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Self-Efficacy and its Effect on Goal Directed Behaviour

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The present study hypothesized that high self-efficacy and goal setting behaviour would relate to better performance on a series of three anagrams. Previous research has found that goal-setting is related to improved performance on various tasks (Douma, Ordonez, Schwitzer, 2005). Self-efficacy is the belief in one’s ability to accomplish difficult tasks and affects individual’s performance. In total 60 undergraduate students of the University of Western Ontario were recruited for participation, they were divided in to three groups: create your own goal, yoked goal and do your best. Self-efficacy was measured using the General Self-Efficacy scale developed by Jerusalem and Schwarzer. The results are deemed insignificant. The concepts of goal setting and self-efficacy will be further discussed.

Metacognition is an important cognitive ability that adults utilize on a consistent basis, it involves “higher-order mental process involved in learning that include making plans for learning, using appropriate skills and strategies to solve a problem, making estimates of performance and calibrating the extent of learning” (Coutinho & Neuman, 2008). Metacognitive regulation refers to the cognitive processes of controlling thinking and learning (Coutinho & Neuman, 2008). Research found that individuals can discriminate between information they already know and information they need to review and learn in terms of studying for a test. Thus an individual’s metacognitive level is related to performance in difficult tasks (Coutinho & Neuman, 2008).

Goal-setting is a mental process that utilizes metacognition. It is a mechanism that is used to obtain specific outcomes. Setting goals can take on two forms: mastery
and performance goals (Coutinho & Neuman, 2008). Mastery goals are a function of intrinsic motivation to improve performance in a domain. Effort is directed at increasing knowledge and is closely associated with metacognition. When the goal is not met and failure is considered, people with mastery goals react with problem solving attitudes and continued performance (Coutinho & Neuman, 2008). Conversely, performance oriented goals are extrinsically motivated as the individual seeks to show proficiency and avoid negative judgement made by others (Coutinho & Neuman, 2008). Goals can also be seen in the approach-avoidance dichotomy, which have positive or negative motivating results. Individuals develop multiple goals that can be simultaneous and independent of the other (Coutinho & Neuman, 2008).

Goal setting also has an effect on performance outcomes. Setting goals is an important cognitive task because it provides specific and challenging goals that aid us in completing an assigned task. Locke et al. (1990) did a meta-analysis of the goal setting literature and found that specific and challenging goals led to higher performance than “do your best” goals or no goals (Douma, Ondenez, Schwitzer, 2005). It is important that the participants accept goals, receive feedback and are given rewards for attainment.

The acceptance of goals is an important factor for determining successful outcomes. A study by Erez and Zidon (1984) examined goal acceptance and performance in a within-subjects design (Colella & Vance 1990). Subjects were assigned an increasingly difficult goal over seven trials and had to either accept or reject goals. The researcher informed participants that rejecting difficult goals was
self-efficacy and its effect on goal directed behaviour

socially acceptable, in order to ensure accurate appraisal of the assigned goals. The results indicate that performance increased if the goals were accepted. In opposition, rejected goals resulted in a decrease in performance (Colella & Vance, 1990).

Feedback is an important environmental mechanism that assists in attaining goals and utilized to determine the efficiency of behaviour (Colella & Vance, 1990). There are two feedback processes that occur: goal discrepancy and performance discrepancy. Like the name suggests goal-discrepancy feedback provides information about the magnitude of the subject's performance above or below the goal. Performance discrepancy indicates whether a subject's performance is increasing between trials. Colella and Vance (1990) assigned students seven anagrams each with an assigned goal that increased in difficulty. Their results suggest that negative goal discrepancy causes participants to reject the goal, whereas negative performance discrepancy to maintain the original goal they set (Colella & Vance, 1990).

Geller and Ludwig (2000) manipulated goal setting in order to reduce the number of car accidents within pizza deliverers. The accident rates of pizza delivers were much higher than the national average of car accidents and the number of injuries tended to occur on a consistent basis. Geller and Ludwig first observed the workers to develop a baseline accident rate. The pizza deliverers were then assigned to three groups: participative goal, assigned goal or the control group. The participative goal group developed a goal through discussion and group feedback (Geller & Ludwig, 2000). The results demonstrated that the assigned and participative goal groups reduced their accidents considerably better than the control group. The study concluded that participative goal setting improved safety behaviour
Self-Efficacy and its Effect on Goal Directed Behaviour

significantly more than the assigned group goal or control group (Geller & Ludwig, 2000). This highlights the importance that individuals can be influenced by training and assistance in their goal setting behaviour that directly results performance.

Self-efficacy was developed by Bandura and is defined as “person’s perceived ability to attain a desired outcome” (Coutinho & Neuman, 2008). Motivation is influenced by self-efficacy in the direction and persistence of behaviour. People with high self-efficacy tend to accomplish difficult tasks because they think their efforts will be successful (Bandura, 2002). Metacognition is a factor in self-efficacy as it is a controlled mental process. Self-efficacy can be learned through performance accomplishments, vicarious learning, encouragement and emotional arousal (Betz & Schifano, 2000). Students exert more effort if they believe that they can accomplish a goal than if they are unconfident. Thus, previous successes and failures have an effect on an individual’s self-efficacy (Coutinho & Neuman, 2008).

Goal orientation is interrelated with the concept of self-efficacy. Research indicates that mastery goals and high self-efficacy lead to improved performance when compared with people who simply have performance specific goals (Sonnentag & Volmer, 2009). The relationship between performance goals and self-efficacy is ambiguous as some research cites that there is a positive relationship and other research cites a negative relationship between performance goals and self-efficacy (Sonnentag & Volmer, 2009).

Self-efficacy can be manipulated in order to determine its effects on performance outcomes. Betz and Shifano’s (2000) research question was to determine if self-efficacy in women concerning construction activities could be
increased with self-efficacy intervention. Participants were selected for the study based on a low score on realistic confidence. The women attended three sessions on architectural design, hardware equipment and utilizing the tools. The posttest confidence means increased from 2.73 to 3.45 in the women, demonstrating that self-efficacy can be improved with mentoring, positive reinforcement and vicarious learning (Betz & Shifano, 2000).

Campbell and Hackett (1986) also studied an individual's self-efficacy level and the ability to complete a series of tasks (Armstrong, Bonitz, Larson, 2008). The tasks used were anagrams and incomplete number series. The results indicate that individuals who scored high on self-efficacy also performed superior to participants with lower levels of self-efficacy.

The present study will examine further the relationship between self-efficacy and performance related goals. Specifically participants will be required to complete three anagrams and will be randomly assigned to three conditions, based on the 1990 study executed by Colella and Vance. The first group will be instructed to create their own goal; the second group's goal will be yoked off the first group's goal. The third group will be required to simply do your best. Based on the literature, participants who are assigned a specific and attainable goal will perform better than those without a specific goal in mind. In conjunction with the goal setting behaviour, it is hypothesized that people with high self-efficacy will perform better than participants with a low self-efficacy.
Method

Participants

The subjects were 60 participants all of whom were undergraduate students at the University of Western Ontario. The subject pool ranged between the ages of 18 to 24 years old. In total 25 men and 35 women completed the study, the distribution of men and women was not consistent between conditions. The participants were chosen based on the researcher’s availability and their willingness to participate in the study and were randomly assigned to goal setting, yoked goal or no goal conditions. In order to maintain a diverse sampling of the undergraduate subset the researcher frequented communal areas on campus to recruit participants. Areas include; the Student Activity Center, the Huron Library, Campus Recreation and the Spoke. University students represent a small percent of the overall Canadian population. Students who attend the University of Western Ontario generally are from similar socio-economic backgrounds and were predominantly Caucasian.

Materials

All participants were provided a consent form to ensure participants were made aware of any risks, that information provided was confidential and that participation was voluntary. The General Self-Efficacy Scale (GSE) developed by Matthias Jerusalem and Ralf Schwarzer in 1993 is used to determine the participant’s perceived level of self-efficacy; the belief that you can accomplish a novel or difficult task or overcome a specific challenge (Luszczynska, Scholz, Schwarzer, 2005). The GSE consists of ten statements in which participants must rate each item on a four point scale using the descriptors: exactly true, moderately true, hardly true and not
Self-Efficacy and its Effect on Goal Directed Behaviour

true at all. The scoring ranges from 10 to 40 points, the higher score means the respondent has a higher level of self-efficacy. A median split (median = 30) was used for the present study, high self-efficacy was graded as a score above the mean and low self-efficacy was graded as a below the mean. Self-efficacy scores have been used in the clinical environment to influence behavioural change (Luszcynska et al., 2005). General self-efficacy is a universal construct, a belief that is constant across cultures (Bandura, 2002). General self-efficacy has been found to correlate positively with “goal intentions, implementation intentions, outcome expectancies, self-regulation” (Luszcynska et al., 2005). It is a measure that has been used for over twenty years and has been translated into many languages. Internal consistencies of this scale are alpha = 0.75 and 0.91, and general self-efficacy is considered to be high convergent and discriminant validity (Kumar & Lal, 2006).

Next the participants were required to complete a series of three anagrams. The anagrams were developed Colella and Vance (1990). Each anagram consisted of seven letters and subjects were required to list as many words possible during a one minute interval. The instructions outlined that the words created had to be a minimum of two letters, couldn’t be a proper noun, each letter could only be used once and in one form (no plural versions were accepted) (Colella & Vance, 1990). The yoked-goal condition was assigned a specific goal based on the goals set by the “set your own goal” condition. In Colella and Vance’s research, they performed a pilot study to determine the mean number of words generated for each set. For the present study the anagrams were selected based on the pilot means and chosen for their varying difficulty in order to present a fair task. The first anagram had a mean
of 9.63, the second a mean of 8.84 and the third a mean of 11.6 (Colella & Vance, 1990). See Appendix A for the complete set of instructions and anagram list. A debriefing form was provided to all participants after the completion of the task.

Procedure

Due to research limitations, each condition was completed at a different date, time and location. Testing started on March 18th and ended on April 7th, 2010. The experimenter remained consistent for each trial to ensure the procedure did not change from participant to participant. Participants were randomly selected based on their availability. Some subjects participated in groups. Group sizes ranged from two to four participants, talking was prohibited within the group conditions. After being approached by the researcher and provided verbal agreement to participate in the study, the participant completed the consent form. Each participant was provided with the necessary materials to complete the study, including writing utensils. Instructions for the anagram task varied depending on the condition. Once participants had read the instructions and communicated their understanding of the rules to the researcher the anagram task began. The researcher utilized a stop-watch to keep track of the one minute intervals provided for each anagram task. At the end of one minute the researcher communicated that it was time to move on to the next task. Each participant stopped writing at the end of the three minute period. Finally, a debriefing form was provided to the participants and any further questions about the study were addressed. The scores on the General Self-Efficacy Scale were calculated, as well as the mean performance on the anagram tasks. Words that did not fit with the instructions were eliminated from the calculations, as well as any illegible words. Statistical analysis was used to examine the results of the study.
Results

A two-by-two between subjects ANOVA was performed to examine the interaction and main effects of goal setting (or lack of goal setting) behavior and self-efficacy’s effect on anagram performance. In total, 17 participants had self-efficacy. In the create your own goal group three participants had low self-efficacy, 6 in the yoked-goal group and 8 in the do your best group. The results of further statistical analysis prove to be insignificant (shown in Figure 1). The main effect of goal or no goal setting behavior was insignificant ($F(2, 54) = 0.32$, n.s.). The main effect of self-efficacy was also found to be insignificant ($F(2, 54) = 0.17$, n.s.). The test of interaction between goal and self-efficacy was also insignificant ($F(2, 54) = 0.40$, n.s.). The ANOVA summary table can be found in Appendix B.

Discussion

The results of the current study reject the hypothesis that high levels of self-efficacy and setting goals will have a positive improvement on performance. The insignificance of the goal setting main effect demonstrates that performance on the anagram was not a function of the metacognitive processes that underlie goal-setting behaviour. The findings do not support the general belief in the literature that when an individual is assigned a goal or sets a goal themselves that their performance will improve. Stipulations about the confounding variables that could have influenced the results will be further explored.

The number of participants used in the present study could be a contributing factor to the insignificant results. Colella and Vance (1990) utilized 90 participants for assessing performance on the anagrams; the present study had 60 participants.
Figure 1. Mean performance on anagram task for high and low self-efficacy participants. (1 - set your own goal, 2 – yoked goal, 3 – do your best).
More participants could increase the variance between the different goal setting conditions' performance. The Colella and Vance study provided seven anagrams for the participants to complete, contrasting the three anagrams provided in the present study. Performance for the present study was based on the mean number of words participants were able to complete. Adding more anagrams would provide participants more opportunities to perform and meet their goals, thus providing a more accurate representation of their ability.

Self-efficacy scores of the participants range from 20 to 39 with an overall mean self-efficacy score of 31. There were no outliers in the self-efficacy data this is due to homogeneous sampling of participants. One of the requirements to be a successful university student is to have an elevated belief in one’s personal abilities and intelligence in order to complete difficult examinations. It is not surprising that only 17 of the 60 participants were deemed to have low self-efficacy based on the median split. A problem with rating statements from exactly true to not true at all is that it provides absolute terms for the participant. Many subjects commented after the trial was complete that they wanted to pick an option between the variables given. This indicates that there could be a discrepancy between their self-evaluations and their self-efficacy score. To increase the number of low-self efficacy scores in future studies, participants should be pre-screened for self-efficacy level then rejected based on their score. This would ensure that there is a better representation of high and low self-efficacy determines its effect on performance.

Selecting participants from a diverse sampling could improve the results of the study. Due to admission averages and formal grading mechanisms, university
Self-Efficacy and its Effect on Goal Directed Behaviour

students generally have similar levels of metacognition and intellectual capacity in comparison to the general population and thus have higher levels of self-efficacy in comparison to the others. It would be useful to determine if differences exist between sexes and different age groups.

Issues of control are an area of concern for the current study and could be a contributing factor to the insignificant results. Each study was conducted in a different setting at a different location at the University of Western Ontario. The researcher had no control over the environmental conditions and potential distracters that could have taken participants focus away from the task at hand. In addition, many of the trials were conducted relatively close to the final examination period in April, a typically stressful time for students. It is hard to determine if the participants were committed to the task at hand and not distracted by deadlines and studying required of them. Ecological validity is in question for the occurrence of completing anagrams and deciphering in everyday life is rare.

One participant indicated that they were dyslexic and thus the goal they set and their subsequent performance was significantly lower the other subjects. This brings up the concern about the relationship between self-efficacy and performance on the anagrams. An individual could have a high general self-efficacy score but lack the cognitive ability to create various words. Perhaps having a variety of goal-related tasks that utilize various mental modes to include numerical analysis, problem solving and word tasks would cater to participants unique skills in various areas.

The results of the current study go against the general consensus in the psychological community, that setting specific and attainable goals will affect
Self-Efficacy and its Effect on Goal Directed Behaviour

performance; goal setting is still an important skill for individuals to master. If the proposed modifications to the current study it would be interesting to determine if self-efficacy has an effect on overall performance in conjunction with goal setting behaviour. Future research should consider self-efficacy and goal-setting in more realistic and natural settings.
References


Appendix A

Part 2: Word Creation Exercise (*create your own goal condition*)

Your task is to create words using the seven letters listed at the top of each page. Each word must be an English word, two or more letters long, other than a proper noun, made by using each of the 7 letters only once per word, and used in only one form.

On each page, you will have one minute to create your words. Write your words in the spaces provided.

**SAMPLE LETTERS**

AEDBKUG

Possible words: bad, bed, bag, beg, bug, bade, bake, bead, dug, duke, keg

It is important that you commit to a specific yet attainable goal. You must come up with your own goal. Your goal can be anywhere between creating 0 to 16 words.

Your goal is to create ____________ words during the allotted 1 minute using the 7 letters.

Do not turn the page until you are instructed to do so.

OELHMAZ

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Part 2: Word Creation Exercise (*yoked goal condition*)

Your task is to create words using the seven letters listed at the top of each page. Each word must be an English word, two or more letters long, other than a proper noun, made by using each of the 7 letters only once per word, and used in only one form.

On each page, you will have one minute to create your words. Write your words in the spaces provided.

**SAMPLE LETTERS**

AEDBKUG

Possible words: bad, bed, bag, beg, bug, bade, bake, bead, dug, duke, keg

It is important that you commit to a specific yet attainable goal. You must come up with your own goal. Your goal can be anywhere between creating 0 to 16 words.

Your goal is to create 8 words during the allotted 1 minute using the 7 letters.

Do not turn the page until you are instructed to do so.
Part 2: Word Creation Exercise (*no goal condition*)

Your task is to create words using the seven letters listed at the top of each page. Each word must be an English word, two or more letters long, other than a proper noun, made by using each of the 7 letters only once per word, and used in only one form.

On each page, you will have one minute to create your words. Write your words in the spaces provided.

SAMPLE LETTERS

AEDBKUG

Possible words: bad, bed, bag, beg, bug, bade, bake, bead, dug, duke, keg

Do your best to create *as many words as you can* during the allotted 1 minute using the 7 letters on each page.

Do not turn the page until you are instructed to do so.

OELHMAZ

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Appendix B

Table 1. *ANOVA Summary Table*

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<th>df</th>
<th>MS</th>
<th>F</th>
<th>Sig</th>
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<td>1.276</td>
<td>0.318</td>
<td>0.729</td>
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<tr>
<td>Self-Efficacy</td>
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<td>0.683</td>
<td>0.170</td>
<td>0.682</td>
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<tr>
<td>Goal x Self-Efficacy</td>
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<td>1.593</td>
<td>0.397</td>
<td>0.675</td>
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<tr>
<td>Error</td>
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<tr>
<td>Total</td>
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