition were told, by a psychologist, that they had high success potential. This manipulation was intended to increase subjects self-efficacy. The control group was told nothing about their success potential. "Learning performance as measured by both weekly instructor ratings and weekly written examinations was significantly higher in the ..." high self-efficacy group than in the control group "... confirming [the] hypothesis that inducing high self expectations enhances trainee performance" (Eden & Ravid, 1982).

This study is methodologically sound, and proposes some potential applications for the SFP. However, there are many situations where it would be unethical or

impractical to manipulate trainees' expectations about their individual success potential in order to increase the effectiveness of a training program. Such manipulations can result in a variety of negative outcomes if they are misused, or the subject becomes aware of the manipulation. Respectively, damage may result to the individual's self-esteem, or a general distrust of the trainer or Psychologist may develop, if the individual finds out they were deceived. At the very least these problems could obviate the effectiveness of the training. At worst, they could result in psychological damage to the individual. It is this second outcome that is to be most feared. Arguably, the risk of psychological damage far outweighs any potential benefits.

It is important to note that the current conceptualization of the self-fulfilling prophecy has one potential weakness -- it is atheoretical. The self-fulfilling prophecy states that people tend to act in accordance with their perceptions of others' expectations of them, as well as their own expectations. But, no statement is made about the psychological processes that underlie the development of these expectations. Nor is any statement made regarding the psychological processes that may mediate the effectiveness of the SFP. In fact, research has not determined if expectations are actually

manipulated by the SFP. This weakness has not, so far, adversely affected the application of the SFP. But, due to the atheoretical nature of the SFP, no guidelines are available for developing and delivering effective SFP manipulations. Current research indicates that the SFP is sufficiently robust that it works almost all the time, regardless of variations in its use.

At this point the research on the self-fulfilling prophecy has given it the status of an interesting, but not highly applicable psychological principle. The SFP possesses several positive aspects which make it worthy of further study, with an eye toward potential applications. The SFP is one of the few *simple* motivation technique that has the potential for easy and effective use by managers and trainers. To this end, the use of the SFP as a motivation technique, in an organizational (type) training program, was examined.

SELF EFFICACY

The construct of self-efficacy, a key element of Bandura's Social Cognitive Theory, is the belief in one's ability to "...successfully execute courses of action required to deal with prospective situations" (Bandura, 1982, p. 122). Just as the self-fulfilling prophecy focuses on the role of expectations, so too does the notion of self-efficacy. Self-efficacy provides a logical explanation for the psychological processes that underlie individuals' alterations of their perceptions regarding their likelihood of successful performance. To generalize, people with high self-efficacy possess a strong belief that they can act effectively in a variety of situations. Whereas people with low self-efficacy have a much weaker belief in their ability to act effectively.

Unfortunately, the current conceptualization of self-efficacy is not so clear cut as the description presented above. It is clouded by a variety of theoretical and methodological problems. The current literature suffers from a lack of agreement on the exact nature of self-efficacy and how it should be measured. Bandura (1982) states that self-efficacy can be both stable and changeable. In keeping with the tenets of Social Learning Theory he states that *self-efficacy is*

changeable in novel situations in response to the influences of direct and indirect (i.e. observed) experiences. However, *self-efficacy is stable "...in the case of habitual routines"* (p. 123). The exact nature of "novel situations" and "habitual routines" is never defined. Therefore it is left to the discretion of each researcher to determine the degree to which their experimental paradigm constitutes a novel or familiar (i.e. habitual) situation.

This distinction between novel and familiar situations is very important from both a theoretical and measurement standpoint. From the theoretical perspective there is some confusion as to whether self-efficacy is a largely stable personality variable or is highly task dependent. On one side there are researchers such as Sherer (et al., 1982) who have developed a measure of self-efficacy based on its definition as a general personality trait operating across situations. In the middle are researchers like Dosset (1988) who characterizes self-efficacy as generalizable across a range of similar tasks: "[It is] a relatively stable perception of one's ability to successfully cope with a generalized situational stimulus....". On the other side are researchers such as Bandura who regard self-efficacy as directly influenced by the task at hand. Specifically,

he states: "Self-efficacy theory has never tendered the preposterous notion that perceived self-efficacy is an autistic entity that is identifiable independently of the nature and complexity of performance tasks" (Bandura, 1986, p. 370).

This confusion is compounded at the measurement level where it is unclear the appropriate degree of task specificity for a good measure of self-efficacy. Bandura's writings may be the source of some of this confusion. He states that the items of a self-efficacy measure should be "...constructed at an intermediate level of generality representing a generic level of competence at each aspect of a domain. Thus, for example, individuals are asked to judge their perceived efficacy to cope with congested city traffic rather than with traffic on a specific street in a specific city". It is only with self-efficacy measures constructed at this intermediate level of generality that we will develop an understanding of how self-percepts of efficacy affect human functioning (Bandura, 1986).

In actuality Bandura's scales for measuring self-efficacy do not generally meet his criteria for an "intermediate level of generality". Rather they tend to be highly task specific. For example, in assessing the generality, magnitude and strength of snake-phobic

subjects' self-efficacy for dealing with snakes, Bandura and his colleagues (Bandura, Adams & Beyer, 1977) used largely task-specific measures: "Subjects were provided with the list of performances included in the behavioral test and instructed to designate those they expected to perform [successfully] before treatment". In addition, "To provide an index of the generality of self-efficacy, subjects rated the level and strength of their expectations in coping successfully with an unfamiliar snake as well as a boa constrictor similar to the one used in treatment" (p. 128). Clearly, both the specific behaviors of the behavioral test, and dealing with a boa constrictor, are highly task-specific topics and do not meet the criteria for "an intermediate level of generality".

Based on the example set by Bandura most researchers have used similarly task-specific measures of self-efficacy. Thus, the literature is characterized by the implicit assumption that self-efficacy is highly task-specific. For instance, in a study of the effects of self-efficacy on task perseverance, subjects were given bogus feedback on their performance on a puzzle solving problem. Following feedback self-efficacy was measured via two items that asked subjects to rate (on a 14 point Likert scale) how well they expected to do on a second

puzzle solving problem (Jacob, Prentice-Dunn, & Rogers, 1984). Again, this was a highly task-specific rating that did not conform to Bandura's criteria.

A weakness of this highly task-specific operationalization of self-efficacy is that it is indistinguishable from the effort-performance expectancy of Expectancy Theory. It provides no explanation of motivation beyond that provided by (the expectancy component of) expectancy theory. Both focus on the perceived likelihood of task success in a specific situation. Bandura is aware of the high degree of similarity between self-efficacy and expectancy. He attempts to differentiate the two by explaining that: "...perceived self-efficacy encompasses much more than effort determinants of performance. People judge their capacity for challenging activities more in terms of the knowledge, skills, and strategies they have at their command than solely in terms of how much they will exert themselves" (1986, p. 371).

This definition of expectancy is overly narrow and inconsistent with the literature which makes no such restrictive statements. Vroom (1964) defines an expectancy as nothing more than "...a momentary belief concerning the likelihood that a particular act will be followed by a particular outcome" (p. 17). Although not

specifically stated, logically this expectancy is based on peoples' analysis of their own strengths and weaknesses (e.g. knowledge, skills, and strategies), as well as the nature of the situation. Clearly, the definition of expectancy and the operationalization of self-efficacy do not differ appreciably.

The definitions of expectancy and self-efficacy are, however, very different. Expectancy is only part of a complex interaction of four core components (job outcomes, valence, instrumentality, and expectancy) that produce motivation (force). Self-efficacy, on the other hand, is simply an expectation for success based on the person's *interpretation* of past successes and failures as a determinant of their ability to succeed in the situation at hand. For instance, a person of generally high ability may interpret their past successes as due simply to luck rather than ability. Accordingly, they will tend to have low self-efficacy and low expectations for success in most situations.

Self-efficacy provides a much simpler explanation, than does expectancy theory, of the relationship between expectancy and motivation/performance. Given the great difficulty of measuring the expectancy performance relationship via Expectancy Theory, and the much greater

simplicity provided by self-efficacy, it makes sense to examine self-efficacy rather than expectancy.

Furthermore, the self-fulfilling prophecy (probably) manipulates peoples' expectations, and self-efficacy provides a measure and explanation of the degree to which these expectations can be manipulated. The psychological mechanism(s) underlying goal setting is unknown, but self-efficacy is a plausible mechanism influencing its effectiveness. Therefore, it makes sense to examine self-efficacy as a potential mechanism influencing the effectiveness of both goal setting and the self-fulfilling prophecy.

Another problem with the current measurement techniques applied to self-efficacy is that all fail to meet minimal requirements for psychometric validity. Specifically, all the published studies measure the construct of self-efficacy with scales that are, at best, only content valid. In fact, research (Dosset, 1988) has found that these types of self-efficacy measures have little or no construct validity. Without proper construct validation there is no certainty that self-efficacy is actually measured by these instruments.

In terms of general research, several studies of self-efficacy are similar to the current study. They have manipulated subjects' expectations about the effectiveness

of a training program and examined the interaction of expectations and self-efficacy in creating training outcomes (e.g. Manning & Wright, 1983; Maddux, et al., 1986;). And, like the present study, they have used verbal persuasion based on empirically proven techniques (e.g. Maddux & Rogers, 1980), to create expectations in their subjects.

However, these studies all suffer from the methodological problems discussed above -- the measures of self-efficacy used have no construct validity. In addition, they suffer from several other shortcomings: 1) The studies did not measure actual changes in behavior due to training, they only measured subjects' anticipated changes in behavior following training. And these researchers admit that it is extremely difficult to differentiate self-efficacy expectancy from outcome expectancy. Therefore these studies may be confounded. The present study assesses actual behavioral changes; 2) these studies did not examine the types of training typically used in business organizations, in the case of the present study skill training. Rather, they focused on topics such as the ability to mentally control pain during childbirth (Manning & Wright, 1983), or assertiveness training (Maddux, et al., 1986).

There have been a number of other studies involving training and self-efficacy. None of these bear a strong resemblance to the present study. Typical of these studies is a comparison of alternate training methods (behavior modeling vs. tutorial training) for a PC-based software package (Gist, et al., 1989). Subjects were randomly assigned to a training condition and their self-efficacy measured. Like all other studies involving self-efficacy the measure of self-efficacy was task specific and unvalidated. Although this was a true experimental design, the self-efficacy measure was largely meaningless. Once again, it is impossible to draw any firm conclusions, about the nature of self-efficacy, from such studies.

Given the theoretical and methodological problems with the current conceptualization of self-efficacy, it makes sense to define it in more usable terms. Current (operational) definitions of self-efficacy as task specific makes it indistinguishable from the effort-performance expectancy of Expectancy Theory. Such definitions provide no explanatory power beyond that of Expectancy Theory. In order for self-efficacy to be a useful construct it must provide an explanation for an individual's behavior in a variety of situations, as

opposed to the situationally specific view of behavior provided by Expectancy Theory.

Bandura, and others, have interpreted the generally positive relationship between these task-dependent self-efficacy measures and task performance as affirming "...the generality of the relationship between perceived self-efficacy and motivation" (Bandura & Cervone, 1986). However, due to the lack of validity of these scales, and the narrow operational definitions used, self-efficacy cannot be generalized from such studies. Only when valid measures of self-efficacy are used can the generality of self-efficacy be judged.

To this end self-efficacy should be redefined as a general, not task-specific, construct. In other words, *self-efficacy is the belief in one's ability to successfully execute courses of action required to deal with a variety of situations.* This is the definition of self-efficacy used in this study. It is based on the definition used by Sherer et al. (1982) in their development of a generalized measure of self-efficacy (the SES). In fact, this definition is not theoretically inconsistent with Bandura's general definition. The only point of disagreement is the degree of stability of self-efficacy. Bandura asserts that self-efficacy is situationally and temporally stable when people are

performing familiar tasks but is changeable in novel situations. Most researchers have implicitly taken the view that the majority of tasks we perform are novel and self-efficacy should therefore be measured with task-specific instruments. In this author's opinion, most people spend the majority of their time performing tasks that are familiar, or contain largely familiar components, such as dealing with work, friends, colleagues, family and home. Therefore, it makes sense to view self-efficacy as remaining stable, most of the time, and accordingly to measure it with a generalized measure.

Given this theoretical orientation, the methodology used to measure self-efficacy must reflect this stability. It is almost impossible to constantly construct and validate task-specific measures, at an intermediate level of generality, for each new behavioral paradigm studied. More importantly, in order to be consistent with this interpretation of self-efficacy a generalized measure should be used in most situations.

Because the present study places subjects in a relatively familiar situation (a basic learning paradigm), performing a familiar task (typing), it is logical to use a general measure of self-efficacy. To this end, the present study uses an instrument designed as a general measure of self-efficacy across situations - the

Self-Efficacy Scale (Sherer, et al. 1982). As previously discussed, the Self-Efficacy Scale (SES) is based on the definition of self-efficacy advocated by this author -- a generally stable personality variable that underlies individual behavior in a variety of situations.

The present study examined the effect of (high and low levels of) self-efficacy on the effectiveness of the SFP, and goal setting, in raising motivation. The context of this study was a training program where motivation (measured via performance) was manipulated by the SFP and goal setting, and the population was comprised of equal numbers of high and low self-efficacy subjects. This allowed the comparison of the effectiveness of the SFP and goal setting as motivation techniques, as well as the influence of self-efficacy on the effectiveness of the SFP and goal setting.

STATEMENT OF RESEARCH

The preceding review illustrates the large variety of motivation techniques and theories available to the practitioner. Some of these work, many do not. However, only two theories, goal setting and the self fulfilling prophecy, fulfill the aim of this study: the identification of a simple, quick and straightforward motivation technique that can be easily and successfully applied, by lay people, to training programs.

Goal setting currently provides a powerful, but theoretically weak, motivation technique. Further research is required to gain a better understanding of when and how goal setting works most effectively.

As far as the self-fulfilling prophecy is concerned, current research has given it the status of an interesting but not highly applicable psychological principle. The self-fulfilling prophecy has been shown to effectively alter performance, and behavior, when people's perceptions about themselves, or others, are manipulated. No existing research has applied the SFP to the improvement of performance when peoples' perceptions about the situation are manipulated. This study reports on the use of the SFP to raise subjects' (trainees') expectations about the

effectiveness of a training program in an attempt to increase the effectiveness of the training.

The present study examined the use of both goal setting and the self fulfilling prophecy, singly and in combination, in increasing the effectiveness of a training program. This was an attempt to: 1) expand the research on goal setting into the area of skill-based organizational (like) training; and, 2) develop an alternate motivation technique, based on the SFP, that avoids the limitations of goal setting while maintaining its simplicity, ease of application, and effectiveness.

In addition, the moderating effects of self-efficacy on performance were examined. This was based on the hypothesis that self-efficacy is an important psychological variable, mediating the degree to which manipulations such as goal setting and the self-fulfilling prophecy affect subjects' performance.

This is the first time research on the SFP has studied the manipulation of situational rather than personal efficacy. Previous research has demonstrated that the SFP can simply, quickly, and successfully manipulate perceptions of personal efficacy, producing performance improvements. But, as previously discussed, these manipulations are not very practical. In this author's opinion the simplicity and effectiveness of the

SFP will gain greater practical applicability through the manipulation of situational rather than personal efficacy. This holds promise as a potential motivation technique that can be used, by managers and trainers, to simply and easily increase the motivation of employees.

HYPOTHESES

This study examined the following hypotheses:

Hypothesis 1. Subjects in the "do your best" control condition (Condition 2) would show the smallest performance improvements.

Hypothesis 2. Subjects in the specific and difficult goal condition (Condition 4) would show a greater mean improvement in performance than subjects in the "do your best" (condition 2) or SFP only condition (Condition 1).

Hypothesis 3. Subjects in the two conditions combining goal-setting and the SFP (conditions 3 and 5) would show a significantly greater mean improvement in performance than subjects in the other three conditions.

Hypothesis 4. Subjects in the condition combining a difficult goal and the SFP (condition 5) would show a significantly greater improvement in performance than subjects in the other 4 conditions.

Hypothesis 5. Self-efficacy would serve as a moderating variable across all five conditions; subjects high in self-efficacy would tend to show significantly greater improvements in performance than subjects with low self-efficacy. This was based on the assumption that subjects with high self-efficacy have a greater belief in their ability to succeed at tasks than subjects with low

self-efficacy. Accordingly, they work harder to improve their performance and show correspondingly greater improvements in performance.

METHODS

SUBJECTS and TASK

All subjects were students at a large urban university enrolled in undergraduate psychology courses. They were recruited as participants in a "marketing" study of a PC based program designed to teach typing skills -- Typing Tutor IV. One hundred and six students (34 male and 72 female) served as subjects, receiving typing skills training from the software. Approximately 20 subjects were used per condition. This sample size was used in the hope it would provide adequate power. The smallest level of analysis performed was a dichotimization of each of the 5 conditions, into high and low self-efficacy subjects. This provided a minimum level of analysis of at least 10 subjects per cell.

The subjects all met prescreening criteria (i.e. self-efficacy and typing scores) described (respectively) in the Personality Variable and Procedures sections of this chapter.

INDEPENDENT VARIABLES

Manipulations

Condition 1: In order to test the effectiveness of the Self-Fulfilling Prophecy as a motivation technique 23

subjects were presented with highly positive statements about the effectiveness of the typing training software program they were using. Subjects received verbal statements that "This program has proven very effective in improving peoples' typing skills. Most first time users show an improvement in speed of 25% to 50%, with 95% or better accuracy, in just 30 minutes." This manipulation was intended to raise subjects' expectations about their own potential for improvement. It was expected this would improve their typing speed and accuracy.

Condition 2: 21 subjects were presented with a very simple and easily applicable goal setting intervention, commonly known as the "do your best" condition. Specifically, subjects were told: "do your best to increase your typing speed and accuracy". **This served as both the control and a simple goal-setting condition** (as it does in most research on goal setting).

Condition 3: In order to determine if basic goal-setting (i.e. "do your best") and the SFP could be combined in a synergistic manner, the 21 subjects in the third condition received a statement combining the above two statements: "This program has proven very effective in improving peoples' typing speed and accuracy. Most first time users show an improvement in speed of 25% to

50%, with 95% or better accuracy, in just 30 minutes. Do your best to improve your speed and accuracy."

Condition 4: This was a goal-setting condition examining the effectiveness of a difficult and specific goal. 20 subjects were told: "You should try to increase your typing speed by 50% and achieve an accuracy score of at least 90%". Although the SFP conditions used 95% as the potential upper accuracy level attainable, 90% was chosen as a more realistic accuracy level to set in the difficult and specific goal conditions (4 and 5). In order for goal setting to be effective it is important to set difficult but realistic goals. Unfortunately, no goal setting research exists on a similar experimental paradigm. Therefore, no guidelines were available for setting the most effective level of difficulty and specificity. Accordingly, the experimenter used his best guess judgment. It was felt that an accuracy goal of 95% would be perceived as too difficult, resulting in performance decrements rather than improvements. Ninety percent accuracy was chosen as the closest goal, to the upper accuracy level indicated in the SFP conditions, that would produce performance improvements.

Condition 5: In order to determine the effectiveness of combining a specific and difficult goal-setting intervention with the SFP manipulation, the 21 subjects in

this condition received a statement combining Conditions 1 and 4: "This program has proven very effective in improving peoples' typing skills. Most first time users show an improvement in speed of 25% to 50%, with 95% or better accuracy, in just 30 minutes. You should try to increase your typing speed by 50% and achieve an accuracy score of at least 90%".

Refer to Diagram 1 (Appendix A) - Research Design - for a graphic representation of this research design. Refer to Diagram 2 (Appendix B) - Experimental Conditions Ranked by Effect - for a graphic representation of the predicted relative effectiveness (in terms of increases in typing speed and accuracy) of the 5 conditions.

Insert diagrams 1 & 2 about here

Personality Variable

As previously stated, the subjects' self-efficacy was hypothesized to have a moderating effect on training. The Self-Efficacy Scale (Sherer, et al., 1982) was used to measure this variable. Unlike the task-specific measures of self-efficacy, used in all previous studies involving self-efficacy, the SES possesses adequate psychometric validity across situations: research has shown "The SES

...to have good criterion related validity by accurately predicting that people with higher self-efficacy would have greater success than those who score low in self-efficacy in past vocational, educational, and monetary goals. The SES also has demonstrated construct validity by correlating significantly in predicted directions with a number of measures such as the Ego Strength Scale, the Interpersonal Competency Scale, and the Rosenberg self-esteem scale" (Corcoran & Fischer, 1987). Only one available study reported norms for the SES (Hong & Grambower, 1986): A mean of 91.83 and SD of 14.01 for men, a mean of 91.47 and SD of 12.52 for women.

Self-efficacy, as measured by the SES, provides a measure of a person's general expectations for success in a variety of situations. This expectation is based on past performance and success, moderated by the person's interpretation of that success. For instance, a person of high ability may believe their past successes are due to luck, not ability. Accordingly, they will tend to have low self-efficacy and low expectations for success in the future.

Only subjects who scored in the upper and lower third of the scale, based on the reported norms, were used in this study. At least 10 subjects from each end of the

scale were randomly assigned to each condition. The SES was administered twice: First, when subjects were initially recruited, and again when they completed the training provided by the program. This allowed an analysis of both the stability of the construct of self-efficacy, as measured by the SES, and the extent to which it is altered by the experimental manipulations. Appendices E and F contain the pre- and post-training versions of the Self-Efficacy Scale (SES) respectively. The Scoring key for the SES is contained in Appendix G.

The post-training version of the SES (Appendix F) included 5 additional questions (31-35), which are not part of the SES, as a manipulation check. These were not designed to assess if subjects attempted to meet the performance criteria for each condition, but rather to determine if the manipulations (especially those containing the SFP) raised subjects' expectations. Specifically, these questions were designed to measure the extent to which subjects liked the training (in the form of the Typing Tutor IV program), and felt it could help improve their typing skills. According to the (minimal) theory underlying the SFP, behavioral changes are brought about by increased expectations for success. But research has not determined if this is actually the process by which the SFP mediates behavior. Therefore, these

questions were designed to assess if the SFP does actually affect behavior by raising expectations, as compared to non-SFP conditions.

No predominant explanation exists for the psychological process(es) mediating the effectiveness of goal setting. Therefore, the researcher was unable to identify, and include, a similar check on the effects of goal setting.

This manipulation check does not allow a determination of whether or not the manipulations were attended to by subjects. Such questions were not included due to two reasons.

First, it was feared that a manipulation check would tip-off subjects to the true purpose of the study. If they then told future subjects of their suspicions the overall results might have been contaminated (by informed subjects second-guessing the experimenter). This was a possibility because many subjects were drawn from the same classes but, due to administrative constraints, participated in the study on different days. Therefore, it was possible that subjects who became aware of the true nature of the study, based on the manipulation check, might inform classmates who had not yet participated in the study. These later subjects, so informed by their

classmates, could intentionally or unintentionally alter their behavior in the study, creating misleading results.

Second, due to the generally positive tone of the literature, it was assumed that both goal setting and the self-fulfilling prophecy would produce performance improvements. The question was which would be more effective. Based on this assumption it appeared that a manipulation check would provide little useful information. Therefore, the possibility that the check might contaminate the results outweighed its anticipated benefits.

Unfortunately, neither the SFP nor goal setting make any statement regarding the specific psychological processes which underlie their success. Therefore, it was also impossible to include a (validated) psychological instrument as a manipulation check.

DEPENDENT VARIABLES

Typing Scores

The two dependent measures were the change scores in the subjects' typing speed and accuracy. The change scores were calculated based on the differences between the subject's speed and accuracy scores on an initial (standardized) test administered by the program and their scores on the final (standardized) test administered by

the program. For the purposes of this study, increases in typing speed and accuracy served as the operational definitions of learning and motivation.

PROCEDURE

The training program used for this study, Typing Tutor IV, is a PC based software program that teaches typing skills. The software emulates a word processing environment. Users were alerted of typing errors and could correct them as they typed. The training constituted subjects receiving approximately a 1/2 hour of instruction via this program. The software uses a form of "artificial intelligence" to tailor the training to each subject. Preliminary pilot studies, conducted as part of this research, indicated that by using this program for a 1/2 hour, following the procedures outlined below, users showed speed increases of up to 50%, often accompanied by small increases in accuracy. Initial typing speed did not appear to have a great affect on the amount of improvement shown, although highly skilled typists (i.e. type over 60 wpm) and people with no familiarity with the keyboard usually showed very small improvements. The program provided continuous feedback on both instantaneous and cumulative performance for speed and accuracy. This provided students with a teaching/learning situation where

they could improve their performance. In addition, the experimenter provided regular feedback and encouragement to all subjects to facilitate learning. This was based on established principles for both effective goal setting, and training, providing feedback and encouragement to enhance learning.

In order to initially recruit subjects all potential subjects were given the following information:

"The experimenter is conducting a marketing study on the effectiveness of a PC software program that teaches typing skills. He is evaluating people's reactions to this software. All participants must be able to type between 20 and 40 words per minute. The study takes about 45 minutes, is administered on an individual, or small group basis, and is completely confidential. All participants will be paid \$15.00.

"The study requires participants to do three things: First, they will answer some questions about themselves [the pre-SES]. If their responses to these questions reveal that they fit the profile of the typical purchaser of this software they will be eligible to participate in the next phase of the study. All students eligible and willing to participate in the second phase will use the program for approximately a 1/2 hour in order to "get a feel for it". And finally, they will again answer some questions about themselves and their reaction to the program [the post-SES]."

This information was given to subjects twice. First at the time of recruitment, and again at the time of participating in the study.

All students who expressed an interest in participating were asked to complete a copy of the Self-Efficacy Scale. Only those students who scored in

the upper or lower third of the scale were called back as subjects.

As noted before, initial typing speed does not appear to greatly alter the effectiveness of the training provided by this software. However, potential subjects were told they must be able to type between 20 to 40 words per minute. This was done to reduce the number of subjects who were extremely skilled or unskilled and were therefore unlikely to benefit from the training, provided by the program, in the time allotted. However, subjects were not eliminated from the study unless they demonstrated either extremely high (i.e. over 60 wpm) or extremely low initial typing speed (i.e. under 10 wpm). This was done in order to maximize the eligible subject pool, while ensuring that all subjects were familiar with the keyboard.

When subjects arrived for testing they received the following information:

"The program you are about to use is designed to help you improve your typing speed and accuracy. It employs a form of artificial intelligence which tailors each lesson to your individual needs. The first thing you will do is take an initial test to identify your strengths and weaknesses. After that you will take two practice lessons. As you type, the program will identify which keys give you the most difficulty, and the practice sessions will concentrate on improving your speed and accuracy on those keys. This will serve to improve your overall speed and accuracy. Following the initial lessons you will take a practice test, followed by two more practice lessons, and a final test. Following each

lesson, and test, the program will provide you with feedback on your typing speed and accuracy. Research has shown the fastest improvements in speed and accuracy using this combination of tests and lessons for about a 1/2 hour, 3 to 4 times a week."

After taking the initial test subjects received the information/manipulation unique to their condition. Expectations were manipulated in a manner similar to that used in previous studies of self-efficacy - via verbal communications to subjects. Research on persuasion, or the creation of expectations, reveals that greater persuasiveness is induced by a source perceived as an expert on the topic, and when supporting arguments are provided. The experimenter, serving in the role of "trainer" and "researcher", fulfilled these requirements. Physical characteristics of the source have been found to have no effect on persuasiveness (Maddux & Rogers, 1980).

Subjects used the program as outlined above, filled out the post-training SES form (Appendix F), received their payment, signed a receipt, and were dismissed. Debriefing was provided to all subjects via a letter (Appendix H). The letter was mailed to subjects at the completion of the study and explained the real purpose of the study, the results of the study, and the techniques used to obtain the results.

RESULTS

Random Assignment In order to ensure that subjects were adequately randomized in their assignment to conditions a statistical test was made. Two one-way ANOVAs were performed for experimental condition by pre-training typing accuracy and speed. Appendix J Table 5 contains the means and standard deviations of these performance scores for subjects in each of the five conditions. As seen below, in ANOVA Tables 1 and 2, no significant differences were found indicating that no groups differed by more than would be expected due to sampling error.

TABLE 1

Analysis of Variance on Pre-Training Typing Speed by Condition

<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F ratio</i>
Between	4	268.71	67.18	.73
Within	<u>101</u>	<u>9240.27</u>	91.49	
Total	105	9508.99		

TABLE 2

Analysis of Variance on Pre-Training Typing Accuracy by Condition

Source	df	SS	MS	F ratio
Between	4	5.19	1.30	2.00
Within	101	65.53	.65	
Total	105	70.73		

Underlying Assumptions Most of the data analyses reported in this section are based on ANOVAs. The assumptions underlying the validity of these ANOVAs are that the population variances are equal for all groups in each comparison, and that these populations are normally distributed. ANOVA is robust with regard to these assumptions and yields accurate results even when population variances are not homogeneous and population shapes depart moderately from normality -- as long as sample sizes are about equal (Welkowitz, Ewen, & Cohen, 1982). Therefore, it is not necessary to test the validity of these assumptions because the sample sizes are highly similar for all comparisons. It is reasonable to

assume that the underlying assumptions, necessary for these ANOVAs to be valid, have been met.

HYPOTHESES

In order to test Hypotheses 1 through 4 difference scores were calculated for typing speed and accuracy (difference score = post-training score minus pre-training score). Pair-wise Analysis of Variance (ANOVA) was then performed to test the hypotheses. The means and standard deviations of these difference scores are presented in Appendix J, Table 1. In addition, Tables 2, 3, and 4 in Appendix J present the mean post-training typing scores for all subjects, as well as low and high self-efficacy subjects respectively. In all cases typing speed is reported in words per minute, while typing accuracy is reported as percentage of text typed correctly. The results of all significant ANOVAs are presented in the text. In addition, the results of all ANOVAs performed are presented, for reference purposes, in Appendix I.

Normally, for purposes of education and employment, typing skill is treated as a single construct derived from the inter-related variables of speed and accuracy (e.g., typing speed - errors). The following analyses treat speed and accuracy as separate variables in order to examine the existence of differential effects of the

experimental manipulations on speed and accuracy. The reader should not be misled by this (artificial) dichotomization to regard speed and accuracy as completely independent of each other. Rather, improvements in typing skill can be seen in changes in speed and/or accuracy.

Hypothesis 1 The study provided mixed support for Hypothesis 1, that subjects in the "do your best" condition (Condition 2) would show the smallest performance improvements. A two-way analysis of variance (ANOVA) was used to compare the performance means (based on difference scores described above) of subjects in condition 2, on improvements in typing speed and accuracy, to subjects in the other four conditions. Several significant differences were found: 1) Subjects in condition 2 ($M=6.90$, $SD=5.20$, $n=21$) showed significantly greater improvements in typing speed than subjects in condition 1 ($M=4.40$, $SD=4.60$, $n=23$); and, 2) subjects in condition 5 ($M=.33$, $SD=1.10$, $n=21$) showed significantly greater improvements in accuracy than subjects in condition 2 ($M=-.14$, $SD=.48$, $n=21$). The first finding was not expected, but it provides some indication that the Self-Fulfilling Prophecy alone produces smaller performance improvements than simple (do your best) goal-setting. The second finding was in line with

predicted outcomes. It indicates that combining a difficult and specific goal, with the Self-Fulfilling Prophecy, results in higher performance than simple (do your best) goal-setting alone. It is important to note that these differences are only significant at the $p < .10$ level. This is less stringent than the $p < .05$ level generally used as a minimum criteria for significance. Therefore, not a great deal of weight should be placed on these findings. They are included simply as an indication of trends in the data, and as a guide for future research. No significant differences were found between any other performance means. The results of the significant ANOVAs are presented in Tables 3 and 4. Appendix I, Tables 1-8, contain the ANOVA tables for all of the comparisons performed.

TABLE 3
Analysis of Variance on Self-Efficacy and Changes in
Typing Speed for Conditions 1 and 2

Source	df	SS	MS	F ratio
Main Effects				
Condition	1	66.78	66.78	2.88 ⁺
SES	1	32.3	32.3	1.39
Between	3	142.96	47.65	2.06
Within	<u>40</u>	<u>927.48</u>	23.19	
Total	43	24.89		

⁺ $p < .10$

TABLE 4

Analysis of Variance on Self-Efficacy and Changes in
Typing Accuracy for Conditions 2 and 5

Source	df	SS	MS	F ratio
Main Effects				
Condition	1	2.38	2.38	3.48 ⁺
SES	1	.92	.92	1.34
Between	3	3.59	1.20	1.75
Within	38	26.03	.69	
Total	41	29.62		

⁺p<.10

Hypothesis 2 No support was found for Hypothesis 2, that subjects in the specific and difficult goal-setting condition (Condition 4) would show greater performance improvements than subjects in the "do your best" (Condition 2) or SFP only (Condition 3) conditions. Separate one-way ANOVAs revealed no significant differences between the (difference score based) performance means for either speed or accuracy. Appendix I, Tables 11, 12, 15 and 16 contain the ANOVA tables for these comparisons.

Hypothesis 3 Some support was found for Hypothesis 3, that subjects in the two conditions combining goal-setting

and SFP (conditions 3 and 5) would show greater mean improvements in performance than subjects in the other three conditions. Two-way ANOVAs revealed significantly greater improvements in typing speed for subjects in condition 3 ($M=7.19$, $SD=4.80$, $n=21$) than condition 1 ($M=4.43$, $SD=4.6$, $n=23$), and, as previously reported, significantly greater improvements in typing accuracy for subjects in condition 5 ($M=0.33$, $SD=1.10$, $n=21$) versus condition 2 ($M=-0.14$, $SD=0.48$, $n=21$). This provides some indication that combining goal-setting with SFP results in more effective training outcomes than either goal-setting or SFP alone. The results of these ANOVAs are presented in Tables 4 and 5. Once again, these ANOVAs are only significant at the $p<.10$ level. Accordingly, they are included as an indication of trends in the data, not as definitive findings. Appendix I Tables 4, 7, 8, 9, 10, 14, 15, 16, 19, and 20 contain the ANOVA tables for all the comparisons performed.

TABLE 5

Analysis of Variance on Self-Efficacy and Changes in
Typing Speed for Conditions 1 and 3

Source	df	SS	MS	F ratio
Main Effects				
Condition	1	83.15	83.15	3.95 ⁺
SES	1	31.81	31.81	1.51
Between	3	159.46	53.152	2.52
Within	40	842.79	21.07	
Total	43	1002.25		

⁺p<.10

Hypothesis 4 Some support was also found for Hypothesis 4, that subjects in the condition combining a difficult, specific goal and SFP (Condition 5) would show significantly greater improvements in performance than subjects in the other 4 conditions. As previously discussed, there was a significantly greater improvement in typing accuracy for subjects in condition 5 (M=0.33, SD=1.10, n=21) versus condition 2 (M=-0.14, SD=0.48, n=21). No significant differences were found between any other performance means. Appendix I Tables 7, 8, 13, 17, 18, 19 and 20 contain the ANOVA tables for these comparisons.

Hypothesis 5 Partial support was found for Hypothesis 5, that self-efficacy would serve as a moderating variable across all five conditions. Two separate two-way analysis of covariance (ANCOVAs) were performed to examine the effects of treatment condition and self-efficacy on (1) typing speed and (2) accuracy. The results of these ANCOVAs are presented in Tables 6 and 7 respectively. The mean Difference scores for typing speed and accuracy by condition are presented in Appendix J, tables 7 and 8 respectively. In addition, these results are graphically presented in Diagrams 3 and 4 (Appendices C and D respectively) for high and low self efficacy subjects, and both groups together.

Insert diagrams 3 and 4 about here

The post-training scores for speed and accuracy were used as the dependent variable, while the respective pre-training speed and accuracy scores were used as the covariate. This procedure partialled out the pre-existing differences between subjects, in typing speed and accuracy, making the final comparison of group means a more accurate reflection of changes due to training than could be obtained with an ANOVA. Thus adjusting for pre-test typing accuracy the high self-efficacy subjects

($M=99.83$, $SD=.47$, $n=51$), at post-test, showed significantly greater typing accuracy than the low self-efficacy subjects ($M=99.68$, $SD=.57$, $n=55$). It is important to note that while this difference in accuracy scores is statistically significant, it is of little practical significance. The actual difference between the two groups, in terms of accuracy, is only 0.15%. No Main Effect was found for self-efficacy on typing speed.

TABLE 6

Analysis of Covariance on Main Effects of Self-Efficacy on Changes in Typing Speed for Conditions 1 through 5

<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F ratio</i>
Covariate	1	14,677.47	14,677.47	767.09
Main Effects				
Condition	4	48.94	12.24	.64
Self-Efficacy	1	9.34	9.34	.49
2-Way Interactions				
Cond. by SES	4	12.76	3.19	.167
Within	<u>95</u>	<u>1,817.72</u>	19.13	
Total	105	16,566.64		

TABLE 7

Analysis of Covariance on Main Effects of Self-Efficacy on
Changes in Typing Accuracy for Conditions 1 through 5

Source	df	SS	MS	F ratio
Covariate	1	8.77	8.77	44.87
Main Effects				
Condition	4	.60	.15	.77
Self-Efficacy	1	.814	.814	4.17*
2-way Interactions				
Cond. by SES	4	.876	.219	1.12
Within	95	18.57	.195	
Total	105	29.62		

*p<.05

EXPLORATORY ANALYSES

In addition to testing the hypotheses, exploratory analyses were performed to explore trends in the data not directly examined by the hypotheses.

1. Effectiveness of Training In order to test the effectiveness of the training a paired t-test was performed for both pre vs. post-training typing speed (Table 8) and pre vs. post-training typing accuracy (Table 9). The paired t-test for accuracy was not significant. The paired t-test for typing speed was significant beyond the p<.001 level, indicating a significant increase in

speed following training. This may be due to training, or a practice effect. To determine the cause of this increase would have required a separate control condition. Because the efficacy of the typing-training program was not the focus of this study, such a control condition was not used, due to the added time and expense required.

TABLE 8

Paired t-test on Changes in Typing Speed Pre vs. Post-Training

<i>Pre Mean</i>	<i>SD</i>	<i>Post Mean</i>	<i>SD</i>	<i>N</i>	<i>t</i>	<i>Signif.</i>
26.01	9.52	32.11	12.56	106	-13.02	.001

TABLE 9

Paired t-test on Changes in Typing Accuracy Pre vs. Post-Training

<i>Pre Mean</i>	<i>SD</i>	<i>Post Mean</i>	<i>SD</i>	<i>N</i>	<i>t</i>	<i>Signif.</i>
99.69	0.82	99.75	0.53	106	-0.98	.329

2. Manipulation Check The post-training version of the SES (Appendix F) included 5 additional questions (31-35), which are not part of the SES, as a manipulation check.

These questions were designed to assess the extent to which subjects liked the training, and felt it could help to improve their typing skills. This was intended to provide an indication of the degree to which subjects' perceptions, about training, were affected by the experimental conditions. The underlying assumption was that the SFP conditions (1,3,5), which were intended to raise subjects' expectations about the efficacy of the training and their potential for success, would create a higher overall rating of liking and effectiveness than the non-SFP conditions (2,4).

The responses are keyed as follows: 1=5, 2=4, 3=3, 4=2, 5=1, with the exception of item 33 which is keyed in reverse. The items were totaled to derive a single overall rating of the training, ranging from 0 (unfavorable) to 25 (highly favorable).

The reliability of this 5 item scale, calculated using Cronbach's Alpha, was 0.62. An acceptable reliability coefficient for a short scale, indicating the 5 items provide a consistent measure of subjects' attitudes about the training.

A two-way analysis of variance (ANOVA) was performed to examine the differences, among subjects' responses to the manipulation check, due to experimental condition and self-efficacy. The results of this ANOVA are presented in

Table 10. The mean ratings, by condition and SES, are presented in Appendix J, table 6. No Main Effect was found across conditions. A significant Main Effect was found between high and low self-efficacy subjects. High self-efficacy subjects ($M=21.50$, $SD=2.01$, $n=50$) tended to show higher expectations for, and more positive perceptions of, the training than the low self-efficacy subjects ($M=20.56$, $SD=2.00$, $n=55$).

Taken together, these findings indicate that there were no differences across conditions in terms of subjects expectations for success, nor perceptions of the effectiveness of training. This provides some indication that the SFP conditions did not, as had been expected, positively effect subjects perceptions of the training. Apparently, there was no difference in the perceptions created by the goal setting and SFP conditions.

Self-efficacy, on the other hand, did appear to effect subjects' perceptions of the training. High self-efficacy subjects showed higher expectations for, and more positive perceptions of, the training than did low self-efficacy subjects. This indicates that: 1) high self-efficacy subjects tend to be generally more positive than low self-efficacy subjects; and/or, 2) high self-efficacy subjects respond more positively, than do

low self-efficacy subjects, to goal setting and the self-fulfilling prophecy.

TABLE 10

Analysis of Variance on Conditions 1-5 and Self-Efficacy for the Manipulation Check

Source	df	SS	MS	F ratio
Main Effects				
Condition	4	11.87	2.97	2.97
SES	1	23.60	23.601	5.70*
2-way Interaction				
Cond. x SES	4	11.07	2.77	0.67
Between	9	45.90	5.10	1.23
Within	<u>95</u>	<u>393.09</u>	4.14	
Total	104	438.99		

*p<.05

3. Main Effect of Experimental Condition Several one-way analyses of variance (ANOVA and ANCOVA) were performed in an attempt to find a significant difference between the performance means of typing speed or accuracy across the five conditions. Despite significant differences between several conditions (i.e. 3 vs. 1 and 5 vs. 2), as seen in the test of Hypotheses 3 and 4, no Main Effect was found for Experimental Condition on speed or accuracy. The results of these ANOVAs are presented in Appendix I Tables 21 - 24.

The major potential problem was the occurrence of a ceiling effect on typing accuracy. As Appendix J table 7 illustrates, 81% of all subjects showed perfect (100%) accuracy prior to training. No subject produced an accuracy score of less than 96%. Accordingly, most subjects could show no improvements in accuracy following training, and those subjects who could improve had little room for improvement. Therefore the potential for the training to create significant differences between groups, in terms of accuracy, was severely limited. This limitation may account for the lack of significant differences, in typing accuracy, between conditions. But, it does not limit the measurement of subjects' overall improvements in typing skill. Typing accuracy and speed are interrelated; Once a person reaches a level of perfect accuracy further improvements in typing skill will be reflected in improvements in speed. In fact, for purposes of education and employment, typing skill is treated as a single construct derived from the inter-related variables of speed and accuracy (e.g., typing speed minus errors). This study treated speed and accuracy as separate variables in order to examine the existence of differential effects of the experimental manipulations on speed and accuracy.

4. Main Effect of SES on Accuracy As previously discussed, there was a significant Main Effect of self-efficacy on typing accuracy across all 5 conditions (Table 4). In order to better understand this Main Effect further analyses were performed. Conditions were logically grouped and analyzed according to type of manipulation. [Refer to Appendix J Table 1 for a comparison of the mean changes in speed and accuracy scores of the 5 conditions, and to Appendix J Tables 8 and 9 for a comparison of the high vs. low self-efficacy subjects in each condition. In addition, these results are graphically presented in Appendices C and D, Diagrams 3 and 4.] For the first set of analyses Conditions 1, 2 and 3 were grouped together based on the common characteristic of manipulating expectations and motivation via simple, general statements. Two separate two-way ANCOVAs were performed to examine the effects of self-efficacy and conditions 1, 2 and 3 on (1) typing speed and (2) accuracy. The post-training scores for speed and accuracy were used as the dependent variable, while the respective pre-training scores for speed and accuracy were used as the covariate. The ANCOVA for accuracy, presented in Table 11, revealed a significant Main Effect for self-efficacy on typing accuracy across the three conditions; subjects in the high self-efficacy

category showed significantly greater improvements in typing accuracy ($M=99.90$, $SD=.40$, $n=31$) than subjects in the low self-efficacy category ($M=99.76$, $SD=.43$, $n=34$). As previously discussed, in regard to Hypothesis 5, although this finding is statistically significant it is of little practical significance. The difference between the two groups is only 0.14%. No Main Effect was found across conditions 1, 2 and 3 for self-efficacy on typing speed (Table 12).

For the second set of analyses conditions 4 and 5 were grouped together based on the commonality of the greater complexity of the difficult and specific goal-setting statements made to subjects. Two separate two-way ANCOVAs were performed to examine the effects of self-efficacy and conditions 4 and 5 on (1) typing speed (Table 13) and (2) accuracy (Table 14). The post-training scores for speed and accuracy were used as the covariate. These ANCOVAs revealed no Main Effect across conditions 4 and 5 for either speed or accuracy.

Conditions 1, 2, and 3 manipulate expectations and motivation via simple, general statements. In contrast, conditions 4 and 5 use specific and difficult performance goals. Self-efficacy appears to moderate performance in conditions involving general (conditions 2 and 3) or no goals (condition 1). When specific and difficult

performance goals are set, as in conditions 4 and 5, self-efficacy does not moderate performance.

TABLE 11

Analysis of Covariance on Changes in Typing Accuracy by Conditions 1, 2, and 3

Source	df	SS	MS	F ratio
Covariate	1	1.95	1.95	14.26
Main Effects				
Condition	2	.459	.230	1.68
Self-Efficacy	1	.762	.762	5.58*
2-way Interactions				
Cond. by SES	2	.050	.025	.182
Within	<u>58</u>	<u>7.92</u>	.137	
Total	64	11.138		

*p<.05

TABLE 12

Analysis of Covariance on Changes in Typing Speed by Conditions 1, 2, and 3

Source	df	SS	MS	F ratio
Covariate	1	10,364.20	10,364.20	548.03
Main Effects				
Condition	2	44.92	22.46	1.19
Self-Efficacy	1	12.12	12.12	.64
2-way Interactions				
Cond. by SES	2	10.114	5.057	.267
Within	<u>58</u>	<u>1096.89</u>	18.19	
Total	64	11528.06		

TABLE 13

Analysis of Covariance on Changes in Typing Speed by
Conditions 4 and 5

Source	df	SS	MS	F ratio
Covariate	1	4310.68	4310.68	215.44
Main Effects				
Condition	1	4.24	4.24	.212
Self-Efficacy	1	12.12	12.12	.016
2-way Interactions				
Cond. by SES	1	.041	.041	.002
Within	<u>36</u>	<u>720.32</u>	20.01	
Total	40	5035.61		

TABLE 14

Analysis of Covariance on Changes in Typing Accuracy by
Conditions 4 and 5

Source	df	SS	MS	F ratio
Covariate	1	5.94	5.94	20.29
Main Effects				
Condition	1	.063	.63	.217
Self-Efficacy	1	.155	.155	.531
2-way Interactions				
Cond. by SES	1	.829	.829	2.832
Within	<u>36</u>	<u>10.53</u>	.293	
Total	40	17.51		

5. Correlation Coefficients Appendix J, Table 10, presents a correlation matrix of the two dependent variables of typing speed and accuracy, and the personality variable of self-efficacy, measured both pre and post training. Four significant correlation coefficients appear. First, there is a very strong correlation between pre-training and post-training typing speed ($r=.94$, $p<.01$); subjects tended to retain their relative standing, in terms of speed, before and after training. Second, there is a moderate correlation between pre-training and post-training typing accuracy ($r=.54$, $p<.01$); subjects tended to retain their relative standing, in terms of accuracy, before and after training. Third, there is a strong correlation between pre and post training self-efficacy ($r=.91$, $p<.01$). This indicates two things: first, the SES has high reliability (i.e. test-retest) and second, the construct of self-efficacy is stable across time and situations. Fourth, there is a small negative correlation between pre-training typing speed and post-training accuracy ($r=-.26$, $p<.05$). This is mirrored by a slightly smaller, less significant, negative correlation between post-training typing speed and post-training typing accuracy ($r=-.23$, $p<.10$); As subject's typing speed increased their accuracy tended to

decrease, and vice-versa. This provides a concrete example of the inter-related nature of speed and accuracy.

DISCUSSION

The purpose of this study was to examine motivation techniques that could be effectively applied in training programs, by managers and trainers, to improve performance and learning. Although the field of training is well established and researched there are no consistently effective motivation techniques that meet these criteria. The use of effective motivation techniques, such as goal setting and the self-fulfilling prophecy, provide a possible answer. It is only by applying research to such practical problems that the value of psychological principles can be evaluated and put to good use.

Although not the focus of this study, it is interesting to note that the training program, used to test the experimental paradigm, appears to work. It is reasonable to assume the training was effective based on three results: 1) Subjects showed significantly higher speed scores across conditions following training ($t=13.02$, $p<.001$); 2) there were no significant pre-training differences in speed or accuracy across conditions, indicating that subjects were randomly assigned to conditions; and, 3) significant differences were found across conditions, between high and low self-efficacy subjects, on improvements in typing

accuracy. This indicates that the training was utilized differently by these two groups, resulting in significantly different outcomes. The most likely mechanism responsible for bringing out these differential improvements, due to self-efficacy, is the training provided by the software in conjunction with coaching by the experimenter. As discussed previously, these differences may also be due to a practice effect. To determine the cause of these differences would have required a separate control condition. Because the efficacy of the training itself was not the focus of this study, such a control condition was not used, due to the added time and expense required.

Another interesting finding is the lack of a significant difference, across conditions, on the manipulation check. There was no difference across conditions in terms of subjects' expectations for success, nor in terms of their perceptions of the effectiveness of training. This may indicate that the SFP conditions did not positively effect subjects' perceptions of training, as had been expected based on current conceptualizations of the SFP. Possibly, there was no difference in the perceptions created by the goal setting and SFP conditions. This may be related to the general failure of the SFP, and goal setting manipulations, to create

behavioral changes. In other words, none of the manipulations positively affected subjects' expectations because the manipulations themselves failed to work. This possibility is discussed in greater depth in later sections of this chapter.

EXPERIMENTAL CONDITIONS

No main effect was found for experimental condition on either typing speed or accuracy. This indicates that none of the experimental manipulations of goal setting and SFP (i.e. Conditions 1-5), used either alone or in combination, were significantly different in effectiveness. There were three marginally significant performance improvements found between individual conditions: 1) subjects in condition 2 (do your best) showed significantly greater improvements in typing speed than subjects in condition 1 (SFP alone) ($F=2.88, p<.10$); 2) subjects in condition 3 (SFP plus do your best) also showed significantly greater increases in typing accuracy than subjects in condition 2 ($F=3.95, p<.10$); and, subjects in condition 5 (SFP plus difficult and specific goal) showed significantly greater improvements in typing accuracy than subjects in condition 2. This provides some indication that the use of the self-fulfilling prophecy alone is less effective than either simple goal setting,

or the combination of the self-fulfilling prophecy with goal setting. Interestingly, a similar difference was not found between condition 2 and condition 4 (difficult and specific goal), indicating that the SFP and a difficult and specific goal (re: condition 5) may combine in a synergistic manner. These differences are only significant at the $p < .10$ level. This is less stringent than the $p < .05$ level generally used as a minimum criteria for significance. Therefore, not a great deal of weight should be placed on these findings. They are included simply as an indication of trends in the data, and as a guide for future research.

A much more important finding is the overall lack of a significant main effect of experimental condition. This indicates that neither goal-setting, the SFP (as used here), nor the combination of the two, produced performance improvements.

This is probably not due to the (half-hour) time limit on the training. The time allowed was sufficient to reveal several significant main and simple main effects (discussed below) of self-efficacy on speed and accuracy.

As discussed in the literature review, other studies have reported similarly negative results when using goal setting. This is probably due to the goals (e.g., difficulty, specificity, and feedback) being inappropriate

for the subjects and situation; different people require different levels of difficulty, specificity, and degree of participation in setting goals in different situations. If the level of these factors are not appropriate, to the person and situation, the goal setting does not work. Unfortunately, due to the atheoretical nature of goal setting, there are no established guidelines for setting the difficulty, specificity, and degree of participation that are optimal for each subject and situation. Therefore, goal setting remains a hit-or-miss technique whenever it is used in a new situation. It is only through trial and error that the most effective goals can be determined. The goals used in this study were apparently inappropriate for the subjects and task, producing no performance improvements. This problem is discussed further in the Conclusion section of this chapter.

The finding on the lack of effectiveness of the SFP is unique. This is the first time the SFP has been used as a manipulation of subjects' expectations about the situation. This is an important distinction because previous research on the SFP has shown alternate applications to be effective but often impractical. The failure of the self-fulfilling prophecy is probably due to the same problem that undermines the effectiveness of goal

setting; when the SFP is used to manipulate subjects' expectations about a situation its effectiveness may be dependent on such factors as the specificity and difficulty of the expectations generated, and their appropriateness to the subjects. For example, the (SFP manipulation) statement that the training typically produces speed improvements of 25% to 50%, and accuracy scores of 95%, may have been perceived as unrealistically high by some subjects. Accordingly, the manipulation failed to work. Similarly, the (proven) SFP technique used by Miller & McAuley (1987) failed (they hypothesize) due to a mismatch between the subjects and the SFP manipulation.

SELF-EFFICACY

Self-efficacy proved to have a main effect on typing accuracy; high self-efficacy subjects showed significantly greater increases in typing accuracy than low self-efficacy subjects ($F=4.17, p<.05$). Subjects with a high level of confidence in their ability to perform successfully (i.e. high self-efficacy) showed significantly greater performance improvements than subjects with a weak belief in their likelihood for success (i.e. low self-efficacy).

The exploratory analyses reveal that the significant performance differences due to self-efficacy exist within conditions 1, 2 and 3. There are no significant performance differences within conditions 4 and 5 due to self-efficacy. Conditions 1, 2 and 3 all manipulate expectations and motivation via simple and general statements. In contrast, conditions 4 and 5 involve more complex statements, involving specific and difficult performance goals. Self-efficacy appears to moderate performance in conditions involving general (conditions 2 and 3) or no goals (condition 1). When specific and difficult performance goals are set self-efficacy does not moderate performance. One possible reason for this may be that the specific goals in conditions 4 and 5 were perceived as too difficult to achieve successfully. Regardless of level of self-efficacy, people did not work to meet these goals, believing themselves unable to do so.

Although the differences between conditions 1, 2, and 3 are statistically significant they are of little practical significance. The differences between conditions, on accuracy scores, were all less than .20%. Therefore, this finding is of theoretical interest, indicating that high self-efficacy is related to improved performance in conditions involving no goals or general goals, but not difficult and specific goals. But, this

finding is of no practical significance given the extremely small mean performance differences between conditions.

High self-efficacy subjects also rated the training as significantly more effective than did the low self-efficacy subjects. This may be due to two causes: 1) people with high self efficacy tend to be generally more positive than people with low self-efficacy; and/or, 2) people with high self-efficacy tend to be more responsive to techniques such as basic goal setting and the self-fulfilling prophecy. This difference in responsiveness, to the experimental manipulations, is seen in the higher accuracy scores obtained by the high self-efficacy subjects in conditions 1 through 3. The difficult and specific performance goals, in conditions 4 and 5, did not produce performance improvements, despite higher ratings of the training. As previously discussed, the goals set in these conditions were probably inappropriate for the subjects, resulting in no performance improvements.

Finally, the correlation matrix revealed a strong correlation between pre and post-training self-efficacy scores on the SES ($r=.91$, $p<.01$). This indicates two things. First, the SES possesses high (test-retest) reliability; an average of two weeks passed between the

first and second administrations of the SES, and subjects responses were highly similar on both administrations. Second, the construct of self-efficacy, conceptualized as a general "can do" attitude across situations, shows high stability.

These findings indicate that the definition of self-efficacy used here -- a generalized belief in one's ability to successfully deal with a variety of situations -- is workable and useful from both a measurement and theoretical perspective. In terms of measurement the SES was shown to be useful for identifying individual differences in general self-efficacy. In turn, this provides a theoretical explanation for observed differences in performance. It is not necessary to use task-specific self-efficacy measures, (as advocated by Bandura) with all their inherent problems, to effectively measure self-efficacy. The definition of self-efficacy as a general personality variable provides the same explanatory power as the task-specific operational definitions previously used. And, it allows the measurement of self-efficacy with a valid and widely applicable instrument. Thus, we now have a definition and measure of self-efficacy that, to paraphrase Bandura (and Cervone, 1986): allows us to judge the generality of the

relationship between perceived self-efficacy and motivation.

LIMITATIONS

The primary limitation encountered was a ceiling effect on typing accuracy. This is more a problem in appearance than fact. The results show that 81% of all subjects had perfect (100%) accuracy prior to training. No subject had an accuracy score lower than 96%. This means that both the range and variability of the accuracy variable were restricted. Accordingly, most subjects could show no improvements in accuracy following training. Those subjects who could improve had little room for improvement. As a result, there was very little difference between subjects, across conditions, in terms of accuracy. One reason for this very high accuracy level is that the software used for training, consistent with good training and goal setting practices, alerted subjects of errors and allowed for corrections. The accuracy score was then derived from the percentage of errors not corrected by the completion of the typing test. In this situation anyone, no matter how poor their typing skills, could easily achieve a perfect accuracy score. However, the more errors corrected the lower the typing speed.

This study treated speed and accuracy as separate variables mainly for exploratory purposes. It was hoped

that by examining speed and accuracy separately any differential effects of the experimental manipulations, on speed and accuracy, could be detected. This should not mislead the reader to believe that speed and accuracy are actually independent of one another.

As with all skill tasks, there was a trade-off between speed and accuracy involved in the typing skills task. By maximizing accuracy subjects lowered their speed. As previously discussed, the typing skills software alerted subjects of errors which they had the option of correcting. However, the time required to make corrections detracted from speed. This is reflected in the negative correlations between both pre-training typing speed and post-training typing accuracy ($r=-.26$, $p<.05$), and post-training typing speed and accuracy ($r=-.23$, $p<.10$). Subjects with higher accuracy scores showed lower typing speed, and vice-versa.

Speed and accuracy are two sides of one variable - typing skill. Any change in one will result in a change in the other. Improvements in typing skill can be reflected as increases in either speed or accuracy. In this task accuracy was a finite, and much more easily controlled variable. People tended to reach their maximum performance level first on accuracy. Once a person reached a high level of accuracy, further improvements in

typing skill were reflected in speed increases. The improvements that might have appeared as increases in accuracy were not unmeasurable, rather they were seen as increases in speed. The inter-related nature of speed and accuracy is reflected in the correlation matrix where a negative correlation is revealed between the two. This provides evidence that as one variable increases, the other tends to decrease, due to the inherent trade off between speed and accuracy.

The highly interrelated nature of typing speed and accuracy is a widely accepted fact. For purposes of education and employment testing, and training, typing skill is reported as a single number, based on raw typing speed corrected for errors. In other words, speed and accuracy are not separate variables, but two halves of the overall construct of typing skill. Improvements in typing skill can be produced by increases in speed, and/or accuracy. People who have perfect (or near perfect) accuracy will show improvements in typing skill via improvements in speed.

A second reason the ceiling effect is not a problem is that there was sufficient room for improvement, among subjects, for significantly different increases in accuracy to be measured; a main effect was found for self-efficacy on typing accuracy. If the personality

variable of self-efficacy could create significant differences between people, on typing accuracy, it is reasonable to assume that had the experimental manipulations worked they too would produce significant differences, between conditions, on typing accuracy.

The appearance of this ceiling effect was surprising because it did not appear in pre-testing. Pre-test subjects accuracy scores averaged 90% prior to training, rising anywhere from 0% to 8% following training.

This difference in pre-training accuracy scores may be due to inherent differences between the pre-test and the experimental subjects. The pre-test subjects were evening session undergraduates, the only population readily available at the time pre-testing was conducted. The experimental subjects were mostly full-time day students. The evening session students tended to be employed full time, while the day session students were full time students, holding evening and weekend jobs. It is this difference in work status that is the main difference between the two groups.

Due to their practical work experience, the pre-test subjects may have realized that output is as important as quality, and they sought a compromise between the two. For them a few errors on a typing task were an acceptable trade off for higher speed and productivity. The

experimental subjects, on the other hand, did not have this production orientation. They do not spend most of their time in a business environment where speed and accuracy are equally important. Rather, they are usually in an academic environment where accuracy is more important than speed. Given this orientation they were not willing to trade accuracy for speed. Accordingly, they took advantage of the software's error correction feature and went back and corrected almost every mistake. In so doing they lowered their typing speed. Despite the fact that subjects were told to maximize both speed and accuracy, the experimental subjects focused more on accuracy than speed.

CONCLUSION

Despite the failure of the manipulation check, to reveal any significant changes in expectations due to the experimental manipulations, this study was followed through to its conclusion. Given the currently atheoretical nature of (research on) both goal setting and the self-fulfilling prophecy, there was no certainty that either manipulation would effect expectations even if successful. Previous research has demonstrated that both goal setting and the self-fulfilling prophecy are generally effective. But, this research has largely

failed to examine the use of these motivation techniques in typical organizational settings, where they could be applied by managers and trainers. Despite this, the generally positive trends in the literature led to the expectation that both goal setting and the self-fulfilling prophecy would prove to be effective. This did not, however, prove to be true.

Rather than viewing this study's negative findings as a failure, they should be viewed as a contribution. The research literature has largely overlooked a major shortcoming that seriously limits the applicability of both goal setting and the self-fulfilling prophecy. Because neither theory provides any specifications of the psychological, situational or individual variables that mediate their effectiveness no guidance is provided on developing effective manipulations.

Self-efficacy, measured via the SES, does appear to account for some of the differences in performance between subjects in the SFP and basic goal setting conditions. However, self-efficacy accounts for only a very small portion of this difference - less than 1%.

Clearly, much more basic research is needed on both goal setting and the self-fulfilling prophecy. Both the psychological underpinnings and the specific procedures and situations effecting them must be determined. It is

only through such research that the true promise and potential of goal setting and the self-fulfilling prophecy will be realized -- the development of motivation techniques that can be easily and effectively applied in organizations by non-Psychologists.

Diagram 1 Research Design

Self-Fulfilling Prophecy Conditions

		YES	YES	NO	NO
Goal Setting Conditions	YES	High Self-Efficacy Low Self-Efficacy Condition 3 (SFP + "do your best")	High Self-Efficacy Low Self-Efficacy Condition 5 (Difficult, Specific Goal + SFP)	High Self-Efficacy Low Self-Efficacy Condition 2 (Control Condition = "do your best")	High Self-Efficacy Low Self-Efficacy Condition 4 (Difficult, Specific Goal)
	NO	High Self-Efficacy Low Self-Efficacy Condition 1 (SFP)	X	X	X

Diagram 2

Experimental Conditions Ranked by Predicted Effect

Most Effect

(i.e., greatest learning occurs)



Condition 5 (SFP + Difficult, Specific Goal)

Condition 3 (SFP + "do your best")

Condition 4 (Difficult, Specific Goal)

Condition 1 (SFP)

Condition 2 (Control Condition = "do your best")

Least Effect

(i.e., least learning occurs)

Diagram 3: Changes in Typing Speed Following Training

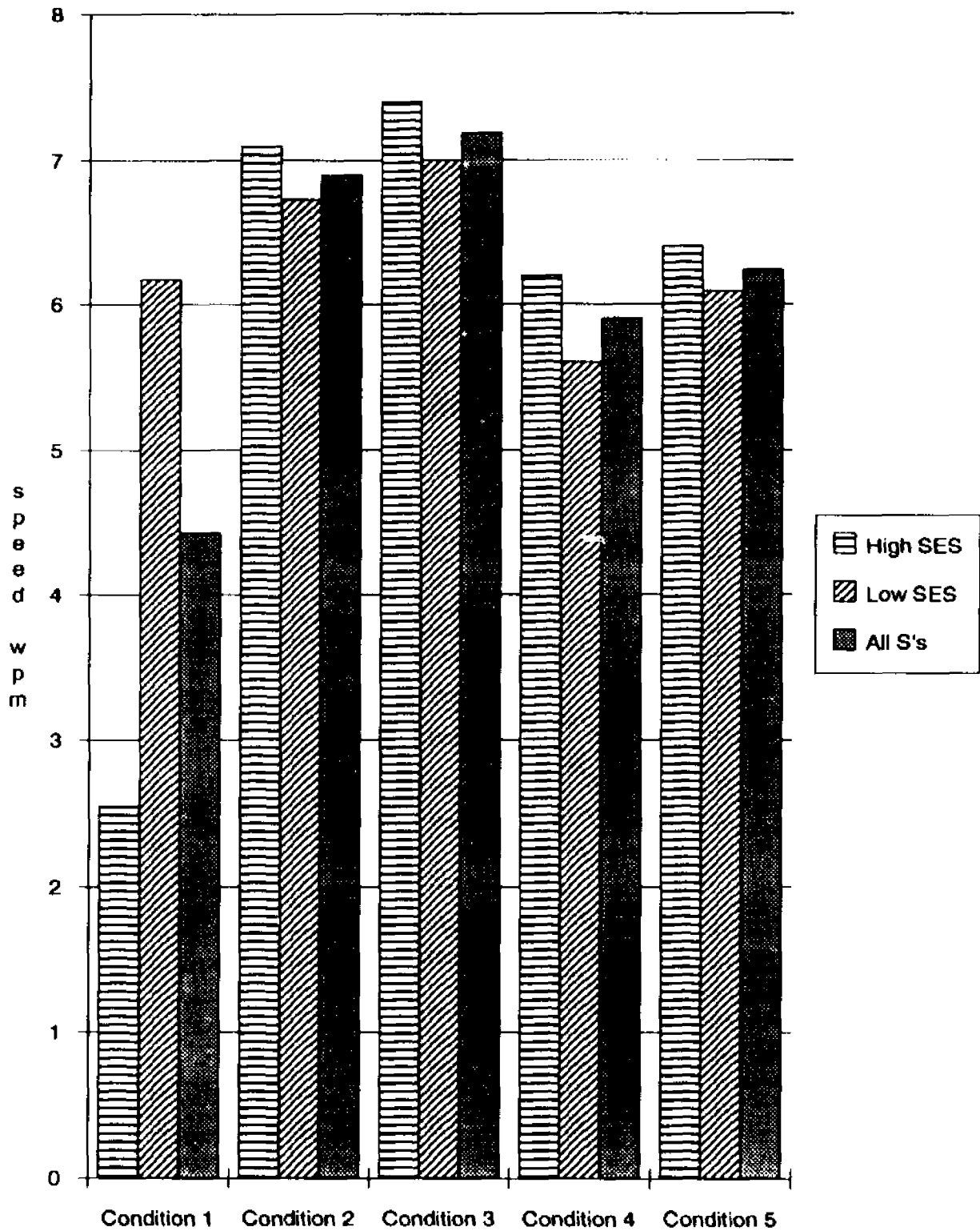
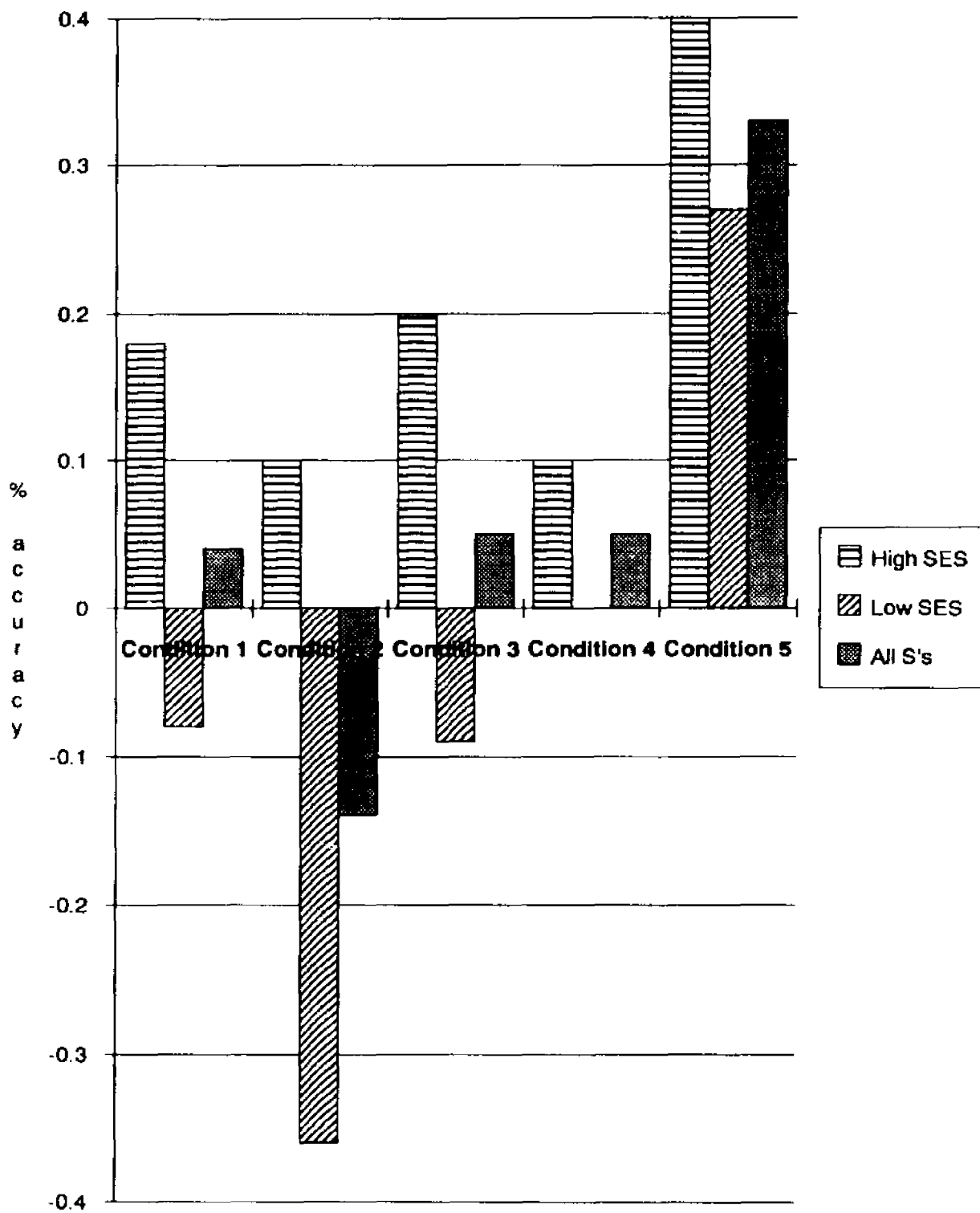


Diagram 4: Changes in Typing Accuracy Following Training



TYPING SKILLS TRAINING STUDY**INTRODUCTION**

This study is part of a marketing effort designed to evaluate the effectiveness of various skills training software. College students are being asked to participate because marketing studies have revealed that college students are one of the groups most likely to purchase this software. The current study is concerned with people's reaction to software designed to enhance typing skills. All participants must be able to type between 20 and 40 words per minute. The study takes about an hour, is administered in an individual or small group setting and is completely confidential. All participants who complete the study, and meet the criteria described below, will be paid \$15.00.

As the first part of this study all participants must answer the attached questionnaire. This questionnaire is designed to obtain demographic data (e.g. age, sex, etc.) on potential purchasers of this software, and to determine if your answers fit the profile of the typical software purchaser. If your answers fit this profile you will be called in to participate in the next phase of the study. Please answer the following questions as accurately as possible. Keep in mind there is no right answer to any question.

DIRECTIONS

1. Please use the scannable computer answer sheet to record all your answers. **DO NOT MARK YOUR RESPONSES ON THIS QUESTIONNAIRE.**
2. Use only a No. 2 pencil.
3. Make heavy black marks that fill the circle completely.
4. Erase completely any answers you wish to change.
5. Make no stray marks on the answer sheet.
6. Write your name in the boxes where indicated on side 1 of your answer sheet. If your name is too long fill in as many letters as will fit. For each letter blacken the corresponding circle in the column directly below. Fill in your Birth Date, Sex, and highest level of education completed, in the same way. In the section labeled Identification Number put in a daytime phone number, including area code, where you can be reached.

QUESTIONNAIRE INSTRUCTIONS

This questionnaire is a series of questions about your personal attitudes and traits. Read each statement and decide to what extent it describes you. There are no right or wrong answers. You will probably agree with some of the statements and disagree with others. Please indicate your own personal feelings about each statement below by marking the number that best describes your attitude or feeling. Please be very truthful and describe yourself as you really are, not as you would like to be.

For each question, your response can range from Disagree Strongly (1) to Agree Strongly (5). A "3" response would indicate that you have no clear-cut feelings of either agreement or disagreement. You should choose one of the five ratings below for each question.

EXAMPLE:	DISAGREE STRONGLY	DISAGREE	NEUTRAL	AGREE	AGREE STRONGLY
	DS	D	N	A	AS
	1	2	3	4	5

		DS	D	N	A	AS
1.	I like to grow house plants.	1	2	3	4	5
2.	When I make plans, I am certain I can make them work.	1	2	3	4	5
3.	One of my problems is that I cannot get down to work when I should.	1	2	3	4	5
4.	If I can't do a job the first time, I keep trying until I can.	1	2	3	4	5

	DS	D	N	A	AS
5. Heredity plays the major role in determining one's personality.	1	2	3	4	5
6. It is difficult for me to me to make new friends.	1	2	3	4	5
7. When I set important goals for myself, I rarely achieve them.	1	2	3	4	5
8. I give up on things before completing them.	1	2	3	4	5
9. I like to cook.	1	2	3	4	5
10. If I see someone I would like to meet, I go to that person instead of waiting for him or her to come to me.	1	2	3	4	5
11. I avoid facing difficulties.	1	2	3	4	5
12. If something looks too complicated, I will not even bother to try it.	1	2	3	4	5
13. There is some good in everybody.	1	2	3	4	5
14. If I meet someone interesting who is very hard to make friends with, I'll soon stop trying to make friends with the person.	1	2	3	4	5
15. When I have something unpleasant to do, I stick to it until I finish it.	1	2	3	4	5

	DS	D	N	A	AS
16. When I decide to do something, I go right to work on it.	1	2	3	4	5
17. I like science.	1	2	3	4	5
18. When I try to learn something new, I soon give up if I am not initially successful.	1	2	3	4	5
19. When I am trying to become friends with someone who seems uninterested at first, I don't give up very easily.	1	2	3	4	5
20. When unexpected problems occur, I don't handle them well.	1	2	3	4	5
21. If I were an artist, I would like to draw children.	1	2	3	4	5
22. I avoid trying to learn new things when they look too difficult for me.	1	2	3	4	5
23. Failure just makes me try harder.	1	2	3	4	5
24. I do not handle myself well in social gatherings.	1	2	3	4	5
25. I very much like to ride horses.	1	2	3	4	5
26. I feel very insecure about my ability to do things.	1	2	3	4	5
27. I am a very self-reliant person.	1	2	3	4	5

	DS	D	N	A	AS
28. I have acquired my friends through my personal abilities at making friends.	1	2	3	4	5
29. I give up very easily.	1	2	3	4	5
30. I do not seem capable of dealing with most problems that come up in my life.	1	2	3	4	5

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As the first part of this study all participants must answer the attached questionnaire. This questionnaire is designed to obtain demographic data (e.g. age, sex, etc.) on potential purchasers of this software, and to determine if your answers fit the profile of the typical software purchaser. If your answers fit this profile you will be called in to participate in the next phase of the study. Please answer the following questions as accurately as possible. Keep in mind there is no right answer to any question.

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5. Make no stray marks on the answer sheet.
6. Write your name in the boxes where indicated on side 1 of your answer sheet. If your name is too long fill in as many letters as will fit. For each letter blacken the corresponding circle in the column directly below. Fill in your Birth Date, Sex, and highest level of education completed, in the same way. In the section labeled Identification Number put in a daytime phone number, including area code, where you can be reached.

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This questionnaire is a series of questions about your personal attitudes and traits. Read each statement and decide to what extent it describes you. There are no right or wrong answers. You will probably agree with some of the statements and disagree with others. Please indicate your own personal feelings about each statement below by marking the number that best describes your attitude or feeling. Please be very truthful and describe yourself as you really are, not as you would like to be.

For each question, your response can range from Disagree Strongly (1) to Agree Strongly (5). A "3" response would indicate that you have no clear-cut feelings of either agreement or disagreement. You should choose one of the five ratings below for each question.

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	DS	D	N	A	AS
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		DS	D	N	A	AS
1.	I like to grow house plants.	1	2	3	4	5
2.	When I make plans, I am certain I can make them work.	1	2	3	4	5
3.	One of my problems is that I cannot get down to work when I should.	1	2	3	4	5
4.	If I can't do a job the first time, I keep trying until I can.	1	2	3	4	5

	DS	D	N	A	AS
5. Heredity plays the major role in determining one's personality.	1	2	3	4	5
6. It is difficult for me to me to make new friends.	1	2	3	4	5
7. When I set important goals for myself, I rarely achieve them.	1	2	3	4	5
8. I give up on things before completing them.	1	2	3	4	5
9. I like to cook.	1	2	3	4	5
10. If I see someone I would like to meet, I go to that person instead of waiting for him or her to come to me.	1	2	3	4	5
11. I avoid facing difficulties.	1	2	3	4	5
12. If something looks too complicated, I will not even bother to try it.	1	2	3	4	5
13. There is some good in everybody.	1	2	3	4	5
14. If I meet someone interesting who is very hard to make friends with, I'll soon stop trying to make friends with the person.	1	2	3	4	5
15. When I have something unpleasant to do, I stick to it until I finish it.	1	2	3	4	5

	DS	D	N	A	AS
16. When I decide to do something, I go right to work on it.	1	2	3	4	5
17. I like science.	1	2	3	4	5
18. When I try to learn something new, I soon give up if I am not initially successful.	1	2	3	4	5
19. When I am trying to become friends with someone who seems uninterested at first, I don't give up very easily.	1	2	3	4	5
20. When unexpected problems occur, I don't handle them well.	1	2	3	4	5
21. If I were an artist, I would like to draw children.	1	2	3	4	5
22. I avoid trying to learn new things when they look too difficult for me.	1	2	3	4	5
23. Failure just makes me try harder.	1	2	3	4	5
24. I do not handle myself well in social gatherings.	1	2	3	4	5
25. I very much like to ride horses.	1	2	3	4	5
26. I feel very insecure about my ability to do things.	1	2	3	4	5
27. I am a very self-reliant person.	1	2	3	4	5

	DS	D	N	A	AS
28. I have acquired my friends through my personal abilities at making friends.	1	2	3	4	5
29. I give up very easily.	1	2	3	4	5
30. I do not seem capable of dealing with most problems that come up in my life.	1	2	3	4	5

The following questions assess your feelings about the typing program you just used. Please answer these questions as honestly as possible. For each question you should choose the one answer that best expresses your feelings.

31. How well did you like this program?

1. Very much
2. Moderately
3. Neither liked nor disliked
4. Disliked slightly
5. Disliked very much

32. I feel this program is

1. a lot of fun.
2. moderately fun.
3. neither fun nor boring.
4. slightly boring.
5. very boring.

33. How much would you pay for this program?

1. \$0
2. \$25
3. \$50
4. \$75
5. \$100

34. Would you encourage other people to buy this program?
1. Strongly
 2. Recommend to some people
 3. Recommend with reservations
 4. Not at all
 5. Actively discourage people from buying
35. To what extent do you feel this program could help you improve your typing skills (i.e. speed and accuracy) if used on a regular basis, such as 3 times per week?
1. A great deal
 2. Moderately
 3. Not at all
 4. Would cause typing skills to deteriorate moderately
 5. Would cause typing skills to deteriorate a great deal

SCORING THE SES

Seven items (1, 5, 9, 13, 17, 21, 25) are filler items and are not scored. The scored items are keyed as follows: A=1, B=2, C=3, D=4, E=5. Items presented in a negative fashion (3, 6, 7, 8, 11, 12, 14, 18, 20, 22, 24, 26, 29, 30) are reverse-scored. After reverse scoring these items the scores for all items are summed. The higher the score, the higher the self-efficacy expectations.

APPENDIX H: DEBRIEFING LETTER

Dear Friend:

This past Fall you participated in a study involving a software package designed to teach/improve typing skills. At that time you were told you were participating in a marketing study. This was actually a study of various techniques for improving the effectiveness of training programs. These techniques all involved information, conveyed to you by the researcher, such as "do your best"; "try to increase your speed by 50% and maintain an accuracy score of 90%"; or, "this program has been very effective in improving most peoples' typing skills". The first two types of information are known as goal-setting. As the name implies, this is the setting of general or specific performance goals. Research has found goal-setting to improve performance in a variety of situations. The third type of information was used in an attempt to create a "self-fulfilling prophecy". This occurs when people (unconsciously) act to fulfill the expectations of themselves or others. The purpose of this statement was to create the expectation that, by using the typing program, you had a very good chance of significantly improving your typing skills. Overall, I found no difference in the effectiveness of these statements. Regardless of which statement they heard, most people showed the same improvements in speed and accuracy.

In addition to using the typing program you also completed a questionnaire assessing your feelings on a number of topics, such as following through on plans. This questionnaire measured your self-efficacy. Basically, self-efficacy is a general "can do" attitude towards situations you encounter. People with high self-efficacy believe they can successfully deal with most situations. People with low self-efficacy do not believe they are able to deal successfully with many situations. People with high levels of self-efficacy tended to show greater improvements in typing accuracy than people with low self-efficacy.

If you have any questions concerning this letter, or the research in general, please call. My number is (212) 466-8869. Thank you for your help.

Sincerely,

James Benton

APPENDIX I: ANOVA TABLES

TABLE 1

Analysis of Variance on Self-Efficacy and Changes in Typing Speed for Conditions 1 and 2

<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F ratio</i>
Main Effects				
Condition	1	66.77	66.77	2.88 ⁺
SES	1	32.30	32.30	1.39
Between	3	142.96	47.65	.12
Within	40	927.48	23.19	
Total	43	1070.43		

⁺p<.10

TABLE 2

Analysis of Variance on Self-Efficacy and Changes in Typing Accuracy for Conditions 1 and 2

<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F ratio</i>
Main Effects				
Condition	1	.38	.38	1.89
SES	1	1.42	1.42	7.11 [*]
Between	3	1.91	.64	3.19
Within	40	8.00	.20	
Total	43	9.91		

^{*}p<.05

TABLE 3

Analysis of Variance on Self-Efficacy and Changes in
Typing Speed for Conditions 1 and 3

Source	df	SS	MS	F ratio
Main Effects				
Condition	1	83.14	83.14	3.95 ⁺
SES	1	31.81	31.81	1.51
Between	3	159.46	53.15	2.52
Within	40	824.79	21.07	
Total	43	1002.25		

⁺p<.10

TABLE 4

Analysis of Variance on Self-Efficacy and Changes in
Typing Accuracy for Conditions 1 and 3

Source	df	SS	MS	F ratio
Main Effects				
Condition	1	.00	.00	.001
SES	1	.85	.85	3.73 ⁺
Between	3	.85	.28	1.25
Within	40	9.06	.23	
Total	43	9.91		

⁺p<.10

TABLE 5

Analysis of Variance on Self-Efficacy and Changes in
Typing Speed for Conditions 1 and 4

<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F ratio</i>
Main Effects				
Cond	1	24.10	24.10	1.18
SES	1	29.45	29.45	1.44
Between	3	100.03	33.34	1.63
Within	39	796.39	20.42	
Total	42	896.42		

TABLE 6

Analysis of Variance on Self-Efficacy and Changes in
Typing Accuracy for Conditions 1 and 4

<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F ratio</i>
Main Effects				
Cond	1	.00	.00	.001
SES	1	.38	.38	.96
Between	3	.45	.15	.38
Within	39	15.45	.40	
Total	42	15.91		

TABLE 7

Analysis of Variance on Self-Efficacy and Changes in
Typing Speed for Conditions 1 and 5

<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F ratio</i>
Main Effects				
Cond	1	35.55	35.55	1.69
SES	1	35.46	35.46	1.59
Between	3	111.46	37.15	1.77
Within	40	839.70	20.99	
Total	43	951.16		

TABLE 8

Analysis of Variance on Self-Efficacy and Changes in
Typing Accuracy for Conditions 1 and 5

<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F ratio</i>
Main Effects				
Cond	1	.93	.93	1.36
SES	1	.44	.44	.64
Between	3	1.41	.47	.69
Within	40	27.14	.68	
Total	43	28.55		

TABLE 9

Analysis of Variance on Self-Efficacy and Changes in
Typing Speed for Conditions 2 and 3

<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F ratio</i>
Main Effects				
Cond	1	.86	.86	.03
SES	1	1.56	1.56	.06
Between	3	2.42	.81	.00
Within	38	1009.48	26.57	
Total	41	1011.91		

TABLE 10

Analysis of Variance on Self-Efficacy and Changes in
Typing Accuracy for Conditions 2 and 3

<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F ratio</i>
Main Effects				
Cond	1	.38	.38	1.82
SES	1	1.49	1.49	7.12*
Between	3	1.95	.65	3.11
Within	38	7.96	.21	
Total	41	9.91		

*p<.05

TABLE 11

Analysis of Variance on Self-Efficacy Changes in Typing
Speed for Conditions 2 and 4

Source	df	SS	MS	F ratio
Main Effects				
Cond	1	10.57	10.57	.41
SES	1	2.40	2.40	.09
Between	3	12.97	4.29	.17
Within	37	963.08	26.03	
Total	40	975.96		

TABLE 12

Analysis of Variance on Self-Efficacy and Changes in
Typing Accuracy for Conditions 2 and 4

Source	df	SS	MS	F ratio
Main Effects				
Cond	1	.35	.35	.91
SES	1	.84	.84	2.16
Between	3	1.56	.52	
Within	37	14.35	.39	
Total	40	15.90		

TABLE 13

Analysis of Variance on Self-Efficacy and Changes in
Typing Speed for Conditions 2 and 5

Source	df	SS	MS	F ratio
Main Effects				
Cond	1	4.67	4.67	.18
SES	1	1.22	1.22	.05
Between	3	5.90	1.97	.07
Within	38	1006.39	26.48	
Total	41	1012.29		

TABLE 14

Analysis of Variance on Self-Efficacy and Changes in
Typing Accuracy for Conditions 2 and 5

Source	df	SS	MS	F ratio
Main Effects				
Cond	1	2.38	2.38	3.48 ⁺
SES	1	.92	.92	1.34
Between	3	3.59	1.20	1.75
Within	38	26.03	.69	
Total	41	29.62		

⁺p<.10

TABLE 15

Analysis of Variance on Self-Efficacy and Changes in
Typing Speed for Conditions 3 and 4

<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F ratio</i>
Main Effects				
Cond	1	17.36	17.36	.73
SES	1	2.54	2.54	.11
Between	3	19.70	6.57	.28
Within	37	878.40	23.74	
Total	40	898.10		

TABLE 16

Analysis of Variance on Self-Efficacy and Changes in
Typing Accuracy for Conditions 3 and 4

<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F ratio</i>
Main Effects				
Cond	1	.00	.00	.00
SES	1	.40	.40	.96
Between	3	.49	.16	.40
Within	37	15.41	.42	
Total	40	15.90		

TABLE 17

Analysis of Variance on Self-Efficacy and Changes in
Typing Speed for Conditions 3 and 5

<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F ratio</i>
Main Effects				
Cond	1	9.52	9.52	.39
SES	1	1.32	1.32	.05
Between	3	10.86	3.62	.15
Within	38	921.71	22.75	
Total	41	932.57		

TABLE 18

Analysis of Variance on Self-Efficacy and Changes in
Typing Accuracy for Conditions 3 and 5

<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F ratio</i>
Main Effects				
Cond	1	.86	.86	1.20
SES	1	.46	.46	.64
Between	3	1.39	.46	.65
Within	38	27.09	.71	
Total	41	28.48		

TABLE 19

Analysis of Variance on Self-Efficacy and Changes in
Typing Speed for Conditions 4 and 5

Source	df	SS	MS	F ratio
Main Effects				
Cond	1	1.25	1.25	.05
SES	1	2.08	2.08	.09
Between	3	3.47	1.16	.05
Within	37	875.31	23.66	
Total	40	878.78		

TABLE 20

Analysis of Variance on Self-Efficacy and Changes in
Typing Accuracy for Conditions 4 and 5

Source	df	SS	MS	F ratio
Main Effects				
Cond	1	.84	.84	.93
SES	1	.13	.13	.15
Between	3	.96	.32	.35
Within	37	33.48	.91	
Total	40	34.44		

TABLE 21

Analysis of Variance on Changes in Typing Speed for
Conditions 1 through 5

<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F ratio</i>
Between	4	103.55	25.89	1.12
Within	<u>101</u>	<u>2344.31</u>	23.21	
Total	105	2447.86		

TABLE 22

Analysis of Variance on Changes in Typing Accuracy for
Conditions 1 through 5

<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F ratio</i>
Between	4	2.44	.61	1.28
Within	<u>101</u>	<u>48.10</u>	.48	
Total	105	50.54		

TABLE 23

Analysis of Covariance on Changes in Typing Speed by
Conditions 1 through 5

<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F ratio</i>
Covariate	1	14,677.47	14,677.47	797.76
Main Effects				
Cond	4	49.34	12.34	.67
Between	5	14,726.81	2945.36	160.09
Within	<u>100</u>	<u>1839.83</u>	18.40	
Total	105	16,566.64		

TABLE 24

Analysis of Covariance on Changes in Typing Accuracy by
Conditions 1 through 5

<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F ratio</i>
Covariate	1	8.77	8.77	43.29
Main Effects				
Cond	4	.59	.15	.73
Between	5	9.36	1.87	9.24
Within	<u>100</u>	<u>20.26</u>	.20	
Total	105	29.62		

TABLE 1

Means and Standard Deviations of Changes in Typing Speed (wpm) and Accuracy (%) following Training, by Experimental Condition

<u>Condition</u>	<u>Typing Speed</u>	<u>Typing Accuracy</u>
1 n=23		
M	4.43	.04
SD	4.60	.48
2 n=21		
M	6.90	-.14
SD	5.20	.48
3 n=21		
M	7.19	.05
SD	4.80	.50
4 n=20		
M	5.90	.05
SD	4.70	.76
5 n=20		
M	6.24	.33
SD	4.80	1.10

TABLE 2

Means and Standard Deviations of Post-Training Typing
Speed (wpm) and Accuracy (%) by Experimental Condition

<u>Condition</u>	<u>Typing Speed</u>	<u>Typing Accuracy</u>
1 n=23		
M	28.00	99.87
SD	11.30	.34
2 n=21		
M	35.05	99.71
SD	13.90	.56
3 n=21		
M	34.10	99.90
SD	14.50	.30
4 n=20		
M	32.40	99.65
SD	12.40	.59
5 n=21		
M	31.43	99.62
SD	10.20	.74

TABLE 3

Means and Standard Deviations of Post-Training Typing
Speed (wpm) and Accuracy (%) by Experimental Condition for
Low SES Subjects

<u>Condition</u>	<u>Typing Speed</u>	<u>Typing Accuracy</u>
1 n=12		
M	33.33	99.83
SD	12.20	.39
2 n=11		
M	33.09	99.64
SD	12.80	.50
3 n=11		
M	32.82	99.82
SD	13.30	.40
4 n=10		
M	30.60	99.80
SD	13.30	.42
5 n=11		
M	30.18	99.36
SD	10.43	.92

TABLE 4

Means and Standard Deviations of Post-Training Typing
Speed (wpm) and Accuracy (%) by Experimental Condition for
High SES Subjects

<u>Condition</u>	<u>Typing Speed</u>	<u>Typing Accuracy</u>
1 n=11		
M	22.18	99.91
SD	6.90	.30
2 n=10		
M	37.20	99.80
SD	15.30	.63
3 n=10		
M	35.50	100.00
SD	16.40	0.00
4 n=10		
M	34.20	99.50
SD	11.90	.71
5 n=10		
M	32.80	99.90
SD	10.40	.32

TABLE 5

Means and Standard Deviations of Pre-Training Typing Speed (wpm) and Accuracy (%), by Experimental Condition

<u>Condition</u>	<u>Typing Speed</u>	<u>Typing Accuracy</u>
1 n=23		
M	23.57	99.83
SD	8.04	.39
2 n=21		
M	28.14	99.86
SD	10.50	.65
3 n=21		
M	26.90	99.86
SD	11.80	.36
4 n=20		
M	26.50	99.6
SD	9.30	.94
5 n=21		
M	25.19	99.29
SD	7.70	1.30

TABLE 6

Means and Standard Deviations of Manipulation Check by
Experimental Condition and SES

<u>Condition</u>	<u>Low SES</u>	<u>High SES</u>	<u>All S's</u>
1			
M	20.75	21.50	21.09
SD	1.66	1.96	1.80
n	12	10	22
2			
M	20.55	21.40	20.95
SD	1.21	2.01	1.66
n	11	10	21
3			
M	21.00	21.80	21.38
SD	2.41	2.57	2.46
n	11	10	21
4			
M	19.30	21.50	20.40
SD	2.41	1.84	2.37
n	10	10	20
5			
M	21.09	21.30	21.19
SD	2.02	2.00	1.97
n	11	10	21

TABLE 7

Frequency Distribution of Typing Accuracy (percentage correct) Pre and Post Training

<u>% Accuracy</u>	<u>Pre-Training</u>	<u>Post-Training</u>
95	0	0
96	3	0
97	2	0
98	0	5
99	15	16
100	86	85

n=106

TABLE 8

Comparison of Improvements in Typing Speed of High and Low
SES Subjects Following Training

<u>Condition</u>	<u>Low SES</u>	<u>High SES</u>	<u>F</u>
1			
M	6.17	2.55	4.28 ⁺
SD	5.00	3.30	
n	12	11	
2			
M	6.73	7.10	.026
SD	6.40	4.00	
n	11	10	
3			
M	7.00	7.40	.036
SD	5.10	4.80	
n	11	10	
4			
M	5.60	6.20	.078
SD	4.10	5.40	
n	10	10	
5			
M	6.09	6.40	.02
SD	4.10	5.70	
n	11	10	

⁺p<.10

TABLE 9

Comparison of Changes in Typing Accuracy of High and Low
SES Subjects Following Training

<u>Condition</u>	<u>Low SES</u>	<u>High SES</u>	<u>F</u>
1			
M	-.08	.18	1.77
SD	.29	.60	
n	12	11	
2			
M	-.36	.10	6.50*
SD	.51	.32	
n	11	10	
3			
M	-.09	.20	1.90
SD	.54	.42	
n	11	10	
4			
M	.00	.10	.08
SD	.47	.99	
n	10	10	
5			
M	.27	.40	.07
SD	1.20	.97	
n	11	10	

*p<.05

TABLE 10

Correlation Matrix of Dependent Variables and Personality Variable (SES) Measured Pre and Post Training

	1	2	3	4	5	6
1. Pre-Training						
Typing Speed	—	.94**	-.07	-.26*	-.004	.005
2. Post-Training						
Typing Speed		—	-.03	-.23 ⁺	-.03	-.03
3. Pre-Training						
Typing Accuracy			—	.54**	-.05	-.03
4. Post-Training						
Typing Accuracy				—	.14	.08
5. Pre-Training						
SES					—	.91**
6. Post-Training						
SES						—

⁺p<.10

*p<.05

**p<.01

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