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The Relationship Between Goal Types and Job Performance: Exploring the Moderating Effect of Self-Efficacy

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THE RELATIONSHIP BETWEEN GOAL TYPES AND JOB PERFORMANCE:
EXPLORING THE MODERATING EFFECT OF SELF-EFFICACY

A Thesis

Presented to

The Faculty of the Department of Psychology

San José State University

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

by

Stefani M. Ewell

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The Designated Thesis Committee Approves the Thesis Titled
THE RELATIONSHIP BETWEEN GOAL TYPES AND JOB PERFORMANCE:
EXPLORING THE MODERATING EFFECT OF SELF-EFFICACY

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ABSTRACT

THE RELATIONSHIP BETWEEN GOAL TYPES AND JOB PERFORMANCE: EXPLORING THE MODERATING EFFECT OF SELF-EFFICACY

by Stefani M. Ewell

Motivation to improve performance within the workplace has long been an area of interest for leaders in organizations. While goal setting is often used as a motivational theory to improve performance, further guidelines are needed to ensure the full positive effects of goal setting are realized. The purpose of this study was to understand the effect of four goal types (outcome, performance, process, and personal-best goals) on performance in the workplace. Another purpose of this study was to examine whether the effectiveness of goal types may change as a function of self-efficacy. Performance was measured in two ways: completeness and correctness. Results of an experiment completed by 89 participants revealed that when performance was measured by completeness, performance and outcome goals resulted in significantly higher performance than process goals and personal best goals. Additionally, levels of self-efficacy only had a significant impact when performance was measured as correctness. These results suggest that employers should aim to incorporate performance or outcome goals in the motivation plans of their employees so as to further improve performance.

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Introduction

Goal setting theory is considered to be one of the major motivational theories within the field of industrial/organizational psychology (Locke et al., 1981). Researchers within the field of industrial/organizational psychology have widely accepted that Locke's parameters for goal setting, commonly known as SMART goals, are the most effective. However, limited research has been conducted since then to further understand how to improve the efficacy of goal setting. Lack of clarity within the parameters of goal setting theory have even caused some to argue that goal setting causes harm (Ordóñez et al., 2009). Until further parameters for goal setting can be identified, the full positive effects of goal setting cannot be realized. The present study, therefore, attempted to determine if goal types used within other disciplines of psychology may yield positive effects on performance in the workplace. One purpose of this study was to understand the effect of four goal types (outcome, performance, process, and personal-best goals) on performance in the workplace. Another purpose of this study was to examine whether the effectiveness of goal types may change as a function of self-efficacy.

Origin of Goal Setting Theory

Goal setting theory received wide attention in the late 20th century when Locke and others found creating specific, measurable, attainable, relevant, and time-bound goals led to higher performance than easy goals, vague goals, or no goals (Locke et al., 1981). Locke et al. (1981) introduced SMART goals to the field of psychology to define the necessary attributes of goals to increase motivation to complete a task. The acronym SMART stands for specific, measurable, attainable, relevant, and time-bound. A specific goal refers to a goal

with “specific intentions to take a certain action” (Locke et al., 1981, p. 146). Early on in his studies, Locke discovered the importance of specific goals as individuals were more motivated to achieve their goals when they were given a specific goal as compared to being told to “do your best” (Bryan & Locke, 1967). A measurable goal refers to a goal that provides a knowledge of performance in relation to the goal after it is completed. It is important that goals be measurable so that there is a means to determine if they have been achieved. Additionally, measuring the extent of achievement of a goal is necessary to affect performance improvement (Locke et al., 1981). An attainable goal refers to the goal-setter's ability to achieve their goal. The aspect of goals being set to be attainable is important to ensure goal setters are reasonably able to attain or at least approach their goal so as to encourage goal completion. A relevant goal refers to a goal that the goal setter views as being worthwhile. It is important that a goal be relevant because the set goal needs to focus attention towards a goal setter's area of interest. Finally, a time-bound goal refers to a goal that has a pre-set completion time. Locke et al. (1981) stated that goals need to be time-bound in order to maintain effort over a set time span.

Hardy and Nelson (1988) looked at goal setting within sports and found that goals could be divided into three different types: outcome goals, performance goals, and process goals. Outcome goals are defined as goals set to exceed the performance of others and are used to focus on the end point of events (Burton, 1989). An example of an outcome goal would be to beat all other competitors in a one-mile running event in track. Performance goals are defined as goals set to surpass personal performance standards (Burton, 1989). They are used to focus on the end products of performance without regards to other people. An example of a

performance goal applied to the same scenario outlined above would be to achieve a personal best time in a one-mile running event. Process goals are defined as specifying behaviors, skills, and strategies essential for effective task execution (Mullen et al., 2016). They are used to focus on the processes one wants to engage in order to perform satisfactorily, without regards to other people or the end products of performance. An example of a process goal applied to the scenario outlined above would be to take long strides throughout the entire one-mile race.

Comparison of Goal Types

Outcome goals have been generally agreed upon to have the least significant impact on performance because the achievement of the goal is measured based on how the goal setter performs compared to others. This is viewed to be an ineffective goal type because success of the goal's completion is measured independent of the goal setter's efforts. Even if the goal setter were to improve their performance, they could still fail at achieving their goal because another competitor performed better than them. For example, an individual could run the fastest mile of their career, but still fail at achieving their goal because they did not run faster than all their competitors. Consequently, outcome goals lead to stress as is determined by Locke and Latham's (1985) criteria for generating stress, which states that goals can lead to stress if they are important, require action, and may not always be achieved.

Initially, it was argued that performance goals were superior to outcome goals because they were more controllable and flexible, which decreases the stress associated with outcome goals. Performance goals allow the goal setter to adjust their standards to maintain challenging and realistic goals as well as achieve success independent of how others perform.

It was found that performance goals led to high motivation, low anxiety, and more consistent success (Burton, 1989). However, it was later discovered that, similar to outcome goals, performance goals could elicit negative effects because they satisfied Locke and Latham's (1985) criteria for generating stress by not always being achieved.

Process goals are considered superior to outcome or performance goals in the sense that they are used to mitigate feelings of stress in performance. Process goals are able to alleviate feelings of stress by reallocating attentional resources to strategy and technique development as opposed to results, which increases perceptions of control (Kingston & Hardy, 1997). A highly successful pistol shooter outlined their process goal, saying:

I would write what I wanted to do and say to myself, 'What am I going to do this training session?' I wouldn't just get on the line and pump rounds down the range, but would actually go to the line with an intent, a goal, even if it was just to make sure everything was smooth. When I go to the line, and set everything up, and take up the gun in my hand, I also mentally go through my shot plan checklist before I shoot. This strategy started out very mechanically, with a physical list of words which I have on the shooting table and which I read exactly. These words represented every single step involved in shooting a shot. Then I reduced these to key words so that I could go through the list faster. Finally, I didn't need the list anymore. I would usually write one word to emphasize what I wanted, such as 'trigger' or 'smooth.' Then this shot-plan rehearsal became a mix of simple verbal reminders and images which I ran before each shot. (Orlick & Parington, 1988, pp. 111-112)

Because process goals do not meet Locke and Latham's (1985) criteria for generating stress and are said to improve athletes' self-efficacy, they were further studied. In their paper, Hardy and Nelson (1988) reviewed self-regulation training procedures used in sports. One procedure reviewed was goal setting, in which "product-oriented goals," referred to in this paper as performance goals, were compared to process-oriented goals. They stated that "it is thought that product-oriented goals possess great motivational power, whilst process-oriented

goals aid concentration and the allocation of attentional resources” (p. 1575). In order for the goal to be obtained, the goal performer is expected to allocate their attentional resources (i.e. focus) on the processes they should be engaged in while performing.

Kingston and Hardy (1997) looked at 37 male golfers from the United Kingdom to understand the effectiveness of performance goals and process goals. The study separated the participants into three groups: a performance goal group, a process goal group, and a control group that did not participate in the goal-setting training program. All participants completed Nelson and Hardy’s (1990) Sports-Related Psychological Skills questionnaire and a Competitive State Anxiety Inventory at three points in the study: before the study began, before the second goal-setting training phase, and after the third goal-setting training phase. These assessments were designed to measure participants' imagery skill, mental preparation, self-efficacy, cognitive anxiety control skills, concentration skills, relaxation skills, motivation skills, pre-competition levels of state anxiety, and state self-confidence.

The two experimental groups went through three goal-setting training phases and data were collected from participants after the first and third training phases. In the goal-setting training phases, individual meetings were conducted to reinforce assigned goal types and discuss strategies for practice and competition. The study found that participants who used process goals improved their skills more quickly than participants who used performance goals. Additionally, participants in the process goal group experienced significant improvements in cognitive anxiety control and concentration. These findings suggest that training athletes to set process goals with the primary focus being on strategy development could aid in creating a natural process for improved performance.

Schunk and Swartz (1993) studied process goals in an educational setting. In their study, they sought to understand how goal setting and progress feedback affected self-efficacy and writing achievement in students. The 60 fourth graders and 60 fifth graders who participated in this study were first asked to privately judge their self-efficacy for completing writing tasks and were then asked to complete a writing task. They completed this process five times. The students were randomly assigned into one of four groups: product goal, process goal, process goal plus progress feedback, and general goal. Product goals in the study were defined as a focus on the rate or quantity of work. Students in the product goal condition were instructed, “While you’re working, it helps to keep in mind what you’re trying to do. You’ll be trying to write a descriptive paragraph.” Progress feedback referred to informing participants of their progress in achieving their goals. Students in the process goal and process goal plus feedback condition were instructed, “While you’re working, it helps to keep in mind what you’re trying to do. You’ll be trying to learn how to use these steps to write a descriptive paragraph.” General goals referred to this study’s control in which students were told to do their best. Students in the general goal condition were instructed, “While you’re working, try to do your best”.

The students participated in small group sessions where they were given certain instructions based on their group assignment. In the sessions, the instructor demonstrated how to apply the group’s assignment goal to sample topics and paragraphs, allow for guided practice, and end the session with independent practice. It was found that students with process goals combined with progress feedback scored higher on posttest skills, efficacy for improvement, and progress compared to students with general goals and product goals.

Students who received only the process goals scored higher than the student with the general goal on the above measures. These results imply that process goals with progress feedback have the greatest motivational impact on task achievement when compared to product goals and general goals. Additionally, these results imply that to achieve the greatest motivational impact, goals should be structured to specify the behaviors in which the individual should engage in during the task and that the individual should receive some feedback regarding their progress towards achieving their goal throughout the process.

Process goals face some criticism, though, as they can force goal-setters to focus on components of their performance and lose the natural flow of their performance. This can be seen in a study conducted by Mullen et al. (2016), in which participants were split into either holistic process goal or part process goal groups to participate in a race car driving simulation. Holistic process goals were defined as “goals that focus on a single conceptual cue to encapsulate a movement in its entirety” (Mullen et al., 2016, p. 143). An example of a holistic process goal is to focus on maintaining a certain tempo while running one mile. The holistic process goals used in the study focused on feeling the entire steering movement and focusing on the words “smooth,” “glide,” and “easy.” A part process goal is defined as a goal that focuses on a single movement that cause lapses into conscious processing by creating smaller, more independent movement units (Mullen et al., 2016). An example of a part process goal is to always land on your toes when taking a stride during a one-mile run. The part process goals used in this study focused on using a relaxed grip, using the outside hand to turn the steering wheel, and focusing on making small adjustments to the steering wheel.

The Mullen et al. (2016) study found that the holistic process goal group made fewer and less severe errors while also further improving their lap times when compared to the part process goal group. The results of this study imply that the use of holistic process goals will lead better performance when compared to part process goals. The results also imply that process goals should be structured to focus on the entirety of the task to best increase performance.

Evolution of Perceived Best Goal Type

In recent years, attention has shifted to personal best goals as interest in goal setting has continued in the education discipline. Personal best goals are defined as goals that are specific, challenging, competitively self-referenced, and focused on self-improvement (Martin, 2006). As stated by Burns et al. (2019) who looked at the effects of personal best goal setting on students in Australian secondary schools, they are “the use of goals that are competitively self-referenced, growth-focused, and continually prompt students to strive to outperform their past best performance and efforts” (p. 2). Personal best goals are used to create personal and motivating standards to focus on surpassing one’s level of achievement on a task. An example of a personal best goal would be to run the fastest mile an individual ever has, so that they can become a stronger athlete.

Personal best goals seem to be similar to performance goals since they both focus on improving personal performance. However, personal best goals differ from outcome, performance, and process goals in that personal best goals are comprised of both task-specific and situation-specific goals while the other goal types mentioned above are solely task-specific. Task-specific goals are defined as guidelines for proximal performance (i.e.,

the “what” of the goal), while situation-specific goals are defined as the purpose or reasons for a goal (i.e., the “why” of the goal) (Martin, 2006). While no research has looked at the impact of stress on personal-best goals, this goal type has the positive characteristics of being more controllable and flexible, and focusing attention on strategy and technique. These characteristics have been cited in a previous study (Kingston & Hardy, 1997) as reducing stress in goal setting.

Much of the literature on personal best goals has been from the education realm and focuses on improving students’ academic achievement. Personal best goals have been found to help students achieve greater academic achievement, become more engaged in school, and become more motivated to improve themselves (Martin, 2006). In their study, Burns et al. (2019) sought to understand the role of personal best goal setting in students’ declining engagement. This study aimed to identify if personal best goals had an initiating, contemporaneous, or escalating effect on student’s engagement. An initiating effect is defined as personal best goal setting’s ability to predict the starting value of engagement. A contemporaneous effect is defined as personal best goal setting’s ability to predict engagement in the future. An escalating effect is defined as the impact of personal best goal setting increasing engagement over time.

The Burns et al. (2019) study looked at 368 Australian students in secondary school over the course of three academic years to determine if personal best goals were an effective motivational strategy to foster engagement among adolescences. During the latter third of each academic year, students were asked to complete a survey to assess personal best goal setting and engagement. Items related to personal best goals included, “When I do my

schoolwork, I try to do the best that I've ever done" and "When I do my schoolwork, I try to improve on how I've done before."

The study found that personal best goal setting had significant and positive initiating, contemporaneous, and escalating effects on engagement. This meant that students who used personal best goal setting had higher engagement levels than students who did not use personal best goal setting. Additionally, engagement scores for students who used personal best goal improved over the duration of the study. These findings imply that personal best goals are most effective at improving motivation over time and should be used for tasks with longer durations. It also implies that effective goals should be both personally challenging and competitively self-referenced.

Applications of Goal Types to the Workplace

Much empirical research has been conducted regarding performance goals and process goals in the workplace. In one of their studies, Seijts and Latham (2001) aimed to understand the effects of outcome goals and two types of learning goals (distal and proximal) on task completion. The study asked 92 undergraduate business students to produce unique class schedules using five university classes in three trials of eight minutes. In Seijts and Latham's study, the outcome goal set for participants was to complete as many correct schedules as possible. This would be considered a performance goal in this paper because the goal was set to surpass the participant's standards. It would not be considered an outcome goal in this paper because success of the goal was not defined by how the participant performed compared to others. Additionally, a learning goal was defined as "one that is specific and difficult in terms of the number of strategies to be discovered to learn how to perform the

task” (p. 292). A distal goal was defined as a long-term goal while a proximal goal was defined as a short-term goal. The learning goal would be considered a process goal in this paper because it focuses on specifying strategies essential for effective task execution.

The study found that participants with learning goals performed better than participants with outcome goals. This finding implies that goals should be set to focus on strategies to perform tasks rather than on performing the task itself. It also implies that effective goals should be specific and difficult. Additionally, this study suggested that outcome goals have a detrimental effect on performance when used during the learning process because they distract the individual’s attention from the development and systematic testing of task-relevant strategies.

In a more recent literature review, Latham and Seijts (2016) proposed how process and performance goals may be applied to the workplace. Within their paper, however, they divided process goals into behavioral goals and learning goals. They defined behavioral goals as “metrics for which an employee should be held accountable, but are not easily reducible to an outcome measure” (p. 226). Examples of behavioral goals include goals set to improve ethics, team playing, or the development of subordinates (Latham & Seijts, 2016). They concluded that it is beneficial for behavioral goals to be set to increase the effectiveness of the staff and the organization overall. Latham and Seijts (2016) defined learning goals as “discovering, mastering, or implementing effective strategies, processes, or procedures necessary to perform a task” (p. 227). The authors described one example of a learning goal as identifying five effective strategies to improve teacher evaluations in a teacher’s course. They stated that learning goals are important because they encourage the identification of and

implementation of strategies for completing complex tasks rather than just attributing effort and persistence to performance.

Additionally, a literature review by Latham and Seijts (2016) identified that the focus of performance goals is on outcomes in the workplace. Examples of performance goals in the workplace include “sales divided by the hours an employee worked, revenue generated, and costs reduced” (p. 226). It was suggested that specific, difficult learning goals in addition to “do your best” performance goals be used simultaneously to achieve higher performance. This literature review suggests that the determination of the best goal type is dependent on the situation. A specific situation in which a behavioral goal would be most effective would be when attempting to improve employee communication. A behavioral goal would be most effective when attempting to improve communication because the desired outcome cannot be measured objectively; however, employees still need to be held accountable for communicating appropriately. It would not be effective to set a learning goal or performance goal when attempting to improve communication because the goal setter is not attempting to learn a new strategy, nor is there an outcome that can be objectively measured. A specific situation in which a learning goal would be most effective would be when teaching an employee how to use a new system to complete timecard entries. A learning goal would be most effective in this situation because the desired outcome is to implement an effective strategy to complete a necessary task. It would not be effective to set a behavioral or performance goal when attempting to teach an employee to use a new system to complete timecard entries because the outcome is measurable, and the employee is not trying to achieve a higher level of performance.

Evaluation of Research

Much research has been conducted on the use of performance and process goals in the workplace. Performance goals have been identified to be most effective in the workplace when there is a measurable outcome with a task that has already been mastered. Process goals, often divided into behavioral and learning goals, have been identified to be most effective in situations when the desired outcome is not measurable or where task completion has yet to be mastered. However, no empirical research has been found that applies outcome goals or personal best goals to the work setting. It would be important to understand how outcome and personal best goals perform in the workplace to determine if there are situations when these goal types would be more appropriate than performance and process goals to improve performance.

One example of an outcome goal that could be applied in the workplace would be to sell the most units of a product. Additionally, personal best goals could be applied to the workplace when individuals set goals to complete a certain number of tasks a day to improve their time-management skills. Therefore, one purpose of this study is to understand the effect of four goal types (outcome, performance, process, and personal-best goals) on performance in the workplace. No study I was able to identify has compared the effects of these goal type on performance, therefore, I tested if there would be any difference in performance as a function of goal type.

Research Question 1: Will there be differences in performance related to each goal type (outcome, performance, process, and personal-best goals)?

In addition to examining the potential effects of different types of goals on performance, it is useful to determine whether these effects are influenced or altered by other factors.

Bandura (1986, 1988) proposed that the effects of goal setting depend on self-efficacy so I was also interested in examining whether the effectiveness of goals types might change as a function of self-efficacy. The next section expands on the role of self-efficacy in goal setting.

Self-Efficacy as a Potential Moderator

Self-efficacy has been defined as a judgment of “how well one can organize and execute courses of action required to deal with prospective situations containing many ambiguous, unpredictable, and often stressful elements” (Bandura & Schunk, 1981, p. 587). If an individual with high self-efficacy were put in a situation such as having to lead a new project in the workplace, they would respond with feelings of confidence and beliefs of success and would likely devise a strong plan to complete the project. In contrast, an individual with low self-efficacy would focus on feelings of incompetence, be anxious or pessimistic, and not likely perform as strongly as the individual with high self-efficacy.

Bandura (1988) argued self-efficacy should be considered when assessing goal setting because it is an important cognitively-based source of self-motivation. A cognitively-based source of self-motivation is understood to be a mental process of self-evaluation in reaction to one’s behavior to goal setting (Bandura & Schunk, 1981). Self-efficacy may impact goal setting by affecting the difficulty of the goal that one selects to pursue, or the level of effort one uses to achieve a goal. For example, an individual with low self-efficacy may not set challenging goals because they do not believe they can achieve anything more ambitious. Additionally, if a difficult goal is imposed on an individual with low self-efficacy, they may

not use all their effort to achieve the goal because they do not believe they can achieve regardless of the amount of effort expended.

Several studies have found self-efficacy to be related to many aspects of goal setting, such as goal level, task performance, goal commitment, the choice to set a specific goal, the effort to achieve the goal, and skill development (Bandura & Cervone, 1983; Locke et al., 1984; Schunk, 1983). For example, Locke et al. (1984) examined the effects of self-efficacy, goals, and task strategies on goal choice and task performance and found self-efficacy directly affected performance. Specifically, self-efficacy was positively related to goal choice, strategies used to accomplish goals, and performance. This means that when an individual has a high level of self-efficacy they are more likely to choose a more challenging goal, emphasize using a variety of strategies to achieve their goals, and perform better on their assigned task.

I propose that self-efficacy moderates the relationship between goal setting and performance. In their study, Burke et al. (2010) aimed to understand if self-efficacy moderated the relationship between group goal setting and group performance. Specifically, they hypothesized that the greater the strength of group self-efficacy, the stronger the magnitude of the group goal and group performance relationship (Burke et al., 2010). They suggested that self-efficacy would moderate the relationship between group goal setting and group performance because it effects an individual's response to goal setting. An individual with high self-efficacy will display greater effort, persistence, and more effective strategies, while an individual with low self-efficacy will display reduced effort and persistence and less

effective strategies. In this study, group goal setting was defined as a collective objective for a specific task (Burke et al., 2010)

The study consisted of 6,356 participants who were split into 1,325 groups to participate in a community-based walking program. Upon registration for this event, participants' levels of self-efficacy were measured. Additionally, groups were collectively asked to identify their total team's mileage goal for each week of the eight-week event. After each week, the group's performance was measured by each participant reporting their week's physical activity to their team captain, who then aggregated the teams score and provided it to the program leader.

The study found that there was a moderating effect of aggregated self-efficacy on the relationship between group goal setting and group performance, such that aggregated self-efficacy enhanced the strength of the relationship between group goal setting and group performance, especially when it was high. More specifically, groups with high levels of self-efficacy showed stronger relationships between group goal setting and group performance such that they created harder group goals and had a higher rate of achieving their goals than the groups with low and medium levels of self-efficacy. This may have occurred because self-efficacy increased their confidence to set and achieve a harder goal.

The moderating effect of self-efficacy was also found in a study conducted by Braaten et al. (2004). In their study, they sought to understand if perceived self-efficacy moderated the relationship between performance goals and self-regulatory strategies in Norwegian post-secondary students. Self-regulatory strategies were defined as activities to plan, monitor, and regulate an individual's cognition and were measured using a scale that focused on

metacognitive self-regulation. In Bra ̈ten et al.'s paper, a performance goal was defined as “goals orienting students towards outperforming others, demonstrating ability, and social recognition” (p. 231). What was defined in their paper as a performance goal is being defined as an outcome goal in this study because the goal was to measure performance compared to others. Additionally, this paper separated their performance goals into performance-avoidance goals and performance-approach goals. Performance-avoidance goals were defined as goals to “avoid unfavorable judgements of competence by trying not to look more stupid or ignorant than others” (p. 232). Performance-approach goals were defined as “striving to gain favorable judgements of (one's) competence by trying to outperform others” (p. 232).

This study involved 286 students divided into two groups dependent on the education program they were enrolled in. The first group consisted of students who attended a competitive, private Norwegian School of Management. The second group consisted of students who attended a non-competitive, state-funded teaching college. Both groups completed assessments on goal orientation, self-efficacy, and self-regulatory strategies during their first year of study.

It was found that perceived self-efficacy moderated the relationship between performance-avoidance goals and self-regulatory strategies only in students who attended the competitive, private Norwegian School of Management such that students with higher levels of perceived self-efficacy reported higher levels self-regulatory strategy with lower levels of performance-avoidance goals. This means that self-efficacy has a negative effect on the relationship between performance-avoidance goals and self-regulatory strategies. This also

means that the relationship of self-efficacy as a moderator is to some degree context specific. In conditions where students' goals are to avoid judgments of incompetence, perceptions of high self-efficacy can buffer against negative cognition and emotions. These findings, however, were not supported among the students in the non-competitive, state-funded teaching college.

Based on this research it can be concluded that self-efficacy may moderate the relationship between goal setting and performance.

Research Question 2: Will self-efficacy moderate the relationship between all goal types and performance?

In this current study I predict that self-efficacy will moderate the relationship between all goal types and performance as prior research has found support for self-efficacy moderating the relationship between group goals and performance and outcome goals and self-regulatory strategies. No study I was able to identify has compared the effect of self-efficacy on each goal type, therefore, no prediction can be made about how the effectiveness of different goal types on performance can change as a function of self-efficacy.

Method

Participants

The sample for this study consisted of 89 university students who completed a questionnaire and participated in three experimental trials. Sixty participants were recruited to participate in this study by responding to a posting on the psychology department's experiment recruitment system. The majority of students who participated in this study did so to fulfill a requirement of the psychology course they were enrolled in. In addition, this experiment was conducted in two psychology classes. Participants in these classes were informed that their participation was optional and that their decision would not affect their course grade. Data were collected through the administration of pencil-and-paper surveys as well as pencil-and-paper answer worksheets. Participants who either did not use the provided course packet to complete the task or had excessive errors when completing the task were eliminated from further analyses, thus the final sample consisted of 87 participants.

Table 1 presents the demographic information of participants. Demographic information collected from participants included their age range and gender. Participants' age ranged from 18 to 64 years. The majority of participants' (88.5%) ages ranged from 18 – 24 years in age. The sample consisted of 31.0% males, 66.7% females, and 2.2% participants who identified as non-binary or preferred to self-describe.

Table 1*Demographic Characteristics of Participants*

	Variable	<i>n</i>	%
Age	18-24 years old	77	88.5
	25-34 years old	8	9.2
	35-44 years old	1	1.1
	55-64 years old	1	1.1
Gender	Male	27	31.0
	Female	58	66.7
	Nonbinary	1	1.1
	Prefer to self-describe	1	1.1

Measures*Self-Efficacy*

Self-efficacy was defined as a judgment of “how well one can organize and execute courses of action required to deal with prospective situations containing many ambiguous, unpredictable, and often stressful elements” (Bandura & Schunk, 1981, p. 587). The current study utilized The New General Self-Efficacy Scale (Chen et al., 2001), which measures the trait-like generality dimension of self-efficacy using an 8-item scale. Some items from this scale include: “I will be able to achieve the goals that I have set for myself,” “I will be able to successfully overcome challenges,” and “Even when things are tough, I can perform well.” The New General Self-Efficacy Scale used a 5-point Likert scale to measure the extent to which participants agreed with each item. The Likert scale responses consisted of: (a) *Strongly Disagree*, (b) *Disagree*, (c) *Neutral*, (d) *Agree*, and (e) *Strongly Agree*. Following

the completion of this scale, the mean of the participants scores were calculated to create an overall score with possible values of 1.00 through 5.00, with higher scores representing higher levels of confidence in the ability to perform well. The Cronbach's alpha for the self-efficacy scale was high ($\alpha = .86$) which means that there was strong internal consistency within this scale.

Performance

The current study measured performance in two ways: completeness and correctness. Performance was first measured by assessing the completeness of the assignment. Completeness was assessed by looking at how many course schedules were completed after each trial. Half credit was awarded if participants began constructing a course schedule, but did not complete it during the trial. Performance was also measured by assessing the amount of errors participants made when completing the assignment. Correctness was assessed by looking at how many mistakes each participant made throughout each trial. The more mistakes participants made the higher their correctness score was, but the lower their performance was. Mistakes included missing a mandatory component of a schedule (e.g., missing a section number) or having courses overlap in time within a schedule. All mistakes were scored evenly. Mistakes were not counted if incomplete schedules were missing mandatory components. This means that if a participant began working on a schedule but did not complete writing in all of the mandatory components on the line they were working on, the missing components were not counted as errors because it was assumed that the participant ran out of time rather than forgetting to enter in the missing components.

Demographic Variables

On the questionnaire administered at the beginning of the experiment, participants were asked to provide their demographic information including age and gender. See Appendix for the full version of the questionnaire.

Procedures

This study was conducted in person on a college campus in Northern California. As participants entered the testing facility, they were asked to read the consent notice. Once participants agreed to participate in this study, they were provided with their experiment packet. The packet contained a survey sheet that contained two demographic items and eight items to measure their level of self-efficacy, a strip of paper that contained their goal for the experiment, a course catalog, and a schedule worksheet. Participants were then provided with verbal instructions to open their packets and complete their questionnaire. Participants were instructed to not look at the other items in the packet and to place their pencils down once they had completed the questionnaire. Once all participants completed the questionnaire, they were then able to look at the remaining items in their packet. The first item in the packet after the questionnaire was their goal.

The independent variable in this experiment was the goal type that participants were assigned. Participants were randomly assigned to one of the four goal types: outcome goal, performance goal, process goal, or personal best goal. The statement representing outcome goals was: “The most correct class schedules completed throughout all trials of this experiment is 10. Complete 11 or more correct class schedules throughout all trials of this experiment.” This assigned statement represented an outcome goal because it framed the goal

as exceeding the performance of others and focused on the end point. The statement representing performance goals was: “Your goal for the first trial is to create as many correct schedules as you can. In the second and third trial your goal is to create as many correct schedules as you just did plus 1 additional correct schedule.” This assigned statement represented a performance goal because the goal was set to surpass the participant’s personal performance standards. The statement representing process goals was: “Your goal for the three trials is to discover as many shortcuts or strategies as possible to produce correct class schedules.” This assigned statement represented a process goal because it specified defining strategies that were essential to effectively completing the task. The statement representing personal best goals was: “Create more correct schedules in this trial than you ever have. Use your prior success to help you use better methods to create more correct schedules in this trial.” This assigned statement represented a personal best goal because it focused on self-improvement and prompt participants to outperform their past best performance and efforts.

After reading their goal, participants were informed that their task was to complete course schedules in three eight-minute periods using the goal they were provided in their packet to motivate them. Participants were then informed of the rules that would need to be followed throughout the experiment and were also informed that the rules were printed on the top of each trial page if they needed to reference them throughout the experiment. The rules participants were asked to follow were: “each schedule must indicate the course name, code, meeting time, and section,” “each schedule must consist of 5 courses,” “each schedule must be unique,” “each schedule must contain only one science course,” and “please keep in mind the goal you were given as you complete this task.” Between each trial, participants were

provided a one-minute break. Upon completion of the experiment, participants were thanked for their participation and asked to return their packet to the experimenter on their way out of the testing facility.

The experiment was conducted for three months, where participants could sign-up for time slots on any weekday at their convenience. Once all runs of the experiment were completed, that data were statistically analyzed using Statistical Package for Social Sciences (SPSS) software version 28.

Results

Descriptive Statistics

Descriptive statistics are displayed in Table 2. The numbers displayed in this table represent the average of participants' total scores throughout this experiment. Performance completeness was high ($M = 4.39$, $SD = 1.28$), indicating that participants completed on average more than 4 schedules throughout the entire experiment. This also indicates that most participants were able to complete more than one schedule during each trial. Performance correctness was moderately low ($M = 2.10$, $SD = 2.61$) indicating that most participants made few errors in the creation of their schedules throughout the experiment. While 71.3% ($n = 62$) of the participants made two or fewer errors in the creations of their schedules, there were as many as 15 errors made by participants.

Table 2

Means and Standard Deviations of Performance Completeness and Performance Correctness

	<i>M</i>	<i>SD</i>
Performance Completeness	4.39	1.28
Performance Correctness	2.10	2.61

Tests of Research Questions

Research Question 1 inquired if there would be differences in performance as a function of goal type (outcome, performance, process, and personal-best goals). Table 3 presents the means and standard deviations for performance completeness as a function of goal type and

self-efficacy. A 4 (goal type) x2 (self-efficacy; low vs. high) analysis of variance (ANOVA) was used to test if goal types had a main effect on performance completeness. Table 4 presents the summary of this analysis. There was a significant main effect of goal type, $F(3, 79) = 4.12, p < .01, \eta^2 = .14$. After the significant main effect, analytical comparisons were conducted to determine which goal types were significantly different from each other. Results of these comparisons showed that when performance was measured using performance completeness, those with outcome goals ($M = 4.82, SD = 1.25$) did not differ from those with performance goals ($M = 5.00, SD = 1.31$), $F(1,83) = .23, p = .64$, but performed significantly better than those with both process goals ($M = 3.85, SD = 1.23$), $F(1, 83) = 6.77, p < .01$, and personal best goals, ($M = 4.04, SD = 1.02$), $F(1, 83) = 4.28, p < .05$. Additionally, those with performance goals ($M = 5.00, SD = 1.31$) performed significantly better than both process goals ($M = 3.85, SD = 1.23$), $F(1, 83) = 10.15, p < .01$, and personal best goals ($M = 4.04, SD = 1.02$), $F(1, 83) = 6.93, p < .01$. This means that participants in the outcome and performance goals groups completed significantly more schedules than participants in the process and personal best groups.

Table 5 presents the means and standard deviations for performance correctness as a function of goal type and self-efficacy. A 4 (goal type) x2 (self-efficacy) ANOVA was used to test if goal types had a main effect on performance correctness. Table 6 presents the summary of this analysis. There was not a significant main effect of goal types on performance correctness, $F(3, 79) = 2.21, p = .09, \eta^2 = .08$. Thus, analytical comparisons were not conducted to evaluate the potential difference in performance (i.e., correctness) as a function of goal types

Table 3

Means and Standard Deviations of Performance Completeness as a Function of Goal Types and Self-efficacy

		Goal Type				
		Outcome	Performance	Process	Personal Best	Total
Self-efficacy	High	4.81 (1.31) (n = 8)	5.12 (1.58) (n = 13)	4.09 (1.16) (n = 11)	4.06 (1.43) (n = 17)	4.47 (1.27)
	Low	4.82 (1.03) (n = 11)	4.81 (1.60) (n = 8)	3.65 (1.05) (n = 13)	4.00 (1.45) (n = 6)	4.29 (1.31)
	Total	4.82 (1.25)	5.00 (1.31)	3.85 (1.23)	4.04 (1.02)	

Table 4

ANOVA Summary Table for Performance Completeness as a Function of Goal Types and Self-efficacy

Source	SS	df	MS	F
Self-Efficacy	.78	1	.78	.52
Goal Type	18.57	3	6.19	4.12 **
Goal Type x Self-efficacy	.67	3	.22	.15
Error	118.69	79	1.50	

Note. * $p < .05$ ** $p < .01$

Table 5

Means and Standard Deviations of Performance Correctness as a Function of Goal Types and Self-efficacy

		Goal Type				Total
		Outcome	Performance	Process	Personal Best	
Self-efficacy	High	5.00 (2.83) (n = 8)	3.15 (3.91) (n = 13)	1.55 (1.21) (n = 11)	1.59 (2.62) (n = 17)	2.55 (3.04)
	Low	1.36 (1.63) (n = 11)	2.00 (2.45) (n = 8)	1.31 (1.65) (n = 13)	1.67 (1.86) (n = 6)	1.53 (1.81)
	Total	2.89 (2.83)	2.71 (3.41)	1.42 (1.44)	1.61 (2.41)	

Table 6

ANOVA Summary Table for Performance Correctness as a Function of Goal Types and Self-efficacy

Source	SS	df	MS	F
Self-Efficacy	30.20	1	30.20	4.94 *
Goal Type	40.64	3	13.55	2.21
Goal Type x Self-efficacy	40.26	3	13.42	2.19
Error	483.19	79	6.12	

Note. * $p < .05$ ** $p < .01$

Overall, there was a significant main effect of goal type on performance completeness.

However, there was no significant main effect of goal type on performance correctness.

When performance was measured by completeness, both outcome and performance goals resulted significantly higher at improving performance than process or personal best goals.

Research Question 2 posited that self-efficacy would interact with goal types to affect performance. Participants levels of self-efficacy were measured by calculating the mean of their scores on the 8 items in the self-efficacy scale. Overall scores for this scale ranged from 2.38 – 5.00, ($M = 3.93$, $SD = .54$), with higher scores representing higher levels of confidence in the ability to perform well. To assess the moderating effect of self-efficacy, a median split was used to create low and high self-efficacy groups. Participants with overall scores ranging from 1.00 – 3.75 were placed into a group called low self-efficacy while participants with overall scores ranging from 3.76 – 5.00 were placed into a group called high self-efficacy.

Table 3 presents the means and standard deviations for performance completeness as a function of goal type and self-efficacy. As can be seen in Table 3, there was a slight overall difference in performance completeness between participants with high ($M = 4.47$) and low ($M = 4.29$) levels of self-efficacy. This means that individuals with high levels of self-efficacy completed slightly more schedules than individuals with low levels of self-efficacy

The expected interaction between goal types and self-efficacy was tested through a 4 (goal types) x 2 (self-efficacy) ANOVA. Table 4 presents a summary of the ANOVA results. There was no significant interaction between goal types and self-efficacy, $F(3, 79) = .15$, $p = .93$, $\eta^2 = .01$, indicating that self-efficacy did not interact with goal types to influence performance completeness.

Table 5 presents the means and standard deviations for performance correctness as a function of goal type and self-efficacy. As can be seen in Table 5, there was a slight difference in performance correctness between individuals with high and low levels of self-efficacy who were assigned either outcome or performance goals such that individuals with

high levels of self-efficacy made more errors in the creation of their schedules than individuals with low self-efficacy. These findings were not supported among individuals assigned either process or personal best goals though as there was a very slight difference among the performance correctness of individuals with high and low levels of self-efficacy.

Table 6 presents a summary of the ANOVA results. There was no significant interaction between goal types and self-efficacy, $F(3, 79) = 2.19, p = .10, \eta^2 = .08$, indicating that self-efficacy did not interact with goal types to influence performance correctness.

In summary, results showed that when performance was measured using performance completeness, outcome and performance goals resulted significantly higher performance than process goals and personal best goals. Additionally, levels of self-efficacy only had a significant impact when performance was measured as correctness.

Discussion

The lack of clarity within the parameters of goal setting theory necessitates research on the effectiveness of goal types on performance in the workplace. The purpose of goals in the workplace is to increase motivation and improve performance. Understanding the differences among goal types used in the workplace may better improve the performance of employees by indicating the proper way to frame goals to most effectively improve performance. To understand the efficacy of goal types, the current study examined the effectiveness of four goal types on performance. Furthermore, a moderating effect of self-efficacy between the relationship of goal type and performance was tested.

Summary of Findings

Research Question 1 inquired if there would be differences in performance related to each goal type (outcome, performance, process, and personal-best goals). Results showed that when performance was measured using performance completeness outcome goals and performance goals were significantly greater at improving performance than process goals and personal best goals. These results may be because both the process goals and personal best goals have been recognized as being more effective in long-term goal setting (Burns et al., 2019, Kingston & Hardy 1997). However, when performance was measured by performance correctness there were no significant differences among the goal types.

Research Question 2 sought to understand if self-efficacy would moderate the relationship between all goal types and performance. A two-way ANOVA was conducted to analyze the relationship between goal types, self-efficacy, and performance completeness. Another two-way ANOVA was conducted to analyze the relationship between goal types,

self-efficacy, and performance correctness. In both ANOVAs there was no significant interaction between goal types and self-efficacy. Therefore, there was no support that self-efficacy had a moderating effect on the relationship between goal types and performance.

Theoretical Implications

There are a few theoretical implications of the present study. First, this study has expanded the perspective of goal setting theory in the workplace. Although research on goal setting theory is expansive in the literature (Bryan & Locke, 1967; Locke et al. 1981), goal types being used within the guidelines of goal setting theory in the workplace are nearly absent. This study introduced four goal types that could be used in the workplace in addition to the goal setting theory previously developed by Locke. The results of the present study suggest that there are significant differences among the goal types used to improve performance in the workplace. Though the mixed findings on the effects of goal type on performance completeness and correctness indicate additional research is needed to fully understand the impact of goal types.

Additionally, this study compared the effectivity of four different goal types to enhance performance. This study is the only to date to compare goal types from different disciplines to determine if there is a difference among them in terms of impact on performance. Results indicate that outcome and performance goals are the most effective goal types to enhance performance in the workplace which may be because outcome and performance goals have a stronger effect on short term tasks in comparison to process and personal best goals.

Although goal setting literature has explored self-efficacy as a moderator of the relationship between goal setting and performance (Bra ðen et al., 2004; Burke et al., 2010),

the present study showed that self-efficacy did not significantly interact with goal types to impact performance. This finding suggests that self-efficacy is not related to the task performance aspect of goal setting. Contrary to what Bandura (1988) argued, the findings of this study do not support the belief that self-efficacy should be considered when assessing goal setting. It is plausible that the way performance was measured may impact this relationship.

Practical Implications

One practical implication of this study is that the goal types could be used to enhance performance in the workplace. Outcome and performance goals were found to be more effective in improving performance than process and personal best goals, suggesting employers may identify circumstances where encouraging employees to make SMART outcome of performance goals is more effective than other goal types. Examples of SMART outcome goals that could be used in the workplace include “I want to sell 10% more of our product than anyone in the company ever has by the end of the next quarter” or “I want to have the shortest average response time of everyone on my team this month.” These examples of goals could be altered into SMART performance goals that could be used in the workplace by adjusting the focus to the individual’s perspective: “I want to sell 10% more of our product than I ever have by the end of the next quarter” or “I want to have the shortest average response time I ever have this month.” Additionally, employers can enact training sessions prior to employees creating goals so that they can learn how to use these goal types to further improve their performance.

Another practical implication of this study is that the finding that self-efficacy did not moderate the relationship between goal types and performance, and may provide leaders with a positive perspective towards goal assignment. Because leaders will not have to take their subordinates level of self-efficacy into consideration when creating goals, they can have a more streamlined process in goal creation.

Strengths of the Study

A strength of the present study is its contribution to the goal setting theory research. Most of the research on goal setting theory centers around Locke's SMART goals (Locke et al., 1981). While other disciplines within psychology have looked at goal setting through goal types, this research had previously never transferred to the industrial/organizational psychology literature. This study has helped bridge this gap by applying goal types that have been researched within sports and educational psychology to the workplace.

This study also contributed to the literature on self-efficacy as a moderator. This study found that self-efficacy did not moderate the relationship between goal types and performance. The existing research has only looked at self-efficacy as a mediator of goals and performance (Bandura & Cervone, 1983, Tuckman, 1990). This study expanded the body of research on the relationship between goals and self-efficacy, and indicates a more nuanced relationship that warrants further research.

Limitations of the Study and Suggestions for Future Research

One limitation of the present study was in the design of the goals. There may have been confusion among participants with the wording of the personal best goal. The personal best goal was stated as, "Create more correct schedules in this trial than you ever have. Use your

prior success to help you use better methods to create more correct schedules in this trial.” It may have appeared to participants assigned this goal that they should complete only one schedule per trial and then sit until the time for the trial had concluded. If participants were provided with a short training on the goal type that they were being assigned prior to the beginning of the experiment and were allowed to create their own goal, there may have been a different outcome for this goal type as it would avoid participants misinterpreting their goal. Thus, future research should examine the effect of allowing participants to design their goals.

Another limitation of the present study was in the design of the experiment. Participants who were assigned the process goal were tasked with discovering strategies to improve the number of schedules they had created. The study did not allow for questions or discussions between trials, so participants were not able to verify whether a process they would like to try was allowed. A few participants spoke up during their trial to verify if their method was allowed, so it is possible that if the experiment allowed for questions throughout trials participants would have felt more empowered to try different methods to increase their efficiency in creating schedules. Therefore, future research should examine the incorporation of a participants question section.

An additional limitation of the present study was the lack of a manipulation check. It is not known whether participants understood their goal type. Also, goal commitment is an important factor in goal setting. It is not known whether participants even committed to the assigned goal type. It is possible that the results would have been different if it were

discovered that the participants did not understand or were not committed to their goal. Thus, future research should conduct a manipulation check.

One suggestion for future research is to explore the incorporation of situational trials in the experiment. Similar to how Latham and Seijts (2016) suggested in their paper, the goal types used in this experiment may have certain situations in which they may be more effective at improving performance than others. Therefore, future research should consider adding a situational component to the design of this experiment to measure if there are certain situations in which each goal type may be most effective at improving performance. One suggested situation to consider is having new versus experienced participants complete the experiment to determine if differences in the effectiveness of goal types are dependent on experience. Another suggested situation to explore is having an easy versus difficult task to determine if there is a difference in the effectiveness of goal types dependent on task complexity. This would be a relevant situation to research as it would inform if certain goal types would be more effective to use during different stages of an employee's tenure or for certain task types (Latham & Seijts, 2016).

Conclusion

The present study examined the effect of goal types on performance. Specifically, this study sought to understand which goal types would be more effective at impacting performance. Additionally, the moderating effect of self-efficacy on goal types and performance was tested. The findings of this study suggested that outcome and performance goals were significantly better at improving performance completeness than process and personal best goals. As the nature of work continues to adapt, employers should aim to

incorporate performance or outcome goals in the motivation plans of their employees so as to further improve performance.

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Appendix

Demographic Questionnaire

What is your age?

- a. 18 to 24 years
- b. 25 to 34 years
- c. 35 to 44 years
- d. 45 to 54 years
- e. 55 to 64 years
- f. Over 64 years

What is your gender?

- a. Male
- b. Female
- c. Nonbinary
- d. Prefer to self-describe: _____

Scale Items

Self-efficacy Items

I will be able to achieve the goals that I have set for myself.

When facing difficult tasks, I am certain that I will accomplish them.

In general, I think that I can obtain outcomes that are important to me.

I believe I can succeed at any endeavor to which I set my mind.

I will be able to successfully overcome challenges.

I am confident that I can perform effectively on different tasks.

Compared to other people, I can do most tasks very well.

Even when things are tough, I can perform well.

Experimental Device

ENGL 001A

Course Name: English Composition Code: ENGL 001A Meeting time: T TH 9:30AM - 11:00AM Section: 33932	Course Name: English Composition Code: ENGL 001A Meeting time: M W 11:00AM - 12:30PM Section: 33937
Course Name: English Composition Code: ENGL 001A Meeting time: T TH 11:00AM - 12:30PM Section: 33933	Course Name: English Composition Code: ENGL 001A Meeting time: T 6:30PM - 9:30PM Section: 33938

<p>Course Name: English Composition Code: ENGL 001A Meeting time: T TH 12:30PM - 2:00PM Section: 33934</p>	<p>Course Name: English Composition Code: ENGL 001A Meeting time: T TH 9:30AM - 11:00AM Section: 33939</p>
<p>Course Name: English Composition Code: ENGL 001A Meeting time: M 12:30PM - 3:30PM Section: 33935</p>	<p>Course Name: English Composition Code: ENGL 001A Meeting time: F 9:30AM - 12:30PM Section: 33940</p>
<p>Course Name: English Composition Code: ENGL 001A Meeting time: M W 9:30AM - 11:00AM Section: 33936</p>	<p>Course Name: English Composition Code: ENGL 001A Meeting time: F 3:00PM - 6:00PM Section: 33941</p>

MATH 001

<p>Course Name: College Algebra Code: MATH 001 Meeting time: T TH 12:30PM - 2:30PM Section: 33620</p>	<p>Course Name: College Algebra Code: MATH 001 Meeting time: F 8:00AM - 12:00PM Section: 33625</p>
<p>Course Name: College Algebra Code: MATH 001 Meeting time: M T W TH 10:00AM - 11:00AM Section: 33621</p>	<p>Course Name: College Algebra Code: MATH 001 Meeting time: F 12:30PM - 4:30PM Section: 33626</p>
<p>Course Name: College Algebra Code: MATH 001 Meeting time: T TH 11:30AM - 1:30PM Section: 33622</p>	<p>Course Name: College Algebra Code: MATH 001 Meeting time: M 9:00AM - 1:00PM Section: 33627</p>
<p>Course Name: College Algebra Code: MATH 001 Meeting time: M W 12:30PM - 2:30PM Section: 33623</p>	<p>Course Name: College Algebra Code: MATH 001 Meeting time: T 4:00PM - 8:00PM Section: 33628</p>
<p>Course Name: College Algebra Code: MATH 001 Meeting time: M W 10:30AM - 12:30PM Section: 33624</p>	<p>Course Name: College Algebra Code: MATH 001 Meeting time: M 4:00PM - 8:00PM Section: 33629</p>

COMM 001

Course Name: Public Speaking
Code: COMM 001
Meeting time: M W 7:30AM - 9:00AM
Section: 34024

Course Name: Public Speaking
Code: COMM 001
Meeting time: T 5:00PM - 9:00PM
Section: 34029

Course Name: Public Speaking
Code: COMM 001
Meeting time: M W 7:30AM - 9:30AM
Section: 34025

Course Name: Public Speaking
Code: COMM 001
Meeting time: W 5:00PM - 9:00PM
Section: 34030

Course Name: Public Speaking
Code: COMM 001
Meeting time: M W 9:30AM - 11:30AM
Section: 34026

Course Name: Public Speaking
Code: COMM 001
Meeting time: M W 7:30AM - 9:00AM
Section: 34031

Course Name: Public Speaking
Code: COMM 001
Meeting time: T TH 11:00AM - 1:00PM
Section: 34027

Course Name: Public Speaking
Code: COMM 001
Meeting time: M W 2:00PM - 4:00PM
Section: 34032

Course Name: Public Speaking
Code: COMM 001
Meeting time: T TH 1:00PM - 3:00PM
Section: 34028

Course Name: Public Speaking
Code: COMM 001
Meeting time: M W 3:00PM - 5:00PM
Section: 34033

BIO 010

Course Name: Introduction to Biology
Code: BIO 010
Meeting time: M W 12:30PM - 2:00PM
Lab time: M 2:30PM - 6:30PM
Section: 33741

Course Name: Introduction to Biology
Code: BIO 010
Meeting time: T TH 3:00PM - 4:30PM
Lab time: TH 5:00PM - 9:00PM
Section: 33746

Course Name: Introduction to Biology
Code: BIO 010
Meeting time: T TH 11:00AM - 12:30PM
Lab time: T 1:00PM - 5:00PM
Section: 33742

Course Name: Introduction to Biology
Code: BIO 010
Meeting time: T 8:00AM - 11:00AM
Lab time: T 12:00PM - 4:00PM
Section: 33747

Course Name: Introduction to Biology
Code: BIO 010
Meeting time: M W 10:00AM - 11:30AM
Lab time: W 12:00PM - 4:00PM
Section: 33743

Course Name: Introduction to Biology
Code: BIO 010
Meeting time: TH 12:00PM - 3:00PM
Lab time: 4:00PM - 8:00PM
Section: 33748

Course Name: Introduction to Biology
Code: BIO 010
Meeting time: M W 12:30PM - 2:00PM
Lab time: W 2:30PM - 6:30PM
Section: 33744

Course Name: Introduction to Biology
Code: BIO 010
Meeting time: F 12:30PM - 3:30PM
Lab time: 4:00PM - 8:00PM
Section: 33749

Course Name: Introduction to Biology
Code: BIO 010
Meeting time: T TH 11:00AM - 12:30PM
Lab time: TH 1:00PM - 5:00PM
Section: 33745

Course Name: Introduction to Biology
Code: BIO 010
Meeting time: F 9:00AM - 12:00PM
Lab time: 12:30PM - 4:30PM
Section: 33750

CHEM 002

Course Name: Introductory Chemistry
Code: CHEM 002
Meeting time: M W 11:00AM - 12:30PM
Lab time: M 1:00PM - 4:00PM
Section: 33042

Course Name: Introductory Chemistry
Code: CHEM 002
Meeting time: T TH 2:00PM - 3:30PM
Lab time: T: 4:00pM - 7:00PM
Section: 33047

Course Name: Introductory Chemistry
Code: CHEM 002
Meeting time: M W 11:00AM - 12:30PM
Lab time: W 1:00PM - 4:00PM
Section: 33043

Course Name: Introductory Chemistry
Code: CHEM 002
Meeting time: M W 2:00PM - 3:30PM
Lab time: M 11:00AM - 2:00PM
Section: 33048

Course Name: Introductory Chemistry
Code: CHEM 002
Meeting time: T TH 5:30PM - 7:00PM
Lab time: T 7:10PM - 10:10PM
Section: 33044

Course Name: Introductory Chemistry
Code: CHEM 002
Meeting time: M W 2:00PM - 3:30PM
Lab time: W 11:00AM - 2:00PM
Section: 33049

Course Name: Introductory Chemistry
Code: CHEM 002
Meeting time: T TH 5:30PM - 7:00PM
Lab time: TH 7:10PM - 10:10PM
Section: 33045

Course Name: Introductory Chemistry
Code: CHEM 002
Meeting time: F 11:00AM - 2:00PM
Lab time: 2:00PM-5:00PM
Section: 33050

Course Name: Introductory Chemistry
Code: CHEM 002
Meeting time: T TH 2:00PM - 3:30PM
Lab time: TH 11:00AM - 2:00PM
Section: 33046

Course Name: Introductory Chemistry
Code: CHEM 002
Meeting time: F 11:00AM - 2:00PM
Lab time: 5:00PM - 8:00PM
Section: 33051

ART 095

Course Name: Art Appreciation
Code: ART 095
Meeting time: T 11:00AM - 2:00PM
Section: 32476

Course Name: Art Appreciation
Code: ART 095
Meeting time: M W 2:00PM - 3:30PM
Section: 32481

Course Name: Art Appreciation
Code: ART 095
Meeting time: TH 12:00PM - 3:00PM
Section: 32477

Course Name: Art Appreciation
Code: ART 095
Meeting time: M W 3:30PM - 5:00PM
Section: 32482

Course Name: Art Appreciation
Code: ART 095
Meeting time: M 2:00PM - 5:00PM
Section: 32478

Course Name: Art Appreciation
Code: ART 095
Meeting time: T TH 4:00PM - 5:30PM
Section: 32483

Course Name: Art Appreciation
Code: ART 095
Meeting time: T TH 11:00AM - 12:30PM
Section: 32479

Course Name: Art Appreciation
Code: ART 095
Meeting time: T TH 9:00AM - 11:30AM
Section: 32484

Course Name: Art Appreciation
Code: ART 095
Meeting time: T TH 12:30PM - 2:00PM
Section: 32480

Course Name: Art Appreciation
Code: ART 095
Meeting time: F 11:00AM - 2:00PM
Section: 32485

PSY 001

Course Name: General Psychology
Code: PSY 001
Meeting time: T TH 7:30AM - 9:00AM
Section: 34329

Course Name: General Psychology
Code: PSY 001
Meeting time: M W 3:00PM - 4:30PM
Section: 34334

Course Name: General Psychology
Code: PSY 001
Meeting time: M W 11:00AM - 12:30PM
Section: 34330

Course Name: General Psychology
Code: PSY 001
Meeting time: T TH 6:00PM - 7:30PM
Section: 34335

Course Name: General Psychology
Code: PSY 001
Meeting time: T TH 11:00AM - 12:30PM
Section: 34331

Course Name: General Psychology
Code: PSY 001
Meeting time: W 10:00AM - 1:00PM
Section: 34336

Course Name: General Psychology
Code: PSY 001
Meeting time: T TH 9:30AM - 11:00AM
Section: 34332

Course Name: General Psychology
Code: PSY 001
Meeting time: F 9:00AM - 12:00PM
Section: 34337

Course Name: General Psychology
Code: PSY 001
Meeting time: M W 9:00AM - 10:30AM
Section: 34333

Course Name: General Psychology
Code: PSY 001
Meeting time: F 2:00PM - 5:00PM
Section: 34338

ANT 003

Course Name: Cultural Anthropology
Code: Ant 003
Meeting time: T TH 11:00AM - 12:30PM
Section: 34200

Course Name: Cultural Anthropology
Code: Ant 003
Meeting time: T TH 8:00AM - 9:30AM
Section: 34205

Course Name: Cultural Anthropology
Code: Ant 003
Meeting time: M W 12:30PM - 2:00PM
Section: 34201

Course Name: Cultural Anthropology
Code: Ant 003
Meeting time: T TH 2:00PM - 3:30PM
Section: 34206

Course Name: Cultural Anthropology
Code: Ant 003
Meeting time: T TH 12:30PM - 2:00PM
Section: 34202

Course Name: Cultural Anthropology
Code: Ant 003
Meeting time: F 9:00AM - 10:30AM
Section: 34207

Course Name: Cultural Anthropology
Code: Ant 003
Meeting time: M W 11:30AM - 12:30PM
Section: 34203

Course Name: Cultural Anthropology
Code: Ant 003
Meeting time: F 11:00AM - 12:30PM
Section: 34208

Course Name: Cultural Anthropology
Code: Ant 003
Meeting time: M W 9:00AM - 10:30AM
Section: 34204

Course Name: Cultural Anthropology
Code: Ant 003
Meeting time: F 2:00PM - 3:30PM
Section: 34209

Trial 1

1. each schedule must indicate the course name, code, meeting time, and section
2. each schedule must consist of 5 courses
3. each schedule must be unique
4. each schedule must contain only one science course
5. Please keep in mind the goal you were given as you complete this task

Course Name: Art Appreciation
Code: ART 095
Meeting time: M W 2:00PM - 3:30PM
Section: 32481

Example:

English composition, ENGL 001A, T 6:30PM – 9:30PM, 33938

College Algebra, Math 001, MW 10:30AM – 12:30PM, 33624

Introductory Chemistry, CHEM 002, T TH 2:00PM – 3:30PM, TH 11:00AM – 2:00PM, 33046

Cultural Anthropology, ANT 003, F 2:00PM – 3:30PM, 34209

Art Appreciation, ART 095, MW 2:00PM – 3:30PM, 32481
