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**Effects of Informative Feedback**  
**on the Regulation of Achievement goals**

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**Effects of Informative Feedback  
on the Regulation of Achievement Goals**

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**Report**

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## **Dedication**

I dedicate this to my wonderful wife, Haejoung Kim. She is an amazing friend/mentor and a source of my inspiration. Also, I want to dedicate this report to my three-year old son, Bryan and the newest little girl.

**Effects of Informative Feedback  
on the Regulation of Achievement Goals**

by

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The University of Texas at Austin, 2013

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This proposed study examines whether different levels of informative feedback can change students' achievement goal orientation. A factorial repeated-measures MANOVA will be conducted to investigate changes in levels of trichotomous goals and reading comprehension scores of community college students over one academic semester. I hypothesize that both scores will be responsive to the level of informative performance feedback. Participants who get more information about their performance and a strategy to solve similar tasks will show significantly greater increases in mastery and performance-approach goals and decreases in performance-avoidance goals. In addition, effects of demographic variables on the goal-regulation outcomes (e.g., sex and ethnicity) will be examined. Implications for future research and educational applications are presented. This report also includes an evaluation plan which details the components of the trust building program, a model for the program, and the proposed method to measure the reported outcomes.

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## **Introduction**

Data from the U.S. Census Bureau revealed in 2000 that over 30% of college students in the United States leave after their first year and almost 50% never graduate. Thus, increasing academic success and the retention rate for college students has become both a national and international priority in higher education. What variables are important to predict college students' success and retention? Previous studies have identified two important variables as key predictors of student success: 1) ability, typically measured in terms of nation-wide tests like the SAT or ACT, and 2) prior academic performance like high school GPA (e.g., Vasquez & Jones, 2006; Kohn, 2001). Many researchers believe that another important indicator of success in education is the development of interest in a school or a specific topic, and that a broader definition of success requires consideration of a wider range of predictors (Harackiewicz, Barron, Tauer, & Elliot, 2002; Hidi & Harackiewicz, 2000).

Among the diverse predictors, motivational variables and learning motivation itself may play a principal role in predicting success in college. Researchers have demonstrated that students with high motivation show higher academic performance than students with low motivation (Senko & Harackiewicz, 2005; Spence & Helmreich, 1983). Even in the same schooling context, some students may be intrinsically motivated, whereas others may not be motivated or only extrinsically motivated. Why do they show different motivational status? One reason is that each of them has different beliefs and goals about their performance. Especially, learning motivation is intermediated by individuals' goals and beliefs about their learning in schools (Pintrich & DeGroot, 1990). The learners' value or pursuit goal toward their task should be considered as one of the

important factors that cause learning to be based on intrinsic or extrinsic motivation. These learners' characteristics are referred to as 'achievement goal' or 'goal orientation.' Both have been investigated by developmental, motivational and educational psychologists, especially in relation to learning gains or achievement motivation (Pintrich & Schunk, 2002). The achievement goal construct currently receives the most research attention in the area of competence-relevant motivation. In fact, achievement goal theory has inspired over 1,000 published papers and dissertation in the past 25 years (Hulleman, Schragger, Bodmann, & Harackiewicz, 2010).

Generally, two types of goals have received the most attention: a mastery goal orientation, which involves engagement for the purpose of improvement or mastery; and a performance goal orientation, which involves engagement for the purpose of demonstrating ability or avoiding the demonstration of lack of ability (Elliot & Moller, 2003; Dweck, 1986). Research has provided a big picture of how achievement goals relate to academic beliefs and behaviors (Ames & Archer, 1988; Dweck & Leggett, 1988). Researchers have been interested in studying achievement goals because goal orientation can influence the cognitive processes through some motivational processes and eventually lead to differences in learning achievement and attitudes (e.g., Ames, 1984; Elliot, 2005; VandeWalle, 1997). Little is known, however, about the relations or regulations among achievement goals over time. For example, how might certain achievement goals or instructional settings (treatments) provide a basis for the adoption or change of future achievement goals? This question is especially important with the recent controversy concerning the facilitative nature of performance goals (Midgley, Kaplan, & Middleton, 2001; Urdan & Mestas, 2006).

Although the issue of achievement goal change and regulation is clearly important, it has received little empirical attention in the achievement motivation literature. In the present study, I want to address this oversight, focusing primarily on the foundational question of how students' goal orientation are changed by various educational feedback types they receive in classrooms.

## **Chapter 1: Integrative Analysis**

The proposed study intends to examine the effects of different forms of feedback that participants will receive on regulation of achievement goals. The following literature review begins with a discussion of achievement goal orientations, outlining its definition and classification. After providing this basis for understanding the construct, the effects and role of goal orientation in the classroom will be discussed. And then, I will briefly review how individual achievement goals can be regulated.

Following the review and analysis of goal orientation research, a feedback will be discussed as a particularly educational settings and uses. Similarly, I will explore instructional feedback with overall definitions and then three different perspectives on feedback. Finally, different types (or levels) of feedback and its role in classrooms will be presented.

### **Achievement goals**

#### *Definition of achievement goals*

Achievement goal orientation is a motivational construct that affects how an individual approaches and interprets tasks (e.g., Dweck 1986). Goal orientation is associated with beliefs in the controllability of personal attributes such as intellectual ability (Dweck & Leggett, 1988), how individuals view effort expenditure (Ames, 1992), and how individuals respond to task difficulties or task failure (Dweck & Leggett, 1988). Elliot and Fryer (2008) distilled five basic features of goals. Goals are (a) focused on an object, (b) used to direct or guide behavior, (c) focused on the future, (d) internally represented (cognitively or otherwise), and (e) something the organism is committed to approach or avoid. Achievement goals generally have been considered to be cognitive

representations, rather than implicit needs or drives, with an end state that is centered on competence –either developing (mastery) it or demonstrating (performance) it.

### *Types of achievement goals*

Recent research has focused on identifying different types of goal orientations among students, the motivational processes that are associated with these different goals, and the conditions that elicit them. At first, researchers divided achievement goal orientations into two types: learning goal and performance goal orientations (Dweck & Leggett, 1988); mastery goal and ability focused goal (Ames & Ames, 1981); task involvement and ego involvement goal (Nicholls, 1984); mastery goal and performance goal (Ames & Archer, 1987; 1988). Despite the different terminological uses, some similarities exist. First, most conceptualizations were articulated in the context of a literature emphasizing motives and achievement attributions as explanatory constructs. Competence was viewed as an important component to form the achievement goal construct. Most researchers proffered a comparable achievement goal dichotomy, and the hypothesized effects of each goal were presumed to be quite similar in nature. They tend to view performance/ego involvement goal and learning/mastery/task involvement goal as opposite poles on a single continuum. Finally, they portrayed achievement goals as applicable to both situational and dispositional aspects. Although some researchers tended to focus on situation-specific aspects of goals (e.g., Elliot & Dweck, 1988), others put weight on dispositional goal orientations (e.g., Nicholls, Cheung, Lauer, & Patashnick, 1989). In this proposed study, achievement goal orientation is defined as the behavioral intentional system that decides learning style in this study and is described

based on Ames and Archer's achievement goal orientation term (mastery goal and performance goal).

The major difference between mastery and performance goals is the approach taken by the learners in their learning activities. In the case of mastery goal orientation, they focus on developing ability, seeking task mastery and learning itself. However, learners' demonstrating competence and seeking their normative status characterize the performance goal, and they tend to focus on the negative processes and outcomes. In other words, mastery goal orientation learners attach great importance to the efforts they exert and try to understand novel knowledge and skill acquisition (Ames, 1992; Meece, Blumenfeld, & Hoyle, 1988), whereas performance goal learners concentrate only on their outcome result and demonstrate comparable competence, and hence regard learning activities as a method which can accomplish the previously planned aims (Dweck & Leggett, 1988; Elliot & Dweck, 1988). Therefore, when the mastery goal oriented learners are confronted with task-related difficulties, they can overcome the problems with more effort because they consider their effort as more important factor for success rather than ability (Ames, 1992; Ames & Archer, 1988). However, performance goal learners tend to avoid challenging tasks because of the secure success and attribute task failure to their low ability rather than efforts. Even worse, continuous failure experiences trap them in learned helplessness. These differences between mastery and performance goal are summarized in Table 1.

Table 1. Differences with mastery and performance goal orientations (Elliot, 2005)

Characteristics	Mastery goal	Performance goal
Sense of success	Developing ability, progress, mastery, creativity, innovation, acquisition skill	Getting high grade, achievement, and competence
Evaluation criterion	Absolute inner standards and/or amount of progress	Normative and social comparison
Reason of endeavor	To develop intrinsic valuable thing and mastery	To demonstrate comparable competence
Challengeable task	Pursuit	Avoidance
Failure attribution	Insufficient efforts	Insufficient ability
After failure experience	Do not harm to competence, motivation, and expectancy	Attack self-efficacy easily, Seek another easy tasks

However, Elliot (1999) and his colleagues (Elliot & Church, 1997; Elliot & Harackiewicz, 1996) indicated that the conclusion that mastery goal was more adaptive than performance goal was premature, because dichotomous distinction of mastery-performance orientations ignores the valence of attribute of goals, that is, approach or avoidance motivation. Approach motivation instigates behaviors with desirable outcomes, whereas avoidance motivation drives behavior associated with undesirable

outcomes. They indicated that when these two kinds of motivation valence were taken into consideration with the dichotomous distinction of mastery-performance goal orientations, different types of goals can be identified and show different patterns in learning behaviors and outcomes. Elliot (1997) has proposed a trichotomous hierarchical model of achievement goals that serves as an extension of the mastery-performance dichotomy. In this model, the performance goal construct is bifurcated into approach and avoidance components, while the mastery goal is left unchanged. Whereas a performance-approach goal reflects involvement in an activity in order to demonstrate superiority over others, a performance-avoidance goal focuses on avoiding the demonstration of incompetence relative to others. Mastery and performance-approach goals are construed as an approach orientation, while performance-avoidance goal is considered as an avoidance orientation. This trichotomous goal framework has become popular in academic domains (Duda & Nicholls, 1992) and has been widely used in the related literature (Elliot & MacGregor, 1999; Church, Elliot, & Gable, 2001; Elliot & Harackiewicz, 1996).

Most recently, Elliot and McGregor (2001) conceptualized a “2 x 2 achievement goal framework”, in which four types of goal orientation are derived by both goal dimensions and approach-avoidance dimensions. Mastery-approach goal centers on attaining competence and mastery-avoidance goal focuses on avoiding incompetence when competence is defined in an absolute or intrapersonal standard, such as requirement of the task, one’s own past attainment, or maximum potential attainment. They developed a questionnaire to measure these four goals and used theoretically related constructs to show that these four types of goal have different antecedent and consequence variables,

suggesting that the 2 x 2 goals have different meanings in achievement motivation. However, some studies (e.g., Finney, Piper, & Baron, 2004) showed that the items for mastery-approach goal have high correlations with items tapping mastery-avoidance goal, because these items overlapped meaning in mastery. For this valid reason and lack of consistency, this proposed study adopts the trichotomous goal orientation framework; mastery, performance-approach, and performance-avoidance goal orientations.

#### *Effects of achievement goals in classroom*

Achievement goal orientations not only influence cognitive participation through the motivational process but also produce performance differences and attitudes in learning situations. For example, Elliot and McGregor (1999) demonstrated that performance-approach and avoidance goals were each positive and negative predictors of task performance, and that performance-avoidance goals are linked to test anxiety while taking the exam. Likewise, McGregor and Elliot (2002) found that mastery goals were linked to diverse positive achievement-relevant processes (e.g., challenge appraisals, absorption during preparation), whereas performance-avoidance goals were linked to numerous negative processes (e.g., threat appraisals, anticipatory test anxiety).

In addition, some research reported that mastery and performance goal constructs in the classroom could differentiate students' perceptions of their classroom experiences and learning motivation. For example, when students perceived their class as emphasizing a mastery goal, they were more likely to report using effective learning strategies (information processing, self-planning, self-monitoring), prefer tasks that offer challenge, like their class more, and believe that effort and success covary (Ames & Archer, 1988).

The trichotomous goal framework to achievement motivation has been tested empirically in the education context. Elliot and Harackiewicz (1996), for example, conducted two experiments that manipulated achievement goals and examined the influence of the three achievement goal conditions on intrinsic motivation to solve puzzles. The results of two experiments indicated that performance-avoidance condition undermined intrinsic motivation. In contrast, the effect of performance-approach condition on intrinsic motivation was equivalent to that of the mastery condition, and significantly higher than that of the performance-avoidance condition. Similarly, Elliot and Church (1997) showed that mastery goal predicted intrinsic motivation, performance-approach goal predicted academic performance and performance-avoidance goal undermined both intrinsic motivation and performance. These findings provide further support to Elliot's (1997) argument that mastery and performance-approach goals are more adaptive than a performance-avoidance goal. This argument is also corroborated by a meta-study by Rawsthorne and Elliot (1999) of the experimental literature that has examined the effects of performance and mastery achievement goals on intrinsic motivation. The meta-analysis showed that the undermining effect of performance goals relative to mastery goals was evident only when the experimental procedures induced a performance-avoidance orientation. The mixed findings suggest that the differentiation of the performance goal combining approach and avoidance tendencies has more explanation for the educational data rather than construing performance goal as an omnibus construct.

### *Regulation of achievement goals*

Is an individual's achievement goal stably constant? Or, is it susceptible to change? Both perspectives may be right, because it depends on the learning situation or task which students confront. One reason to anticipate goal stability is that achievement goals represent concrete aims that emerge from personality characteristics such as achievement motives and temperaments (Harackiewicz, Barron, & Elliot, 1998). As a human's personality is not easily changed, it is likely that the individual achievement goal orientation should be stable for a long time.

Some studies suggest that although achievement goals are somewhat stable, there is less stability when students move from one learning environment (i.e., classroom, grade, or teaching methods) to another (Elliot & McGregor, 2001; Meece & Miller, 2001; Stipek & Gralinski, 1996). This is compatible with a social-cognitive perspective that proposes that as contexts change, individuals reevaluate and reconstruct their goals and actions. In addition, achievement goals represent one form of self-regulation, which refers to people's active involvement in generating goals, adjusting their strategies for meeting the goal, monitoring, and evaluating their progress. Thus, several factors or individual perceptions can influence goal changes. Some researchers have suggested that self-efficacy is an important determinant of goals. For example, Schunk (1991) insisted that students are likely to experience an initial sense of self-efficacy for attaining goals. They also are apt to make a commitment to attempt it, which is necessary for goals to affect performance. As they work on the task, they engage in activities they believe will lead to goal attainment: attend to instruction, rehearse information to be remembered, expend effort, and persist. Self-efficacy is substantiated as learners observe goal progress,

which conveys they are becoming skillful. Anderman and Maehr (1994) suggested that goals contribute to perceived efficacy, and that these perceptions mediate outcomes such as performance. More often, however, achievement goal theorists have treated self-efficacy as a moderator between goals and outcomes rather than an antecedent, consequence, or mediator of goals. For example, Elliot and Harackiewicz (1996) showed in a laboratory setting that perceived ability moderated the relations between performance goals and outcomes, whereas this was not found in the relations between task goals and outcomes.

Among diverse educational variables, feedback, particularly performance feedback is the most-researched source of influence on the regulation of goals. It may change individuals' perceived competence, which may facilitate a corresponding adjustment in goal adoption (Senko & Harackiewicz, 2005). Perceived competence has been viewed as a moderator of achievement goal effects, but some researchers considered it an antecedent of achievement goal adoption (Elliot, 1994; Elliot & Church, 1997). Elliot and Church (1997) suggested that people might switch from a performance-approach goal to a performance-avoidance goal after receiving negative competence feedback, or vice versa after receiving positive feedback, because perceived competence should determine whether one frame comparisons against others in an approach or avoidance manner. This change in goal orientations could presumably occur between the mastery goal and the performance-avoidance goal as well. Especially if the evaluative situations emphasize extremely normative competence, then most learners will have high performance-approach goal orientation.

Some research has focused on different types of feedback; product vs. process feedback or effort vs. ability feedback. Mueller and Dweck (1998) compared fifth-grade students' motivation level based on the type of praise they received. They reported that students praised for intelligence were found to care more about performance goals relative to mastery goals than children praised for task effort. That is, the individual feedback about one's performance or learning is one of the powerful instructional techniques to change students' achievement goal orientation and its levels.

Rather than switching between goals, people might simply intensify or reduce their pursuit of one goal without any concurrent adjustments to their pursuit of other goals. For example, a student might enter a class with a strong desire to master the material but later, after earning a poor exam grade, this desire might be lessened without necessarily adopting a new goal in its place. Additionally, with this simpler intensification model of goal regulation, if one pursues multiple goals for an activity, those goals would be regulated independently of one another. For example, if the mastery-oriented student above had also entered the course with a strong desire to outperform his/her classmates, the student could respond to the low grade either by reducing the performance-approach goal striving as well or, instead, maintain high performance-approach goal orientation while reducing only the mastery goals. In sum, according to the intensification of goal regulation, feedback may either affect multiple goals in the same direction or affect one goal but not the others.

## **Instructional feedback**

### *Definition of feedback*

Beyond the specific focus of feedback in education, there is a long, more general history of research on feedback. This is a comprehensive review of existing empirical evidence of feedback types in a formal learning environment. Feedback is an important construct found within many theories of learning and instruction. The term “feedback” is used in a generic sense to describe any of the numerous procedures that are used to tell a learner if an instructional response is right or wrong (Kulhavy, 1977). That is, feedback promotes learning during instruction by providing students with information about their performance. A learning activity accompanied by feedback can maintain or adapt cognitive operations according to how new information about performance matches the learner’s expectations about performance (Bangert-Drowns et al., 1991). Both behavioral and cognitive paradigms of learning incorporate feedback as an essential element.

A critical component of the constructivist paradigm is the role of individuals in constructing their own knowledge and meaning through active interactions and engagements in the learning processes. Vygotsky (1978), through working with children, recognized that greater success in knowledge construction is achieved “under adult guidance or in collaboration with a more capable peer”. In a higher educational setting, this guidance is usually afforded by lecturers or tutors, although peers can also play a critical role in this regard. One of the most effective means of providing such assistance is through strategic and well-planned use of feedback in the assessment process (Sadler, 1989), and the research literature shows that feedback is a key component in terms of promoting learning (Black and Wiliam, 1998).

Overall, we can apply three broad perspectives to examine feedback. First, in a behavioral meaning, feedback may specifically reward or punish very particular prior behaviors and be considered to reinforce correct responses. Based on the Thorndike's (1927) Law of Effect, one might expect positive feedback to be associated with reinforcement and negative feedback with punishment. Reinforcement and punishment facilitate learning and enhance performance. Both positive and negative feedback should improve performance because one reinforces the correct behavior and the other punishes the incorrect behavior. Behavioral studies have used outcome-related feedback types such as *knowledge of result* (KR), *knowledge of performance* (KP), or *knowledge of the correct response* (KCR) (Kulik & Kulik, 1988). For example, several experiments suggested that KR interventions increase performance (e.g., Brown, 1932; Manzer, 1935; Spencer, 1923; Thorndike, 1927). Also, Ammons (1956) reported that KP increases both learning and motivation through his two experiments. Specifically, he stated that "Knowledge of Performance affects the rate of learning and level reached by learning," such that, when there is KP, learning is "almost universally" enhanced. Furthermore, KCR has been shown to be superior to KR from previous studies (Rosa & Leow, 2004; Roper, 1977; Moore & Smith, 1964). Second, in a motivational perspective, feedback is either considered an incentive for successful task completion, or supposed to affect perceptions of incentives, task difficulty competence, and attributions. Some feedback, such as praise, could be considered a motivator that increases a general desirable behavior (e.g., picking up a trash). This definition came from the research (Meyer et al, 1979; Barker & Graham, 1987) that tried to influence the amount of exerted effort through motivation and is strongly related with an evaluative feedback, which will be

discussed later. Third, in an informational meaning (or cognitive viewpoint), feedback might consist of information used by a learner to change performance in a particular direction (rather than just towards or away from a prior behavior). This piece of definition came from information-processing theories. The question of which type of elaborated feedback is the most efficient is of major interest in this point of view. In this study, the informational element will be examined in detail.

### *Information-processing perspective*

The feedback-as-reinforcement perspective was eroded when information-processing theories were adopted and studies began to provide little evidence that feedback following positive responses acts in a reinforcing manner (Anderson, Kulhavy, & Andre, 1972; Bardwell, 1981; Barringer & Gholson, 1979; Roper, 1977). As a consequence, a new concept of feedback was formed, one in which feedback's main function was to provide corrective information. That is, feedback can be conceptualized as information provided by an agent (e.g., teacher, peer, book, parent, self, experience) regarding aspects of one's performance, behavior or understanding. For example, a teacher or parent can provide corrective information; a peer can provide an alternative strategy; a book can provide information to clarify ideas; a parent can provide encouragement; and a learner can look up the answer to evaluate the correctness of a response. That is, feedback provides information for learners' cognitive, behavioral and/or motivational modifications based on a "consequence" of performance. To take on this instructional purpose, feedback needs to provide information specifically relating to the task or process of learning that fills a gap between what is understood and what is aimed to be understood (Sadler, 1989), and it can do this in a number of different ways.

One of the different ways feedback provides information may be through affective processes, such as increased effort, motivation, or engagement. Alternatively, the gap may be reduced through a number of different cognitive processes, including restructuring understandings, confirming to students that they are correct or incorrect, indicating that more information is available or needed, pointing to directions students could pursue, and/or indicating alternative strategies to understand particular information. As Winne and Butler (1994, p34) claimed, “feedback is information with which a learner can confirm, add to, overwrite, tune, or restructure information in memory, whether that information is domain knowledge, meta-cognitive knowledge, beliefs about self and tasks, or cognitive tactics and strategies”.

#### *Types and levels of feedback*

Numerous studies have focused on the types and effects of feedback as an independent or dependent variable with different perspectives in educational settings. Hattie and Timperley (2007) argued that the focus of the feedback is critically important and has four major levels; feedback about the task (FT), about the processing of the task (FP), about self-regulation (FR), and about the self as a person (FS). The FT is the most common of all and often called corrective feedback or knowledge of results, and it can relate to correctness, neatness, behavior, or some other criterion related to task accomplishment. The FP is more specific to the processes’ underlying tasks or relating and extending tasks. Thus, FP induces a deep understanding of learning to students. In contrast, the FR includes six major skills, which are the capability to create internal feedback and to self-assess, the willingness to invest effort into seeking and dealing with feedback information, the degree of confidence or certainty in the correctness of the

response, the attributions about success or failure, and the level of proficiency at seeking help. Finally, FS contains little task-related information and is rarely converted into more engagement, commitment, to the learning goals, or enhanced self-efficacy, and is the least effective for deep processing and mastery tasks.

*Evaluative feedback.* One of the most well-known and used types of feedback in educational settings is evaluative feedback which is defined as feedback that expresses another's (generally, teacher, parents or important others) approval or disappointment in a receiver's behavior or performance attempt. That is, evaluative feedback goes beyond simple acknowledgment of the performance attempt or outcome to reveal the other's affective evaluation of the performance. Praise (e.g., "Way to go! That was excellent!") following a performance success and criticism (e.g., "Come on, that was terrible!") following mistakes are specific examples of evaluative feedback and are similar to the categories of reinforcement and punishment.

The role of evaluative feedback as a source of competence information has been specifically examined in the academic domain. Meyer et al. (1979) and Barker and Graham (1987) have examined the role of evaluative feedback, in the form of praise and criticism, provided by the teacher. In these studies, participants of various ages evaluated the ability of other children after watching them perform equally well on a task but having received different types of feedback from the teacher. For example, Barker and Graham developed a series of video taped scenarios. For half of the scenarios both students generated the correct answer to the problem, while the other half of the scenarios showed each of the students providing an incorrect answer. In the scenarios where the students both answered the problem correctly, the teacher provided one student with

praise (e.g., “Great job!”) while the other student was given neutral feedback (e.g., “Correct”). The neutral feedback category was used as a control condition and was operationalized as simple responses by the teachers that did not go beyond what was needed to indicate knowledge of results (Barker & Graham, 1987). In conclusions where the students both answered the problem incorrectly, one student was criticized by the teacher (e.g., “Come on, what are you doing? The correct answer is 9!”), whereas the other student received neutral feedback (e.g., “No, that is not the correct answer”). After viewing these videotapes, the participants were asked to rate the ability and effort of each of the students. The results from these two studies indicated that the evaluative feedback (i.e., praise and criticism) provided by the teachers in an achievement setting served as an important source of competence information. However, the strength or durability of the effect could be different based on the students’ age and cognitive development. That is, the impact of evaluative feedback on college students is less effectively in terms of academic competence and motivation than its impact on younger students.

*Immediate VS delayed feedback.* Research on feedback timing is one of the most popular research areas, encompassing a variety of evaluation approaches and experimental designs. Previous research on the optimal timing of feedback has yielded a conflicting body of literature (Butler, Karpicke, & Roediger, 2007; Sturges, 1972), but the main point of contention centers on how the timing of feedback enables learners to correct errors. Some researchers (e.g., Dihoff, Brosvic, & Epstein, 2003) argued that immediate feedback (i.e., supplied as soon as a student has responded to a question) promotes retention of learned information. One idea, from behaviorist theories of reinforcement, is that feedback must be given immediately in order to eliminate incorrect

responses and reinforce correct responses (e.g., Skinner, 1954). This position predicted that the efficacy of feedback would decrease substantially as the delay before the presentation of feedback increased. Those who argue for immediate feedback assert that a test procedure that does not employ immediate feedback is likely to foster misconception rather than further learning.

Others believed that delayed feedback is more conducive to learning (Schroth & Lund, 1993; Swindell & Walls, 1993). Proponents of delayed feedback suggested that incorrect responses must be allowed to dissipate or they will interfere with the learning of correct responses (e.g., Kulhavy, 1977). In addition, they believed that it is more effective than immediate feedback because of the delayed retention effect, a phenomenon in which learners who have feedback delayed for some period of time purportedly recall significantly higher than subjects who receive feedback immediately following a learning assessment activity (e.g., Swindell & Walls, 1993). The general results of these investigations were that at acquisition or immediate retention there is no significant difference between delayed and immediate feedback but on later retention, delayed feedback is superior. They argued that information or learning is better retained when learned through repeated presentations that are distributed as opposed to massed (Schmidt & Bjork, 1992).

*Norm VS criterion-referenced feedback.* In terms of assessment method, feedback can be classified into norm-referenced and criterion-referenced feedback. A norm-referenced test is an assessment that yields an estimate of the relative position of the tested individual in the specific population. The estimate is derived from the analysis of test scores and possibly other relevant data from a sample drawn from the population. In

contrast, criterion-referenced tests, which are frequently used by teachers to foster individual learning, compare each student's performance to some pre-established criteria, often in the form of specific learning objectives. Students' scores are evaluated and individual feedback is given by the degree of their mastery on these objectives.

Some studies have focused on the different effects of two types' feedback or assessment on cognitive achievement, learning motivation (e.g., engagement, intrinsic motivation) or emotional variables (e.g., test anxiety). For example, Weiner and Schneider (1971) investigated the effects of normative feedback delivered while subjects were performing on a paired associate and a serial learning task. In this study, subjects with high achievement orientation performed better when given the below-norm feedback than when given the above-norm feedback, while subjects with low achievement orientation did better when given the above-norm feedback than when given the below-norm feedback. In these days, norm-referenced feedback is considered as detrimental to students' intrinsic motivation because it focuses on measuring not individual gain or growth but between-individual differences and induces excessive competition (e.g., Covington & Omelich, 1979; Slavin, 1980).

*Informative feedback.* In the late 1960s, the dominant position on feedback held that the post-response information itself acted as a type of "reinforcer," functioning to increase the probability of a correct response occurring at some later point in time (Kulhavy & Stock, 1989). This strong position developed from the association of feedback and operant psychology through the medium of the teaching machine (Skinner, 1968). As discussed above, however, the adoption of information-processing perspective opened the door for many new issues to be examined. This approach weakened the

influence of operant notions about instructional research, mainly because information perspectives provided greater explanatory power – especially in studies of feedback. The difference between these two notions of how feedback works was essentially a contrast between open- and closed-loop models of behavior (e.g., Talyzina, 1981). In an open-loop configuration, the operating activity of the system is not influenced by input information, and there is a strictly lineal flow between input and output markers. Hence, behavioral responses can be predicted directly by knowledge of stimulus content, which is exactly the case in the operant approach. On the contrary, closed-loop systems contain mechanisms that allow the system to change depending on the nature of input information (Kulhavy & Stock, 1989).

The main predictive difference between the open- and closed-loop conceptions lies in the way the two systems react to what they perceive as error messages. In the open-loop (operant) approach, the appearance of correct feedback following an incorrect response by definition has no effect on the learner. Hence, errors and any effects they might have within the instructional environments, are ignored and attention is paid solely to correct responding. In closed-loop systems, however, errors are of central importance, because such systems have primary mechanisms for correcting them. Therefore, closed-loop conceptions of the feedback process led to experiments in which the analysis and correction of errors became the major empirical goal (Anderson, Kulhavy, & Andre, 1971; Kulhavy & Parsons, 1972).

Cognitive theory would assert that information is what is learned and would object to behavioral theory's postulation that it is the responses that are learned and a lot of research has been conducted based on this perspective. "A cognitive approach implies

that learning from instruction is scientifically more productively studied as an internally, cognitively mediated process than as a direct product of the environment, people, or factors external to the learner” (Wittrock, 1978, P. 15). For example, Kulhavy and Anderson (1972), and Phye, Gugliemella, and Sola (1976) have marshaled evidence for the role of informative feedback in the facilitation of classroom learning through the correction of previous errors. Recently, several studies based on the informational-processing theory have indicated that positive and information feedback enhances perceived competence and intrinsic motivation (e.g., Amorose & Weiss, 1998; Amorose & Smith, 2003).

Informative feedback refers to a response, either to a performance success or mistake, which provides skill-relevant information about the performance attempt that is designed to instruct the learners in some way. Informative feedback can serve two functions. In the case of a correct answer, feedback serves to confirm the correctness of the response. In the case of an error or mistake, feedback would provide information that could be used to correct the error. Consequently, informative feedback would be corrective at any stage depending upon the nature of the feedback. Experimental studies have shown that informational feedback enhances intrinsic motivation through the enhancement of perceived competence and performance (Vallerand & Reid, 1984). They manipulated feedback by making verbal comments to subjects suggesting that they were doing either well or poorly. The results showed that success feedback enhanced intrinsic motivation while lack of success feedback reduced it. Additionally, through a more in-depth analysis of the results the experimenters were able to show that it was not the effect

of the feedback per se, but rather it was the effect of information on the subjects' perceptions of competence that moderated changes in intrinsic motivation.

The informational component of a feedback may consist of further information necessary to progress when solving a task. As previous studies showed, this further information has to be determined carefully. For a simple discrimination task (e.g., assigning colored objects to two boxes), feedback providing just simple knowledge about the result (e.g., right or wrong) would be enough to correct wrong assignment, whereas for a verbal learning task in a multiple choice format knowledge about the correct response together with the item stem was found to be sufficient information (Phye & Bender, 1989). For more complex tasks which do not provide the possible answers in a multiple choice format (e.g., writing task, solving mathematical questions or concept formation tasks), knowledge about the correct response would provide task solutions, but would not promote transfer or the acquisition of metacognitive strategies and task processing skills. Here information like knowledge about mistakes (e.g., type of mistake, explications to the mistakes), or knowledge of how to proceed (e.g., hints about useful rules or strategies) should be provided.

There is some inconsistency of feedback effects on achievement goal orientations and a lack of strong theoretical assumptions on the mechanisms of their interactions. Specific contingencies of informative feedback in interaction with achievement goals have not been closely investigated yet, and their joint effect on performance and motivation has not been approached. In this proposed study, I will attempt to illuminate the effects of informative feedback on the regulation of participants' academic goal orientation while controlling the level of information in feedback.

## **Chapter 2: Proposed Research Study**

### *Statement of Purpose*

Diverse theorists and researchers have investigated achievement goal orientation, because the concept is very important and useful to explain human performance and motivation. Although most studies have tried to determine motivational and cognitively associated variables' differences depending on goal orientation, there is little research to date about relations between different instructional treatments and changes in goal orientation. This study will mainly focus on the effects of diverse educational feedback types aimed at regulating students' achievement goal orientations and will use a pre-and posttest quasi-experimental design. The reason that this research focuses on feedback as an independent variable is that instructional feedback is one of the most widely-used and easily implemented instructional methods in traditional schools and colleges. In particular, in this research proposal I adopt the trichotomous goal orientation conceptualized by Elliot and Church (1997) and use four different levels of feedback in order to measure possible differences in the level of each goal orientation between two different time phases by each feedback condition.

A two-way repeated multivariate analysis of variance (MANOVA) with time (two levels) as the within-subjects factor and different feedback types (four levels and control) as the between-subjects factor will be conducted to examine change in the level of achievement goal orientations and the reading comprehension test scores over one whole-academic semester.

### Chapter 3: Research Questions

This proposed study will address the following research questions:

- I. Achievement goal orientation
  1. Compared to the control group (no feedback), does each experimental condition reveal changes in participants' goal orientation?
    - a. Is there an interaction between feedback conditions and time for a change in mastery goal orientation?
    - b. Is there an interaction between feedback conditions and time for a change in performance-approach goal orientation?
    - c. Is there an interaction between feedback conditions and time for a change in performance-avoidance goal orientation?
  2. Are there any significant differences in the changing level of participants' achievement goal between feedback types based on the demographic variables (sex, ethnicity, and first generation in college)?
    - a. Are there any differences between male and female in the changing level of participants' achievement goal based on feedback types they get?
    - b. Are there any differences between Hispanic and non-Hispanic groups in the changing level of participants' achievement goal based on feedback types they get?

- c. Are there any differences in regulation of goal orientation over time between first-generation in college and non first-generation groups?

II. Nelson-Denny reading comprehension

3. Compared to the control group, participants in at least one of the experimental conditions will demonstrate significant change in reading comprehension scores.
4. Exploratory question: will there be differences between demographic variables (sex, ethnicity, and first-generation) in interaction effects of feedback type and time on reading comprehension scores.

## Chapter 4: Method

### Participants

To minimize the instructor's effects, the researcher will get participants from one community college in Texas, because a four-year college and large research-oriented university generally does not allow one instructor to teach multiple sections of the same course during the same semester. Using the G\*Power program (Bühner, Erdfelder, & Faul, 1997), a power analysis was conducted to determine the proper sample size for this study. Using Cohen's medium effect size ( $d=.25$ , Nelson, Rosenthal, & Rosnow, 1986), moderate power of .80, and the alpha level of .05 showed that the required sample size is 121. However, considering the very high dropout rates of students in community college, approximately 180 students will be asked to participate in the fall semester. Inclusion criteria for participation include (a) being a first year student in Introduction to the Humanities (a high-enrollment required course for all first-year students), (b) being currently enrolled in the Humanities courses with the same instructor, (c) being English speaking (the reason for this criterion is that the main task is English reading comprehension and all questionnaires are only available or validated in English.).

### Measures

Participants in the experimental groups and the control group will be measured two times: (1) before interventions and (2) after interventions.

#### *Achievement goals*

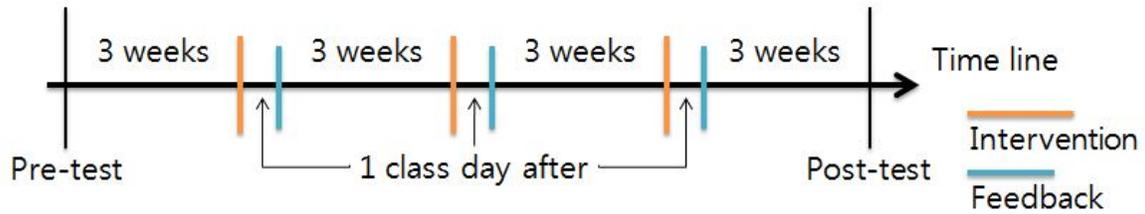
An achievement goal orientation questionnaire proposed by Elliot (1997) will be used to assess participants' adoption of mastery, performance-approach, and

performance-avoidance achievement goals in Humanities class. This scale consists of 18 items, 6 for each type of achievement goal (see Appendix-A). Sample items are: 'I want to learn as much as I can in this class' (mastery goal, Cronbach's  $\alpha = .89$ ); 'I am striving to demonstrate my ability relative to others in this class' (performance-approach goal, Cronbach's  $\alpha = .91$ ) and 'I just want to avoid doing poorly in this class' (performance-avoidance goal, Cronbach's  $\alpha = .77$ ). The responses will be given on a 7-Likert scale (1= totally disagree; 7= totally agree).

#### *Nelson-Denny reading test*

The Nelson-Denny test is a reading comprehension test first developed in 1929 and has been revised multiple times. It has been used nationally as an indicator for students who have trouble with reading so they can be evaluated with respect to future reading progress and academic achievement. The reading comprehension test comes in with two equated forms (G and H) that allow convenient pre- and post-testing of reading progress. The test has two different forms and each takes 20 minutes to complete. Each form is divided into two sections: (1) Vocabulary, (2) Reading comprehension. It consists of seven passages of high school and college level material with 38 multiple-choice questions. The passages were chosen from humanities, science and social science texts (see Appendix-B).

## Procedure



*Figure 1. Time line for the research*

### *Pre-assessment*

The first day of class, participants will be briefed about the experiment by the principal researcher and asked not to discuss this information with other students. Participants will receive information that the experiment would continue for a whole semester and they can withdraw without penalty at any time. Informed consent forms and demographic variables will be obtained from participants before the beginning of the experimental procedures. Demographic information will include their sex, ethnicity, primary language, and first generation in college. Subsequently, they will be asked to complete one form of Nelson-Denny (half will complete Form G and the other for Form H) reading test for 20 minutes and then allowed 10 minutes to finish the goal orientations questionnaires. After 3 weeks, 6 weeks, and 9 weeks of class, I will be back with another in-class reading task for participants to complete. At that time, they will get feedback about their performance based on experimental group or no feedback for control group. All participants from each condition will respond to the test and related items under the supervision of the researcher and the whole procedure for each assessment will last approximately 35 minutes.

### *Intervention*

Considering that giving feedback may be an important strategy to change and regulate students' achievement goals, an intervention phase is designed for participants to get acquainted with different levels and types of feedback for their reading comprehension test. In this proposed study, only the reading comprehension part of the Graduate Record Examinations (GRE) has been chosen for the intervention task and its feedback because most college students do not have experience in taking the GRE. However, the researcher will pick the passages with an easier level difficulty because the GRE is one of the most challenging tests in terms of measuring reading comprehension. Participants will receive the first reading passage and its associated questions (6 to 7 items similar to those on the Nelson-Denny Reading Test) for 10 minutes 3-weeks after pre-assessment. Then, the investigator will give each participant feedback according to his/her experimental condition during the next class session. All feedback and related information will be written by the researcher and handed out individually. Similarly, they will get two more reading interventions and feedback each after three weeks.

*Experimental group.* This proposed research uses four different experimental conditions; simple feedback (SF), short informative feedback (SIF), long informative feedback (LIF), and strategies with long informative feedback (SLIF). First of all, participants will receive only the information whether they respond right or wrong for each question in the SF condition. Providing the knowledge about the result will provide a little information or task solutions, but will not promote transfer or the acquisition of specific strategies and skills for solving a task. This might be considered as low information in feedback. Participants will only be told if their response is right or wrong,

and if it is wrong, they will be told why their answer is not correct in the SIF condition (e.g., Your answer is incorrect because the 3<sup>rd</sup> paragraph contains the differences between two species). If they respond correctly, the researcher will not provide any additional feedback or information. In the LIF group, besides the knowledge about the result (right/wrong) and the knowledge about mistakes, subjects will receive the same amount of information in the case of correct responses (e.g., Your answer is correct. The 2<sup>nd</sup> paragraph shows that Chimpanzee and Orangutan have different behavior for their mating). Finally, participants in the SLIF condition will get a hint or strategy (e.g., To answer the question about the purpose of this passage, you need to use a “skimming strategy” so you can quickly identify the main idea of the text. For example, you can read the first and last paragraph using headings or consider reading the first sentence of each paragraph.) to help you answer comprehension questions.

*Control group.* Participants (approximately 35 students) who are assigned to the control (without intervention) condition will complete the questionnaire at the same time points as the experimental group participants (pre- and post-assessment). But, subjects in this condition will not receive any feedback during the three GRE reading tasks. They will get only the reading passages and the same questions as the students in the experimental conditions to practice for 2<sup>nd</sup> Nelson-Denny reading test.

#### *Post-assessment*

The post-experimental assessment will take place the 12<sup>th</sup> week of class. They will be asked to perform the other form of the Nelson-Denny reading test for 20 minutes and then allowed 10 minutes to finish the goal orientation questionnaire.

Counterbalancing for the Nelson-Denny reading test will be performed to help address carryover effects.

## Chapter 5: Proposed Analysis

Descriptive statistics for pre- and posttest goal orientation and reading comprehension scores will be obtained for the entire sample by feedback types. To test research hypotheses, separate 5 X 2 (feedback conditions by measure time) repeated MANOVAs will be conducted for the each goal orientation measure for the following reasons. First, a repeated-measures design is more robust in minimizing within-subject error variance than a standard MANOVA, which increases the power of this study in detecting differences between experimental groups, if differences are present (Stevens, 2007). Second, MANOVA can help protect the inflation of Type I error, while analyzing with several repeated ANOVAs increase the overall alpha level. Third, the dependent variables of the proposed study are conceptually related. Finally, in order to investigate the interactions among the experimental conditions and achievement goals, a repeated MANOVA method should be utilized. If the results are significant, a series of repeated measure ANOVAs and post-hoc comparison tests will be performed to explore the mean differences. The dependent variables for each of these analyses are the mean ratings of three different goal orientations and the scores of the Nelson-Denny reading comprehension test. Significant effects will be followed by Bonferroni post-hoc comparisons to determine specifically where any differences emerged. Effect sizes are calculated to determine the meaningfulness or strength of the results.

## **Preliminary analysis**

### *Assumptions*

Preliminary analysis will be conducted to investigate that data meet the following three MANOVA assumptions. First, the multivariate analysis assumes homogeneity of variance and covariance (sphericity assumption) among the repeated measurements. This assumption is a multivariate generalization of homogeneity of variance-covariance for a single dependent variable. This requires that all variances of the repeated measurements are equal, and that all correlations between the pairs of repeated measurements are equal. In order to check this assumption, Levene's Test of Equality of Error Variance and Box's Test of Equality of Variance Covariance will be performed. MANOVA is robust to violations of homogeneity of variance-covariance matrices if groups are nearly equal size (sample number of the largest group is no more than 1.5 times the number of the smallest group). Second, the multivariate normality assumption, which implies that the sampling distribution of means of the dependent variables in each cell and all linear combinations of them are normally distributed, will be checked with each condition's skewness and kurtosis through a Kolmogorov-Smirnov test. In most cases, MANOVA is robust with respect to violation of this assumption, especially if there are at least 20 participants in the smallest cell (Tabachnick & Fidell, 2007). Finally, independence of the observation will be examined for this study. The data set of this proposed study is not likely to meet the independence assumption, but this is not a serious problem. The reason is that participants in each experimental condition will be assigned from the same college and there is not any collaboration and interaction with peers and instructor. In addition, if a

more stringent alpha level (.01) would be used, the intraclass correlation issue can be solved (Stevens, 2009).

### **Achievement goal orientations**

*Research question 1.* My main goal of this proposed study is to investigate whether participants' achievement goal orientation will be changed or regulated based on the feedback type they get in the classroom. Compared to the control group, does each experimental condition have changes in participants' goal orientation?

*Hypothesis 1.* Over time, there is at least one experimental condition that will influence participants' levels of goal orientation compared to the control group.

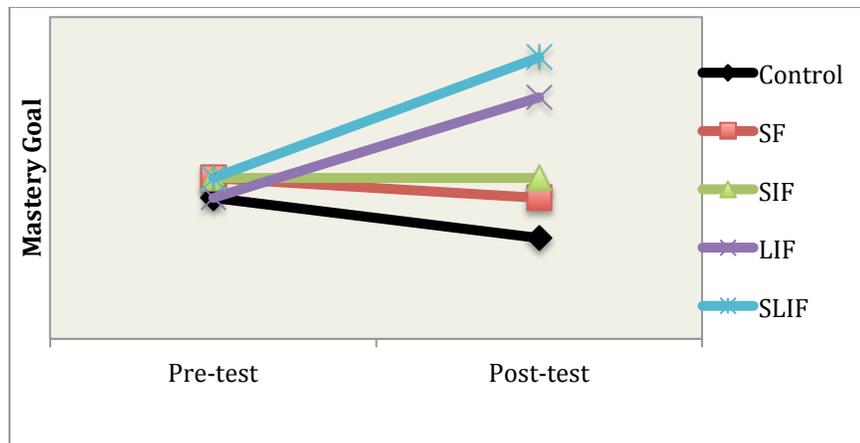
*Rationale 1.* The main goal of this study is to examine if participants' achievement goals will be changed by the feedback type which they get. The investigation of the analysis for the overall effects will be conducted before finding significant differences in goal orientation changes between times within each feedback condition. It is expected that there is at least one significant multivariate test statistics (here Wilk's lambda( $\lambda$ s)). This suggests that at least some changes for each goal orientation are significantly different depending on the feedback that participants get.

*Analysis 1.* A repeated measures MANOVA with one between-subjects factor (feedback type) and one within-subject factor (time; pre- and post-test) will be conducted to investigate possible differences between participants on three dependent variables (mastery, performance-approach, and performance-avoidance goals) using an alpha level of .05 as the criterion for statistical significance. The overall null hypothesis can be rejected depending on its associated Wilk's  $\lambda$  s.

Though the multivariate test informs us of the significance of at least one condition, it is unclear from the multivariate test for which individual comparison the observed mean differences are significant. In order to determine the significance of these differences, a series of 5 x 2 repeated measures ANOVAs, each with a between-subjects factor of feedback condition and time for each goal orientation measure, will be conducted.

*Research question 1-a.* Is there an interaction between feedback conditions and time on changes of mastery goal orientation?

*Hypothesis 1-a.* It is hypothesized that there will be an interaction between feedback condition and time on changes of mastery goal orientation. Participants in LIF and SLIF are expected to show a significantly larger increase in the level of mastery goal orientation than participants in the other groups.



*Figure 2. Mastery Goal*

*Rationale 1-a.* Although there are many scientific studies about goal orientations and theoretical suggestions for informative feedbacks, I could not find a study that has investigated the effects of informative feedback on mastery goal orientation. This study will address this empirically. It is expected that participants in LIF and SLIF conditions

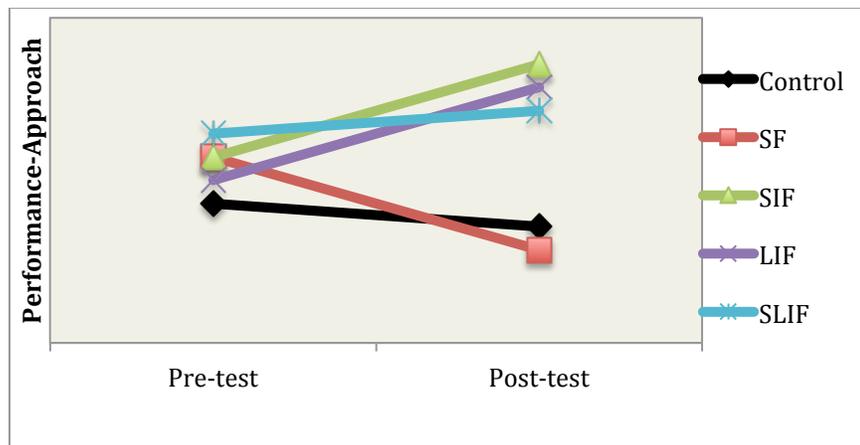
will show a significant increase in their mastery goal level. Students with high mastery goals have been found to focus on developing their ability and progress (Elliot, 2005). It is also interesting to note that even in some of the studies that have found positive effects of performance-approach goals, mastery goals have been associated with even more positive outcomes. Thus, giving task-related information and strategies regardless of success, might enhance participants' mastery goal orientation level. Through the study intervention, they can focus on the task itself not the results. In addition, this may make them less afraid of challenging a difficult task and be able to sustain their motivation to learn. Especially, students in the SLIF group will show a higher increase than those in the LIF group because they consider ability to be malleable and controllable. According to Dweck and Leggett (1988), when students view their intelligence or ability as controllable, they tend to adopt mastery goals to develop their ability.

*Analysis 1-a.* Hypothesis 1-a will examine the interaction effect of experimental condition and time in five groups on mastery goal orientation. The different patterns in mastery goal will be compared in five feedback conditions over time. Much like with the multivariate omnibus test, univariate ANOVA follow-ups do not provide specific mean differences, but rather overall group effects for the time points by any of the effects of interest. In order to investigate the specific mean differences, a following post-hoc test will be conducted. Often it is desirable to place limits on the chance of one or more Type I errors occurring within a specific family of related hypothesis tests. There are two acceptable and general ways - Bonferroni and Scheffe tests- to reduce the error rate (Bird & Hadzi-Pavlovic, 1983). In order to prevent alpha inflation at this level of the analysis, a Bonferroni correction for multiple comparisons will be applied in this proposed study.

These comparison tests will show that participants in LIF and SLIF condition have a significant increase in mastery goal orientation over time and there are not significant differences among the other three conditions in the change of mastery goal level.

*Research question 1-b.* Is there an interaction between feedback conditions and time on performance-approach goal orientation?

*Hypothesis 1-b.* It is hypothesized that there will be an sinteraction between feedback condition and time for a change of performance-approach goal orientation. Participants in SIF and LIF are expected to show a significant increase, whereas participants in the SF condition will have a significant decrease in the level of performance-approach goal orientation.



*Figure 3. Performance-Approach Goal*

*Rationale 1-b.* A number of studies have investigated the relation between performance-approach goals and the use of cognitive, metacognitive, and self-regulatory strategies, and the results have been reasonably consistent. Wolters (2004) found a positive association between performance-approach goals and strategy use in English, social studies, and mathematics. Thus, it is expected that the informative feedback can enhance the level of performance-approach goals. And, both informative feedback

conditions are designed to make participants focus on high achievement in the task. For example, performance-approach goals have been associated with adaptive outcomes such as positive self-concept, affect, attitudes, and the valuing of academic work (Pajares, Britner, & Valiante, 2000; Wolters, Yu, & Pintrich, 1996). However, receiving only simple feedback could decrease participants' performance-approach goals. Particularly, if students feedback that they are wrong continuously, their approach goal orientation should decline.

*Analysis 1-b.* In Hypothesis 1-b, the interaction effects of feedback type and time on the regulation of performance-approach goals will be explored. In order to investigate the specific mean differences and significant interaction pattern, a post-hoc test with Bonferroni correction will be conducted. It is anticipated that participants in the SIF and LIF conditions will have a significant increase in performance-approach goal orientation versus the other experimental conditions and that there will be a significant decrease in the SF group.

*Research question 1-c.* Is there an interaction between feedback conditions and time on performance-avoidance goal orientation?

*Hypothesis 1-c.* It is hypothesized that there will be an interaction between feedback condition and time on regulation of performance-avoidance goal orientation. Students in the SF condition are expected to show a significant increase in the level of performance-avoidance goals and the participants in the LIF and SLIF will show a significant decrease in their avoidance goals.

*Rationale 1-c.* Covington (1992) has described the strategies students use to protect self-worth when they pursue or perceive performance goals. Self-handicapping

involves purposefully withdrawing effort (procrastinating, fooling around with friends instead of studying) so that if subsequent performance is low, those circumstances, rather than lack of ability, will be seen as the cause. In a study by Ryan, Hicks, and Midgley (1998), when students perceived the classroom as a competing situation and/or there is not enough information about their performance, students generally increased in performance-avoidance goal orientation and decreased in intrinsic motivation. That is, participants in the SF condition are expected to have greater levels of performance-avoidance goals.

*Analysis 1-c.* In this hypothesis, the interaction effect of feedback type and time on performance-avoidance goals will be examined with a repeated measures ANOVA test. If there are significant interactions found, Bonferroni post-hoc tests will be performed to investigate the specific mean differences. It is expected that participants in the SF condition have a significant increase in performance-avoidance goal orientation and LIF and SLIF groups will show a significant decrease in their avoidance goal orientation.

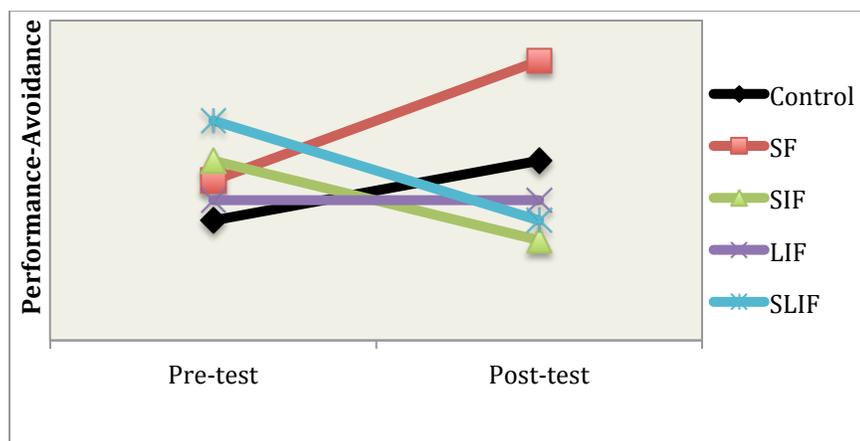


Figure 4. Performance-Avoidance Goal

## **Nelson-Denny reading comprehension test**

*Research question 2.* The learning task chosen for this study is reading comprehension. The feedback groups will receive varying amounts and types of feedback while the control group will simply receive 3 additional hours of reading time with no feedback. This research question addresses possible reading comprehension effects of the four forms of student feedback used in the study. Compared to the control group, are there any changes across time based on the type of feedback students received. It is expected that one or more significant interactions between feedback types and time will be found.

*Hypothesis 2.* Over time, there is at least one experimental condition which can significantly influence on participants' reading comprehension scores compared to the control group. There are only main effects for reading comprehension scores not any interactions between experimental conditions and time.

*Rationale 2.* A lot of studies have reported that instructional feedback enhances the performance of the diverse domain including reading comprehension (e.g., Alber-Morgan, Ramp, Anderson, & Martin, 2007). Particularly, the information in feedback takes an important role for students to monitor their learning progress and increase the performance through self-regulation process (Butler & Winne, 1995). Schunk (1989) reported that effective use of cognitive and metacognitive strategies, progress monitoring, and management of time and study environments are typically attributed to self-regulated and students. In addition, several studies have reported that information feedback enhances intrinsic motivation through the enhancement of perceived competence (Vallerand & Reid, 1984; Amorose & Smith, 2003). Thus, it is anticipated that

participants in the SIF, LIF, and SLIF conditions will show significantly higher increase in reading comprehension score over time than the other groups.

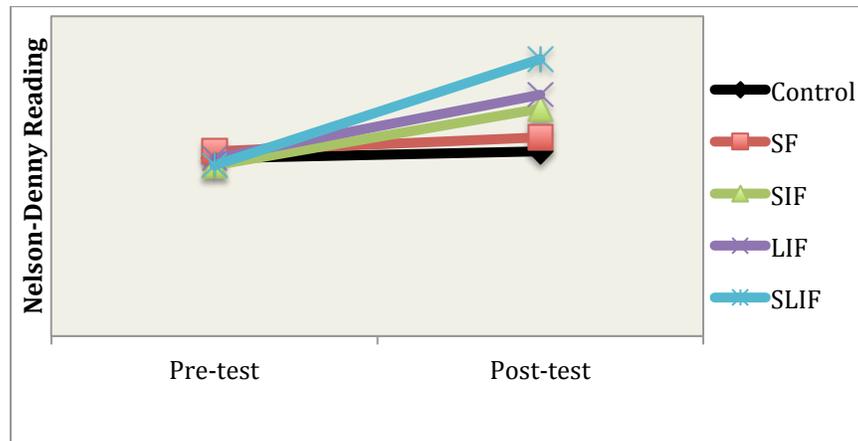


Figure 5. Nelson-Denny Reading Scores

*Analysis 2.* In this analysis, a repeated measures 5 x 2 ANOVAs with one between-subjects factor (feedback type) and one within-subject factor (time; pre- and post-test) will be applied to investigate possible differences between participants on the Nelson-Denny reading comprehension test using an alpha level of .05 as the criterion for statistical significance. Following Table 2 summarizes the results of the repeated measures ANOVA analysis. The column labeled F gives that F value of the test followed by three columns of significance values. The last two columns represent the corrected significance levels for the observed statistic given the above reported corrective coefficients. This analysis yields significant main effects for feedback types and testing time, but will show that there is not any significant interaction between two factors. If there are significant main effects found, follow-up post-hoc tests with Tukey's HSD procedure will be conducted to investigate mean differences between paired experimental conditions.

Table 2. Result for repeated measures ANOVA

Effect	<i>MS</i>	<i>df</i>	<i>F</i>	<i>p</i>	Greenhouse-Geisser	Huynh-Feldt
Time						
Feedback						
Time x						
Feedback						
Error						

### **Goals and Reading test based on Demographic Variables**

*Research question 3.* The purpose of this question is to investigate whether there are any differences in the level of participants' achievement goal between feedback types based on demographic variables (sex, ethnicity, and first generation in college).

*Hypothesis 3.* The demographic variables will influence the interactions between feedback conditions and time on students' achievement goal orientation.

*Rationale 3.* This is an exploratory hypothesis examining three of the most important demographic variables related to college students' success. However, as pointed out by Pintrich and Schunk (2002), there is very little empirical research on differences in goal orientation by sex or ethnicity. Regarding the question of whether there is evidence that each goal orientation type is more facilitative for males than females, or for Caucasian than Hispanic students, Urdan (1997) reported that, for boys, there was a positive relation between performance-approach goals and associating with friends with a positive orientation toward school. Similarly, Bouffard et al. (1995) found that, for boys but not for girls, performance goals were positively related to the reported use of metacognitive strategies. They concluded that adherence to mastery goals has a

positive impact on self-regulation both for girls and boys, for the latter, adherence to performance goals can also be helpful. However, these studies were also conducted with children and not with college students.

Graham (1994), in an extensive review of studies of the motivation of African American students, concluded that some of the current themes that dominate the study of motivation (e.g., goals) have been too sparsely examined among African Americans to make a review of findings. In a study including diverse ethnic groups' goal orientation, McInerney, Hinkley, Dowson, and Van Etten (1998) found that an orientation to performance goals predicted intentions to complete schooling and grades in math and English for the Anglo group but not for the other groups. However, there is a limitation that studies like these have been conducted with four-year college students and not community colleges where a majority of students at-risk for low achievement or failure attend. In this study, the main concern might be Hispanic students and two-year college students because sampling will be conducted in South Texas.

Factors that have been shown to affect completion rate and success are students' sex and ethnicity as well as first-generation status (Choy, 2002). The term "first-generation students" is generally defined as students whose parents never graduated from college. A large number of students enrolling in college are still first-generation college students, and they bring unique challenges to college. In fact, the National Education Longitudinal Study (NELS: 1988-2000) reported that 30.2% were first-generation college students and 40.2% were first-generation students of parents with some college experiences. During the first semester of college, first-generation students have a higher risk of dropping out and not returning for the second year (Inman & Mayes, 1999).

*Analysis 3.* In order to illuminate possible differences in each demographic variable, I will conduct a series of repeated measures MANOVAs. However, the technique for this *analysis* is more complicated because it will contain three different factors, which are two between-subject factors (feedback type and demographic variables) and one within-subject factor (time). For example, in order to examine possible sex differences, the analysis will be conducted with a 2 (sex) x 5 (feedback) x 2 (time) repeated measures MANOVA. With the same procedures, this analysis will start with a repeated MANOVA for a demographic variable (e.g., sex) using an alpha level of .05. If the result is significant, a series of repeated measures ANOVAs and post-hoc test with Bonferroni correction will be conducted to find the mean differences between two different levels (e.g., male and female).

*Research question 3-a.* The purpose of this question is to investigate whether there are differences between men and women in their levels of achievement goals based on the feedback types they receive.

*Hypothesis 3-a.* There is a significant sex difference in terms of changing participants' goal orientation level based on feedback types over time.

*Analysis 3-a.* In order to explore possible sex differences, a repeated measures MANOVA test with 2 (sex) x 5 (feedback) x 2 (time) design will be applied. The first investigation of the data will reveal the separate means on the goal orientation measures for each of the factorial groups (here feedback by sex). The 10 groups and each univariate statistic for all of the Hypothesis 2 analyses are summarized in Table 3.

Table 3. Example of Univariate Statistics (*M, SD*) for sex differences

Group	N	Mastery		Per Approach		Per Avoidance	
		Pretest	Posttest	Pretest	Posttest	Pretest	Posttest
Male Control							
Male SF							
Male SIF							
Male LIF							
Male SLIF							
Female Control							
Female SF							
Female SIF							
Female LIF							
Female SLIF							

Table 4 will be used to summarize whether the multivariate tests are significant or not with Wilk's  $\lambda$ . If the result is significant, a series of repeated measures ANOVAs and post-hoc with Bonferroni correction will be conducted to find the meaningful mean differences between male and female groups. Through the post-hoc comparison tests, it is expected that there are significant interactions found between feedback conditions and time on each achievement goal orientation. And, based on these findings, data will be available to assess possible sex differences in regulation of achievement goal orientations will be induced.

Table 4. Example of Multivariate tests for sex differences

Effect	$\lambda$	$F$	$df_1$	$df_2$
Time				
Time x Feedback				
Time x Sex				
Time x Feedback x Sex				

*Research question 3-b.* The purpose of research question 2-b is to investigate whether there are differences between Hispanic and non-Hispanic groups in their reported achievement goal based on feedback type.

*Hypothesis 3-b.* There are differences between the two ethnic groups in terms of interactions between changes in goal orientation level and feedback types over time.

*Analysis 3-b.* A repeated measures MANOVA test with a 2 (ethnicity) x 5 (feedback) x 2 (time) design will be conducted to examine possible differences between the two ethnicity groups on the three types of achievement goals. The first investigation of the data will show the separate means and standard deviations on the goal orientation measures for each of the factorial groups (feedback by ethnicity). The 10 groups and each univariate statistic will be summarized like Table 4 for sex differences. In order to check for statistically significance, the multivariate test will be performed with Wilk's  $\lambda$ . Furthermore, if these results are significant, a series of repeated measures ANOVAs and post-hoc mean difference tests with Bonferroni correction will be conducted to find pairwise mean differences between Hispanic and non-Hispanic groups.

*Research question 3-c.* Are there any differences in regulation of goal orientation over time between first-generation in college and non first-generation groups? The purpose of this question is to investigate whether there are any significant differences between these two groups in the interactions between achievement goals and feedback types they get.

*Hypothesis 3-c.* There are differences between first and non first-generation in college groups in terms of changing participants' goal orientation level based on feedback types over time.

*Analysis 3-c.* In order to explore possible differences in College generational status, a repeated measures MANOVA test with 2 (first-generation in college) x 5 (feedback) x 2 (time) design will be applied. Just like with sex and ethnicity, the first investigation of the data will examine the separate means on the goal orientation measures for each of the factorial groups (feedback by first-generation). The results table for the multivariate tests will reveal whether *Hypothesis 2-c* can be accepted or not with Wilk's  $\lambda$  values. If the result is significant, a series of repeated measures ANOVAs and post-hoc tests with Bonferroni correction will be conducted to find the mean differences between first-generation and non first-generation in college groups.

*Research question 4-a, b, and c.* In these research questions, I want to know whether there are difference between demographic variables (sex, ethnicity, and first-generation) in interaction effects on reading comprehension scores.

*Hypothesis 4-a, b, and c.* There are differences between demographic variables (sex, ethnicity, and first-generation) in the change of reading comprehension scores based on feedback conditions.

*Rationale 4-a, b, and c.* As discussed above, educational studies have proved that informative feedback enhances the performance of the reading comprehension task (e.g., Alber-Morgan, Ramp, Anderson, & Martin, 2007; Butler & Winne, 1995). However, the effects of information in feedback might be different depending on the students' demographic variables. For example, some studies reported that women are more sensible to feedback than men. Particularly, social psychology studies have showed clear differences between genders in perceiving feedback. In the absence of both comparisons information and performance feedback, women felt they deserved less pay than did men. However, these sex differences were eliminated when women and men were exposed to either the same comparison information or the same performance feedback (Bylsma & Major, 1992). Therefore, it is expected that female participants will be more positively affected by informative feedback when they will take post-test.

It is difficult to predict the expected results for the other demographic variables, because there is little empirical research on differences in feedback perceptions by ethnicity and first-generation variables. Students with first-generation in college will show higher increase in reading comprehension scores after receiving informative feedback, because the information which they have not got will enhance their ability to solve reading task.

*Analysis 4-a, b, and c.* In this analysis, repeated measures 2 x 5 x 2 factorial ANOVAs for demographic variable (sex; male and female, ethnicity; Hispanic and non-Hispanic, or first-generation; yes and no), feedback types (control, SF, SIF, LIF, and SLIF), and testing time (pre- and post-test) will be carried out on Nelson-Denny reading comprehension test with an alpha level of .05 as the criterion for statistical significance.

At the same format with previous analysis, the  $F$  values and associated  $p$  values shows that each null hypothesis can be rejected or not. And, the last two columns represent the corrected significance levels for the observed statistic given the above reported corrective coefficients. It is expected that there are significant main effects for feedback types and testing time across all demographic variables not sex. However, there is not any significant interaction effect between demographic variables. Consequently, post-hoc tests with Tukey's HSD procedure will be performed to investigate mean differences between paired experimental conditions. Participants in the SIF, LIF, and SLIF conditions are expected to have significantly greater post-reading comprehension scores regardless of demographic variables and the differences in SLIF will be the biggest among the feedback conditions. That is, these results can be interpreted that information in feedback takes an important role to increase students' performance of reading comprehension task.

## Chapter 6: Discussion

Research on achievement goals has become one of the most active areas in classroom motivation and performance research during the past 15 years (Hulleman et al., 2010; Pintrich, 2000), because students' orientations can affect their learning and understanding, and facilitate developing new skills, outperforming others, and challenging a hard task. However, there is very little research about the change of the achievement goals by instructional settings or technique. Senko and Harackiewicz (2005) proposed that students appeared to have switched between two performance goals and mastery goal after receiving feedback from their instructor in a classroom. They did not control any experimental condition but only monitored students' following goal orientation measures after competence feedback.

This study begins with the research question whether students' achievement goal orientation can be changed or regulated by the feedback in classroom. In order to investigate the differences in changes of participants' trichotomous goals and the pure feedback effects, this study adopts an experimental methodology. 150 community college students will be employed for this study, and they will be divided into five classes in which the same instructor will teach. Two- and three-way factorial repeated measures MANOVAs and ANOVAs will be the main analysis technique to find significant changes in each goal orientation and the experiment will be performed over a whole academic semester. And, same analyses for Nelson-Denny reading comprehension scores will be conducted.

## **Summary of results**

I anticipate that the results will show that students' goal orientation and reading comprehension scores are responsive to the levels of informative feedback that participants get. Overall, I think the data will indicate that college students in the informative feedback conditions (SIF, LIF, and SLIF) will have significant increases in their reported mastery and/or performance-approach goal orientation. In addition, participants in the LIF and SLIF groups will report decrease in their performance-avoidance goal over time. In addition I believe the results will reveal and increase in students' reading task scores when they receive more information about their performance. If these results are obtained, they will support the value of providing more information to enhance students' success in college through enhancing their learning motivation and academic performance.

Second, it will be interesting to explore significant differences in the demographic variables' interactions with change of achievement goals and reading comprehension. For example, some studies revealed that women are more susceptible to feedback than men (e.g., Bylsma & Major, 1992). Female participants in the informative feedback conditions may have greater changes in goal orientation than male participants.

## **Implications**

My findings may carry two important implications for educational psychology researchers and applied educational settings. The first concerns theorizing about the role of informative feedback conceptions in achievement goal processes. As discussed above, there is a little research about this issue. Existing theory focuses on how people with mastery and performance goals assign different meaning to competence feedback,

especially negative feedback (Dweck & Leggett, 1988). They postulated that people pursuing a performance goal should respond poorly to early failure, whereas those with a mastery goal respond with greater effort and resolve. The findings from this proposed study may suggest an important role for informative feedback about students' performance. That is, periodic informative feedback during a class may alter competence perceptions, which, in turn, may affect whether and how strongly achievement goals are pursued and changed.

Furthermore, this study can give a practitioner and any instructor useful guidelines that instructional feedback should be given to students depending on their individual variability. Through the analyses from demographic variables, I may identify differential effects of informative feedback on pursuing each goal orientation and reading comprehension scores.

### **Limitations and Suggestions**

Several possible limitations to the proposed study are worth noting. Above all, the proposed intervention is relatively short -3 hours over 12 weeks. If I could realistically get more time to work with students I think the intervention could be more powerful. Second, extended follow-up measure would be necessary for both the stability and transfer of any changes observed.

Third, although repeated measures designs have several advantages over between-subject designs, they have limitations. Among them, serious problem with repeated measures is the effect one treatment could have on subsequent treatments, a phenomenon known as a carry-over or practice effect (Huck, 2000). Carry-over effects could cause biased estimates of the effect of the treatment. To control the carry-over effects, a

counterbalancing method, which is one of the most popular ways to control the effects (Huck, 2000; Keppel & Zedeck, 1989), is employed in this proposed study. However, it does not completely prevent one treatment from affecting another (Keppel & Zedeck, 1989). Thus, in order to control the practice effects, future research should have intervals between treatments long enough to allow the previous treatment's effect to dissipate (Keppel & Saufley, 1980).

Fourth, another significant limitation to this study is that the feedback given to all participants includes a normative element. Although it is hoped that participants in the study regulate their achievement goal pursuit in response to this feedback, future research could provide a finer test of goals regulation by using feedback stripped of this normative information. To adopt an individual experimental technique, which is performed with only one participant at one time, is another way to reduce the normative effects.

Finally, future research could focus on individual differences which can affect goal orientation and its regulation. Self-efficacy, for example, can change the pattern of regulating goal orientations. Students with high self-efficacy are less likely to change and modify their goal orientation, whereas the goals of low self-efficacy learners can be easily changed. Furthermore, if there are individual differences in goal regulation, how might those individual differences relate to the quality of experience in the classroom? For instance, do students who more readily alternate between the performance-approach and performance-avoidance goal experience greater negativity or suffer detriments to their performance or interest? Further research is needed to address these questions through a series of investigations.

## **Chapter Seven: Program Application and Evaluation**

In the final chapter of this report, I will re-address analysis section that I got feedback in terms of evaluating individual's goal changes and/or stability in classroom structure. More importantly, I will figure out how post-secondary schools reflect the proposed ideas and create Program Decomposition Model based on Borich and Jamelka's framework (1982). In light of the predicted and documented benefits of informative feedback, I have subsequently designed for teachers and school administrators a training program that is grounded in the theoretical ideas about goals changes and the proper functions of feedback. Based on the program evaluation, I will briefly suggest natural language questions and data analysis procedure.

### **Methodological approaches**

Most of research on achievement goals and stability/change of goals has been primarily investigated with two indexes: mean-level change and differential continuity (rank-order stability). These two methods have been used to measure stability and change in personality and its development over time and mainly focus on measurement at the group level (e.g., Samuel et al., 2011; Wortman, Lucas, & Donnellan, 2012). Recently, two additional indexes of stability and change – individual-level change and ipsative continuity (profile consistency) – have been used in areas of human personality research (e.g., Caspi & Roberts, 1999; Roberts, Caspi, & Moffitt, 2001; Specht, Egloff, & Schmukle, 2011). Each of these indexes yields somewhat different yet complementary data on the questions of stability and change, and the combined use of all four indexes can provide a more accurate assessment of goal's change and stability. In the following, I

will briefly review each of the four statistical approaches to the stability and change of goal orientations.

*Rank-order stability (differential continuity)*

In most of the research on personalities, stability or consistency is operationalized as rank-order stability, which refers to the relative placement of individuals within a group over time (Roberts, Walton, & Viechtbauer, 2006). Two different contradictory predictions have been used to predict the continuity of same traits. Developmental-oriented personality researchers often evaluate whether individuals maintain their rank-ordering on an attribute over an interval of sufficient length for change to meaningfully occur (e.g., Hopwood et al., 2011; Wortman, Lucas, & Donnellan, 2012). They evaluate the extent to which individual differences persist over time through investigating rank-order stability. Correlation coefficients are commonly used to index whether personality dispositions exhibit trait-like properties – that is, whether they are consistent across time and circumstances.

Some achievement goal studies have adopted the differential continuity position and examined change and stability in goals (e.g., E. M. Anderman & Midgley, 1996; L. H. Anderman & Anderman, 1999; Meece & Miller, 2001). They showed positive correlation between two different times, and this suggests that there is a strong stability among goal orientations. However, the above studies included many different variables like academic GPA, other motivational variables such as self-esteem, and cognitive variables such as learning strategies. Those research findings can't be easily generalized in terms of change and stability in goal orientations because the relations might have mixed effects and there were different patterns between measures found. In the same

manner, the hierarchical model of achievement motivation predicts that achievement goals should exhibit relatively high levels of stability, in part, because they are derived from students' enduring temperamental characteristics (Elliot, 2006). A recent review of studies conducted with participants ranging from early elementary school age to college students suggests that achievement goals are relatively stable over time (Senko, Hulleman, & Harackiewicz, 2011).

### *Mean-level changes*

In personality studies, change is most often defined as mean-level change, which refers to whether a group of people increases or decreases on trait dimensions over time (e.g., Roberts et al., 2001). Developmental researchers also evaluate whether there are mean-level changes for individual attributes. Such studies investigate the question of how the average individual in a sample changes over time and are often thought to shed light on normative patterns of development. This type of stability and change is also commonly analyzed with a paired-samples *t* test, within-subject analyses of variance (ANOVA), or multivariate analyses of variance (MANOVA) (E. M. Anderman & Midgley, 1996; Bong, 2005). This index moves beyond rank-order stability by providing information regarding the absolute amount of change in a construct across multiple assessments, and it is not uncommon of there to be a high degree of differential continuity and considerable mean-level change within the same sample (Gottfried, Fleming, & Gottfried, 2001; Roberts & Pomerantz, 2004).

In the achievement goal literature, each of the studies that have discussed rank-order stability has also examined mean-level change (e.g., E. M. Anderman & Midgley, 1996; L. H. Anderman & Anderman, 1999; Meece & Miller, 2001). They found some

increases and decreases in each goal's level, and researchers in the achievement goal orientation have referred to this type of goal change as goal intensification (Muis & Edwards, 2009; Senko & Harackiewicz, 2005). Upward changes reflect increased endorsement of a particular goal type, whereas downward changes reflect reduced endorsement of that goal type.

### *Individual-level change*

Thus far, most of theorists have considered stability and change in achievement goal constructs at the level of the sample by referencing summary statistics –retest correlation and mean-level differences. It is also important, however, to investigate individual differences in change. Some individuals may increase endorsement of a particular goal whereas others decrease. In addition to being tracked with rank-order stability and mean-level change, change also can be tracked in the structure of trait covariances and in individual differences in change (Mroczek & Spiro, 2003). The existence of individual differences in change qualifies the inference that change does or does not occur and that changes are normative. Furthermore, sample-level stability and change can often be unrelated to person-level stability and change (Roberts et al., 2006). For example, when there is no mean-level change for a particular achievement goal, there may still be robust individual differences in increases or decreases in the adoptions of goals. With the same manner, substantial rank-order stability can be present for an achievement goal at the sample level, while considerable change is apparent at the person level.

Individual-level change represents the magnitude of increase or decrease in a construct over time exhibited by an individual. This measurement examines stability and

change at the level of the single person within the sample, whereas differential continuity and mean-level change examine stability and change at the level of the sample. This type of stability and change has received considerable attention in the clinical psychology literature (e.g., Jacobson & Truax, 1991; Zahodne et al., 2009), but has been overlooked in educational studies.

In this report, I will focus on the reliable change index (RCI) to examine individual level changes, which can be calculated by dividing the difference in Time 1 (T1) and Time 2 (T2) scores by the standard error of the difference score. About 50 years ago, McNemar (1962) suggested that a pre- and post-test change score obtained from a scaled measure was dependable if the absolute value of the observed difference, divided by the standard error of measurement of the difference, exceeded 1.96. Two decades later, Jacobson and Truax (1991) developed a ratio they called the RCI as a means of judging if the observed difference between a pre-test and post-test score for an individual receiving psychotherapy is greater than the difference that would be expected by measurement error, under the null hypothesis of no true change. The RCI is usually presented at the 95% level of confidence, so that if an individual's RCI score exceeds 1.96 in either direction they are judged to be 'reliably improved' or 'reliably decreased'. If an individual's index score falls short of this cut-off, they are categorized as 'unchanged'.

### *Ipsative continuity*

The final approach is ipsative continuity, which represents the level of stability and change exhibited in an individual's configuration of constructs over time. In much the same fashion as individual level change, this method has received attention in the

personality psychology literature (e.g., De Bolle, 2009; De Fruyt, Van Leeuwen, Bagby, Rolland, & Rouillon, 2006). The ipsative continuity is exclusively person-oriented and refers to the stability of the ordering and organization of traits within the individual. Ipsative stability is usually examined using two methods. The first approach relies on Cronbach and Gleser's observation (1953) that individual profiles can vary in three major ways: elevation (the average level of scores), scatter (the variability of scores), and shape (the patterning of scores). The second approach to examine ipsative continuity is to compute Q-correlations, that is, within-person correlations across the achievement goal orientations. This is similar to a Pearson product-moment correlation, but it focuses on the person level rather than the sample level and on configurations of constructs rather than single construct. The Q-correlation coefficients can be positive or negative. A large positive coefficient indicates that the individual's configuration of constructs has been highly stable over time, whereas a small positive or negative coefficient indicates that alteration to a individual's configuration has occurred. In this study, I will use Q-correlation method because it is an easier way to calculate ipsative continuity and also has validated previous research on achievement goals (Fryer & Elliot, 2007; Muis & Edwards, 2009).

### **Creating and evaluation of Program Decomposition Model**

One approach to increase college readiness is to enroll students in intensive summer programs. Many colleges and universities in the United States offer summer programs for their incoming students. For this reason, we can easily apply and test the proposed ideas to real school and classroom environments with embedded summer programs. While programs are structured and administered in a variety of ways and target

various student population, the most common type of summer bridge program aims to serve underrepresented students of low socioeconomic status (i.e., first-generation, low-income family and first-year college students). Bridge programs, which target individual students rather than classrooms or schools, usually take place on and are implemented by community colleges and universities. The purpose of these programs is (1) to provide graduating high school seniors with academic and college-going skills and (2) to provide interventions that help participants aspire to, prepare for, enroll in and succeed in college. The programs often include the following components: academic instruction, tutoring, study skills instruction, information about the college application and financial aid processes, and mentoring/counseling/advising (Gullatt & Jan, 2003). Personally, I believe that the Summer Bridge Program is one of the most practical ways to apply and evaluate instructors' training program and effectiveness of constructed informative feedback.

Recognizing the necessity to reduce the need for remedial education in Texas, with the same reason, the state Legislature funded the Texas Higher Education Coordinating Board (THECB) to award grants to public higher education institutions to develop and implement "summer bridge programs" in academic year since 2007. The purpose of the programs was to enhance the college-readiness skills of participating rising 11<sup>th</sup>- and 12<sup>th</sup>-grade students. Thus, eligible students for the programs were rising 11<sup>th</sup>-grade and 12<sup>th</sup>-grade students who took the state-mandated high school assessment exam (Texas Assessment of Knowledge and Skills or TAKS) in English/Language Arts and mathematics and scored at or above the state's standard for high school graduation but below the standard for college (between 2100 and 2200). Specifically, the THECB,

which is the agency that oversees public higher education in the state, wanted to “determine if short-term (but at least four weeks of) academic assistance can positively affect college readiness” for the target population. In addition, the THECB sought evidence to ascertain if program interventions could increase the participants’ expectations to attend college.

There are three big chunks of student’s outcomes which mirror first-order outcomes. In order to measure change in students learning and study strategies all students are given the Learning Skills and Study Strategies Inventory (LASSI) prior to the beginning of the summer program and again at the end of the program. The LASSI (Weinstein, Palmer & Shulte, 2002) provides measures on 10 independent scales: anxiety, attitude, concentration, information processing, motivation, self-testing, selecting main ideas, use of study aids, time management, and test strategies. Through this program, we expect that participants learn how they can use effective strategies for a success in college. Particularly, targeted students’ strategies to cope with anxiety, manage their time for learning and maintain concentration during their class would be increased. In addition to the LASSI, students in this program complete a pre- and post- assessment of their math, reading and writing skills by taking the Texas Assessment of Knowledge and Skills (TAKS). They take this assessment before the first day of the summer session and again on the last day of the session. Among them, their writing abilities and math scores would be incremented by the program. Finally, demographic and academic characteristics of each student also are collected and students are asked to complete an end-of-program survey measuring their overall satisfaction in the summer bridge program with 1 to 5 Likert scales. Second-order outcomes will affect the entire campus lives and

success, as well as the students who benefit from the summer bridge program. These include significant increase in positive attitude, overall satisfaction toward college life, and perception of well-being. All analysis will be conducted with pre- and post-test analysis. Based on the significant results of statistical analysis, the effectiveness of the summer bridge program will be determined with appropriate criterion levels for each dependent measure.

The summer bridge program would benefit from an evaluation using a mixture of the value-oriented and applied research approaches. From a value-oriented perspective, it would be crucial to consider if the program aspects are contributing to the student's learning outcomes identified by LASSI and TAKS. Using the Decomposition Model (Borich & Jamelka, 1982) to diagram the program, the first-level diagram of the program can be seen in *Figure 6*. Inputs of this program are dichotomous and continuous variables which are requirements of the program. The first input to the program is a group of students who will attend the summer bridge program. Their holding levels of achievement goal orientations are most important variable because we need to measure and follow-up the changes and stability in each goal orientation. The second input is a group of instructors who will teach the students. Instructors are the drivers of change in this program; their implementation of the program within their schools is expected to be the cause of student change. The third critical inputs are learning materials in this program. If instructors fail to use the effective strategies and guidelines for providing informative feedback, the proposed effects of the program are minimized or not happened.

*Figure 7* shows the second level of the Decomposition Model which details the program activities or transactions that will lead to expected outcomes. Working under the same constraints and inputs as in the first diagram, the first transaction of the program is the activity has instructors reflect on their experiences as students. After getting instructions of each feedback's condition, instructors will be broken up into small groups. Within these groups, they will be asked to discuss each feedback condition and current status. *Figure 8* shows the final level of the program decomposition. The process of instructors and interaction between instructors and students will affect students' adoption of individual achievement goals.

Pertinent questions to consider are: do the program requirements meet students' needs; are the goals of the program easy to achieve; and are there additional potential outcomes and feasible value to the program. The applied research orientation can be used to find significant differences between experimental and control groups in terms of students' outcome measures. It is possible to evaluate with this perspective because THECB's summer bridge program included control group: rising 11<sup>th</sup> and 12<sup>th</sup> grade students were recruited from high schools in an area of the state where no treatment programs were funded. The intent was for them to meet the same criteria for participation as the treatment groups. With statistical decision making rules, the applied research oriented evaluation could make a decision whether the summer bridge program works for pre-college students.

## Natural language questions and Methodology

### *Student's perspective*

- A. Will Summer Bridge program increase my learning strategy? And, how about the other students who do not participate in the program?
- a. Variables: 10 scales: anxiety, attitude, concentration, information processing, motivation, self-testing, selecting main ideas, use of study aids, time management, test-taking strategies
  - b. Instrument used to measure: In order to measure change in students' learning strategies, all participants of both conditions will take pre- and post-LASSI assessments.
  - c. Data analysis: Across all dependent variables (LASSI scales), data will be analyzed using a MIXED ANOVA with the following design: Time of Test (Pre vs. Post treatment LASSI scores) X condition (Treatment vs. Control). Time of test is treated as a within-participants factor, and condition is treated as a between-participants factor. All ANOVA analyses will be tested for assumption violations.
- B. In terms of not only strategy but also my real abilities, will the program increase my math and reading skills? And, do we have increased abilities rather than students who do not complete Summer Bridge program?
- a. Variables: Participants' math, reading and writing abilities
  - b. Instrument used to measure: In order to measure change in students' math and English abilities, all participants will take pre- and post-TAKS administrations.

- c. Data analysis: At the same manner, data will be analyzed using a MIXED ANOVA with the following design: Time of Test (Pre vs. Post treatment TAKS) X condition (Treatment vs. Control).

C. Will I be prepared for a college education?

- a. Variables: Participants' need for cognition, college readiness, perception of college-education value
- b. Instrument used to measure: Survey of Need for Cognition (NFC) with 1 – 5 Likert scale (e.g., I like to have the responsibility of handling an academic situation that a college requires), college readiness (e.g., I have an understanding how I should study for a college course) and perception of college value.
- c. Data analysis: I would inspect the descriptive statistics (mean, median, and mode) of the survey. And, if possible, I would compare with nation-wide mean.

*Faculty/Staff perspective*

A. Will Summer Bridge program increase students' enrollment and retention rate?

- a. Variables: Enrollment and retention rate
- b. Instrument used to measure: The probability that students will come back to school and retain learning after each semester and academic year.
- c. Data analysis: I would explore the descriptive statistics (mean, median, and mode) of students' enrollment and retention rate. And then, I would compare this result with THECB state-wide data.

B. Do we need to change program, reorganize or modify materials?

- a. Variables: Participants' achievement, NFC, and satisfaction
  - b. Instrument used to measure: TAKS, NFC (1-5 Likert) and satisfaction (1-5 Likert) survey.
  - c. Data analysis: I would explore the descriptive statistics (mean, median, and mode) of students' enrollment and retention rate. And then, I would compare the results with previous academic years. If there is not significant advance, I would suggest program would be needed to change the program materials.
- C. Will students graduate at a faster rate?
- a. Variables: Graduation rates indicating a clear degree plan
  - b. Instrument used to measure: Students records from administrative office or related organizations
  - c. Data analysis: I would create a histogram or bar chart to compare the average graduation rates of students who participate and do not.
- D. Will participants' overall value toward a college be changed?
- a. Variables: Value toward a college
  - b. Instrument used to measure: Students' participation rates and survey for overall value toward a school and campus life
  - c. Data analysis: I would inspect the descriptive statistics (mean, median, and mode) of the students' rates and survey. In addition, I would conduct a t-test to detect differences between experimental and conditional groups.

Figure 6. First Level of Program Decomposition

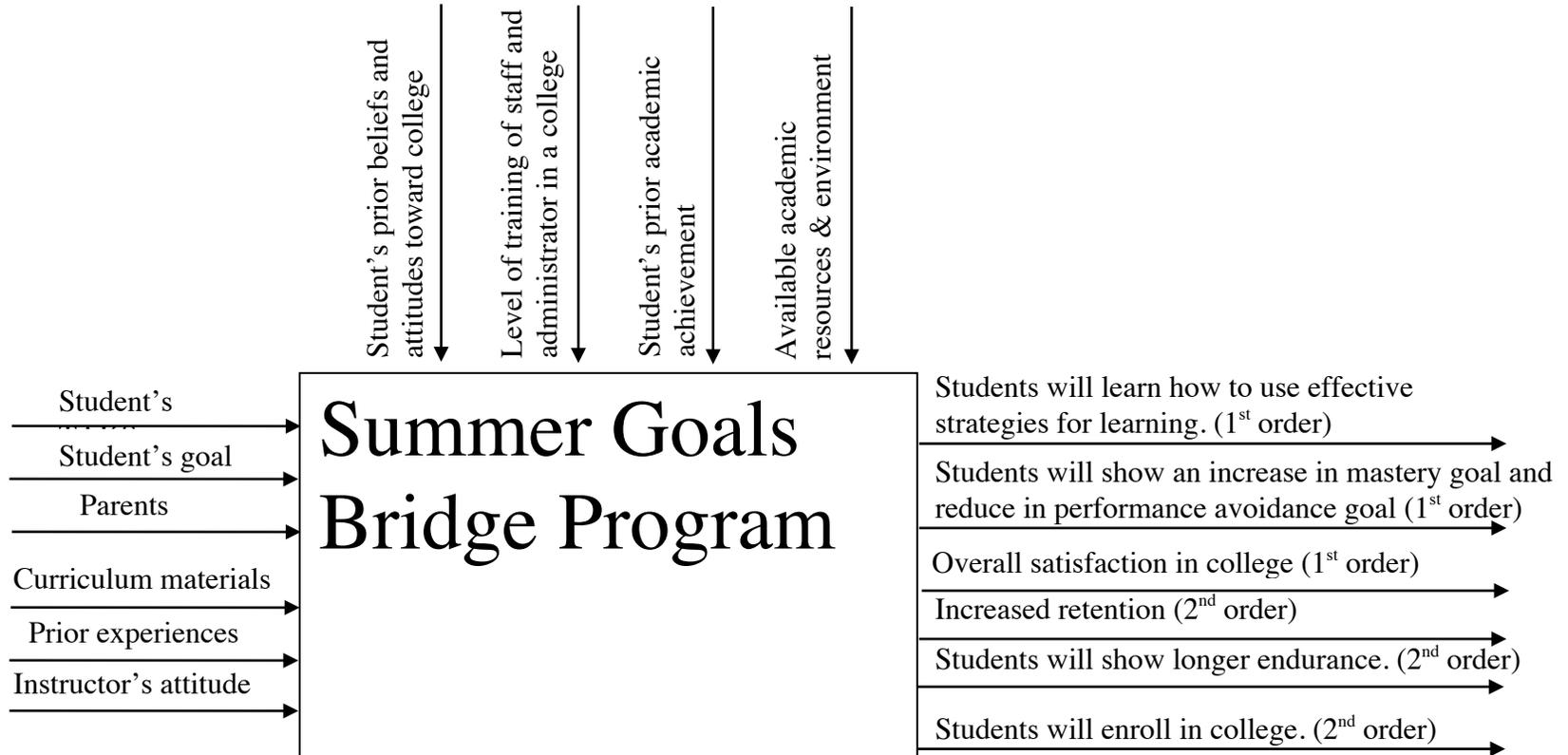


Figure 7. Second Level of Program Decomposition

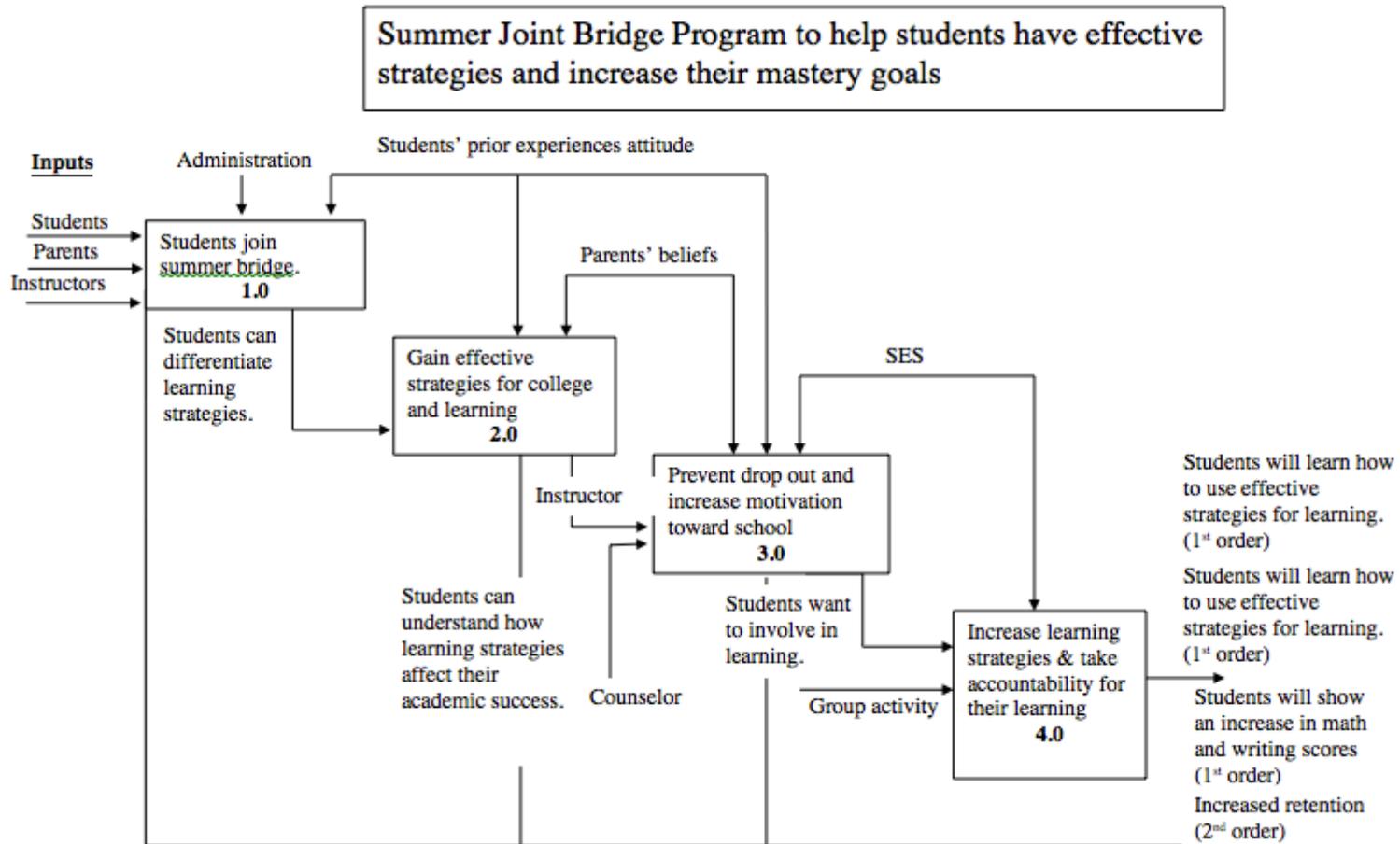
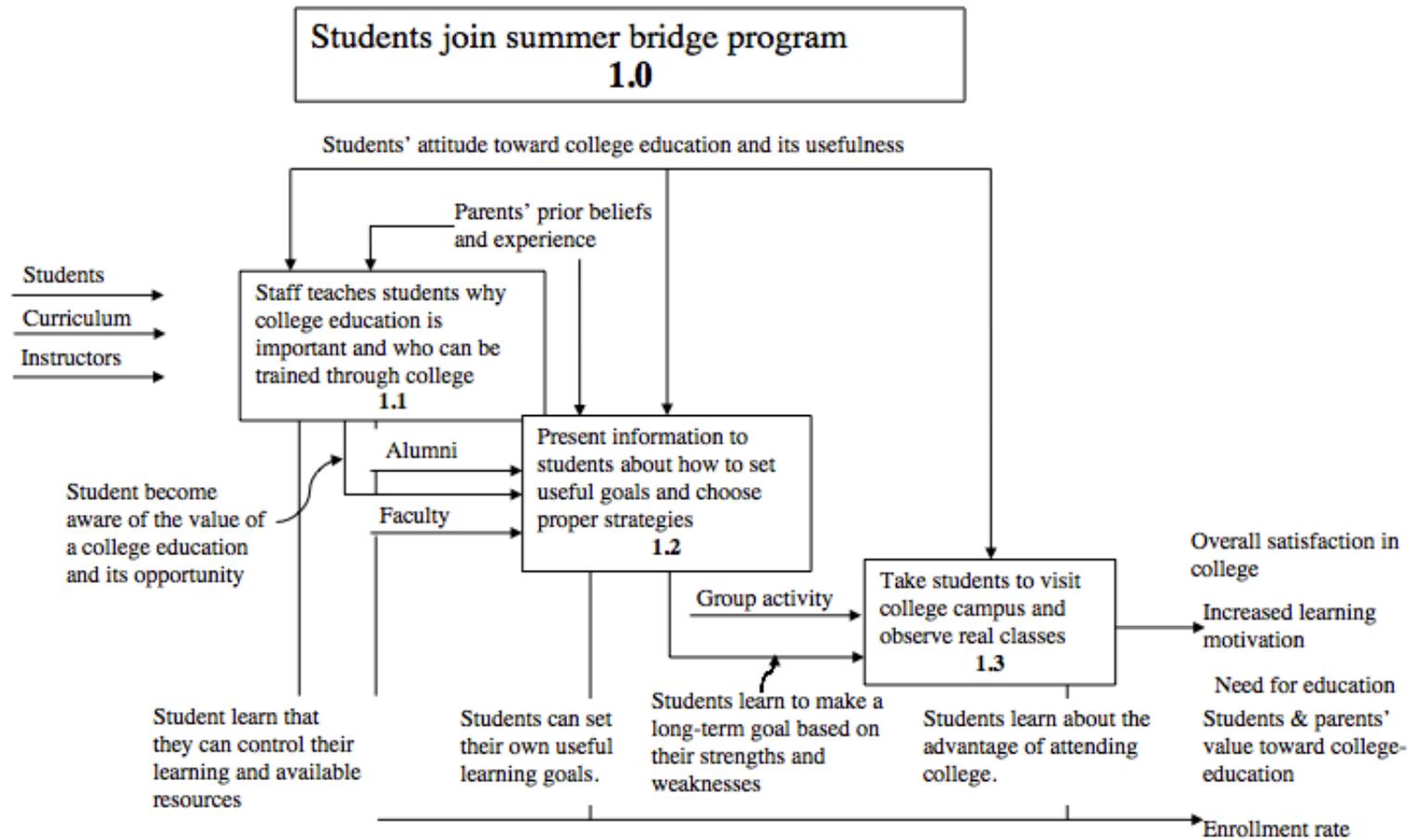


Figure 8. Third Level of Program Decomposition



## Appendix A

### Mastery Goals

1. I want to learn as much as possible from this class.
2. It is important for me to understand the content of the lessons as thoroughly as possible in this class.
3. I hope to have gained a broader and deeper knowledge of physical education when I am done with this class.
4. I desire to completely master the skills presented in this class.
5. In a class like this, I prefer skills that are interesting, even if they are difficult to learn.
6. In a class like this, I prefer skills that really challenge me so I can learn new things.

### Performance-Approach Goals

1. It is important to me to do better than the other students in this class.
2. My goal in this class is to get a better grade than most of the students.
3. I am striving to demonstrate my ability relative to others in this class.
4. I am motivated by the thought of outperforming my peers in this class.
5. It is important to me to do well compared to others in this class.
6. I want to do well in this class to show my ability to my family, friends, advisors, or others.

### Performance-Avoidance Goals

1. I often think to myself ‘What if I do badly in this class?’
2. I worry about the possibility of getting a bad grade in this class.
3. My fear of performing poorly in this class is often what motivates me.
4. I just want to avoid doing poorly in this class.

5. I am afraid that if I ask my instructor a “dumb” question, they might not think I’m very smart.
6. I wish this class were not graded.

## Appendix B

In the sixteenth century, an age of great marine and terrestrial exploration, Ferdinand Magellan led the first expedition to sail around the world. As a young Portuguese noble, he served the king of Portugal, but he became involved in the quagmire of political intrigue at court and lost the king's favor. After he was dismissed from service to the king of Portugal, he offered to serve the future Emperor Charles V of Spain. A papal decree of 1493 had assigned all land in the New World west of 50 degrees W longitude to Spain and all the land east of that line to Portugal. Magellan offered to prove that the East Indies fell under Spanish authority. On September 20, 1519, Magellan set sail from Spain with five ships. More than a year later, one of these ships was exploring the topography of South America in search of a water route across the continent. This ship sank, but the remaining four ships searched along the southern peninsula of South America. Finally they found the passage they sought near a latitude of 50 degrees S. Magellan named this passage the Strait of all Saints, but today we know it as the Strait of Magellan.

One ship deserted while in this passage and returned to Spain, so fewer sailors were privileged to gaze at that first panorama of the Pacific Ocean. Those who remained crossed the meridian we now call the International Date Line in the early spring of 1521 after ninety-eight days on the Pacific Ocean. During those long days at sea, many of Magellan's men died of starvation and disease. Later Magellan became involved in an insular conflict in the Philippines and was killed in a tribal battle. Only one ship and seventeen sailors under the command of the Basque navigator Elcano survived to complete the westward journey to Spain and thus prove once and for all that the world is round, with no precipice at the edge.

1. Magellan lost the favor of the king of Portugal when he became involved in a political :

- (a) entanglement
- (b) discussion
- (c) negotiation
- (d) problems
- (e) none of the above

2. Four of the ships sought passage along a southern:

- (a) coast
- (b) inland
- (c) body of land with water on three sides
- (d) border
- (e) none of the above

3. The passage found near 50 degrees S was named the Strait of:

- (a) Greenwich
- (b) South America
- (c) Spain
- (d) Magellan
- (e) Madrid

4. One of Magellan's ships explored the \_\_\_\_\_ of South America for a passage across the continent.

- (a) coastline
- (b) mountain range
- (c) physical features
- (d) islands
- (e) none of the above

5. The sixteenth century was an age of great \_\_\_\_\_ exploration.

- (a) cosmic
- (b) land
- (c) mental
- (d) common man
- (e) none of the above

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## **Vita**

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