Change and Stability in Achievement Goals Based on Instructional Tasks of a College Classroom

Cheon-woo Han[*]

Vice Provost Office for Undergraduate Affairs, University of Illinois at Chicago
*Corresponding author: cwhan@uic.edu

Abstract Achievement goals play a principal role in enhancing learning gains and adaptive attitudes. Little is known, however, about changes and/or stability in achievement goals over time. This study focused on the research hypothesis that instructional tasks (e.g., exam, in-class quiz, writing a paper, in-class activates) of a course which are focused on competence influence differentially the adoption of college students' achievement goals in a real classroom. A total of 186 college students from an introductory educational psychology course participated in this study. All achievement goals had high stability for each instructional task using a differential continuity analytic approach, while mean-level change analyses showed a considerable decline of each individual goal pursuit. Cluster analysis technique, which is a person-centered approach, suggested changes in cluster memberships between the pre- and post-measure of achievement goals. The results and findings of the current study provide important implications for both instructional design in a classroom and research methodologies used to investigate achievement goals.

Keywords: *achievement goals, instructional tasks, cluster analysis*

Cite This Article: Cheon-woo Han, "Change and Stability in Achievement Goals Based on Instructional Tasks of a College Classroom." *American Journal of Educational Research*, vol. 4, no. 14 (2016): 999-1007. doi: 10.12691/education-4-14-3.

1. Introduction

The concept of achievement goals has proven to be a particularly robust motivational construct as demonstrated by extensive educational research. Achievement goals predict key outcome variables, such as performance [1,2], learning strategies use [3,4], feedback-seeking behavior [5], academic anxiety [6], help-seeking behaviors [7], and knowledge retention [8]. Thus, achievement goals currently have received the most research attention in the area of competence-relevant motivation. In fact, achievement goal theory has inspired over 1,000 published papers and dissertations in the past 25 years [9]. A considerable amount of research has examined how an individual endorses achievement goals in learning environments and how the specific goals affect learning-related outcomes. However, only a small number of studies have explored changes and stability in individual achievement goals [10,11,12,13]. Of these few studies, most have investigated whether students alter their achievement goals in response to feedback on their competence. According to social-cognitive theory, students' goal adoption and goal pursuit can be altered based on their classroom context [14]. For example, how might certain tasks or instructional settings (treatments) provide a basis for the adoption or change of future achievement goals? The present study addressed primarily the foundational question of how students' goal orientations are changed after exposure to different instructional tasks they receive in their classrooms. This question was examined using a person-centered approach that can investigate changes in each individual's goal constructs.

1.1. Conceptual Framework

1.1.1. Achievement Goals in Classrooms

Achievement goals (or goal orientations) are a motivational construct that affects how an individual approaches and interprets tasks [15]. They are associated with beliefs in the controllability of personal attributes such as intellectual ability [16], effort expenditure [17], and task difficulties or task failure response [16]. Achievement goals not only influence cognitive participation through the motivational process but also produce performance differences and attitudes in classrooms. Reference [18] asserted that achievement goals, conceptualized either as mental dispositions or as perceived environmental influences, may have direct impacts on students' learning behaviors and their learning outcomes.

Early research conceptualized mastery and performance goals as mutually exclusive. For example, [1] showed that mastery goals predicted intrinsic motivation, performance-approach goals predicted academic performance, and performance-avoidance goals undermined both intrinsic motivation and performance. However, this is too simplistic a view of academic tasks and goals. An alternative to examining achievement goals and their correlates and outcomes in isolation from each other is the

multiple goals perspective [19,20]. Researchers who endorse a multiple-goals perspective have suggested that students with mastery and performance goals together can be more adaptive in terms of cognition and achievement than students endorsing either goal separately and exclusively [21]. One could easily expect that the high-mastery/low-performance group would have the most adaptive learning patterns based on previous theories and studies [22]. However, a few studies have found the high-mastery/high-performance combination to be the most effective for achieving learning outcomes [23,21]. According to [19], there are different patterns of goal adoptions; additive, specialized, selective, and interactive, which could account for the benefits of multiple goals endorsement. They also found that both mastery and performance goals have independent and positive main effects on a given outcome (e.g., exam performance). The results indicated that both types of achievement goals could be advantageous because, in some cases, each goal was positively associated with unique achievement outcomes. In other cases, the two types of achievement goals could work together to amplify the positive effects of the other. Moreover, goal endorsement is not a matter of either choosing or not choosing to pursue a particular goal. Rather, [14] reported that individuals could have varying levels of commitment to many different achievement goals at the same time. These studies can support a multiple goals perspective and the assertion that very often in class students do not actually pursue "pure" goals but rather multiple goals, and these goals can interact with one another.

1.1.2. Regulation of Achievement Goals

Are achievement goals stable or not? The answer may depend on the learning situation or task which students confront. One reason to anticipate their stability is that achievement goals represent concrete aims that emerge from personality characteristics such as achievement motives and temperaments [24]. Because these characteristics are theorized to be dispositional, one might expect some stability in achievement goals over time and across tasks [25]. As a human's personality is not changed easily, it is logical to think that the individual's achievement goal orientations would also be relatively stable. Recent studies, however, have reported evidence that individual achievement goals can change in a classroom context.

Students might regulate their achievement goal pursuit based on instructional environments and/or perceptions of classroom goals that they confront [14]. For instance, after doing an in-class group activity, a student might shift from pursuing a performance-avoidance goal to pursuing a performance-approach or mastery goal, whereas an in-class exam might increase students' performance-avoidance and/or performance-approach goals. If so, we need to illuminate how goals might be changed or regulated based on the instructional components in a class. Research on this issue [11,12,26] suggested two possible types of goal changes, goal switching and goal intensification.

1.1.3. Person-centered Approach

Most research into the stability/change of achievement goals has been conducted using two indexes: mean-level change and differential continuity (rank-order stability). These two methods have been used at the group level to measure stability and change in personality and its development over time and mainly focus on measurement at the group level [27,28]. Recently, a person-centered approach or individual-level analysis has been used to explore intra-individual differences by examining the various learner profiles that emerged within one classroom [13]. Cluster analysis, which is a common type of person-centered approach, is used to identify discriminable, homogeneous groups of students with similar characteristics, that is, to determine the number of clusters that best differentiate groups in a meaningful way [29]. This technique is beneficial for goal orientation researchers interested in the multiple goals perspective because there is still debate regarding which combination of goals leads to the most adaptive outcomes. Each of these indexes yields somewhat different yet complementary data on the questions of stability and change, and the combined use of all indexes can provide a more accurate assessment of goal change and stability.

Cluster analysis methods have several advantages. First, correlational and experimental studies assess relations between single goals and criterion measures under the assumption that the individuals represent a single population. For example, a number of early studies [30] were limited to simple, correlational approaches that just evaluated the bivariate correlations of each goal with different types of educational outcomes. However, it may be more informative to study how certain combinations of achievement goals relate to other variables rather than how each goal relates separately. Cluster analysis methods provide a way to examine the underlying structures of the data and to determine empirically the degree to which the assumption of homogeneity has been achieved.

Second, many past investigations have examined the prevalence and influence of different motivational patterns with a median split procedure. When using the median split techniques, researchers categorize participants as 'high' if their score falls above the median on a goal factor or 'low' if their score falls below the median. Although the median split technique is easy to implement, many achievement goals studies reported its limitations and supplemented their work with additional analyses [22,31]. The most serious problem with the procedure is an issue with the questionable homogeneity of the cases classified in each profile as well as the problematic use of labels such as 'low' and 'high' to characterize cases falling below and above the median split. Cluster analysis methods go beyond median split procedures to identify structural groupings that provide a satisfactory fit with the data set. Much like factor analysis techniques, clustering methods organize the data into the fewest number of units that explain the most variance on the basis of the clustering algorithm selected. The resulting clusters can then be evaluated on the basis of theory and prior research.

1.2. Objective and Hypotheses of the Study

Different theorists and researchers have considered achievement goals as very important and useful for explaining human performance and motivation. And yet, to date, there has been little research about relation between instructional tasks and change in achievement

goals. In an attempt to understand the complex relationships between tasks and goals in a real classroom, the current study focused on the effects of different instructional tasks (quizzes, in-class activities, writing assignments, and exams) on students' achievement goals within the multiple-goals framework. The reason why this investigation focused on these particular instructional tasks is that most traditional college classrooms incorporate them as methods for teaching students. Students' achievement goals toward each instructional task were assessed at the beginning and end of class.

This study addressed the following research questions. First, would students' achievement goals change significantly after exposure to each different type of instructional task in a class? It was hypothesized that participants' achievement goal endorsements would change over time and the changes would be different based on the specific tasks being evaluated. Most classroom-based research has shown that mastery goals decrease and performance-avoidance goals increase significantly over time [11,12,26]. But, there might be different patterns of changes in goal endorsement for different tasks in a class. For example, taking an exam in class is likely to increase performance-avoidance and decrease mastery goals because the task is associated with test-anxiety, and students might perceive the task as a comparison of their performance relative to that of their peers. However, writing a paper, doing in-class activities, and even taking an in-class quiz might not decrease students' pursuit of mastery goals in their learning because these tasks put less pressure on students. That is, even though all instructional tasks are competence-relevant and important to students in terms of achieving a satisfactory grade in the registered course, some tasks might not produce increases in performance-avoidance goals and decreases in mastery goals.

Second, how many profiles can be extracted for individual achievement goals related to each instructional task? Also, are there meaningful differences between the traditional approaches and the person-centered approach? It was hypothesized that a series of cluster analyses could identify groups of students who endorse theoretically meaningful combinations of achievement goals. Even though there are some investigations of achievement goals through cluster analysis, no one has focused on changes in clusters with a longitudinal approach.

2. Method

2.1. Participants and Tasks

A total of 186 college students (41% male) from an introductory level educational psychology course at a large Southwestern university participated in this study. Ages of the participants ranged from 18 to 25 (M=18.66, SD=1.19) and their majors were diverse. In the course, students were assigned four major types of tasks (each task was worth 150 points except for the in-class activities, which totaled 100 points) during the semester as follows: three exams – two exams had 14 multiple-choice and 4 short-answer questions for 50 min and the cumulative final exam with only multiple-choice items, four writing assignments – students were asked to finish a long individual project, which was an opportunity to apply the systematic approach, ten in-class quizzes - brief quizzes were administered at the start of class on days marked in the course schedule, eight or more in-class activities - active and thoughtful participation in class activities, small and large group discussions, and group work. Data from 13 of the respondents were excluded from the analysis due to participants' dropping the course or missing multiple surveys.

2.2. Measures

Achievement goals were measured using [1]'s questionnaire to assess participants' adoption of mastery, performance-approach, and performance-avoidance goals in their class. This questionnaire consists of 18 items, six for each achievement goal. Example items are: 'I want to learn as much as possible from this class' (mastery goal); 'My goal in this class is to get a better grade than most of the students' (performance-approach goal) and 'I just want to avoid doing poorly in this class' (performance-avoidance goal). All questions about achievement goals for each task were provided with a proper leading passage based on each instructional task. When participants were responding to a questionnaire about in-class quizzes, for example, their introductory passage was worded "Here are some questions about yourself in terms of in-class quizzes in this class. Respond to each of the following statements by indicating how true each statement is for your perception toward the quizzes in this class so far." All questionnaires were gathered with Likert type self-report measures for pre- and post-assessment. (1= totally disagree; 5= totally agree).

In terms of using achievement goal measures, there is disagreement in the literature about the core element of performance approach goals [32]. Some believe it is the desire to demonstrate competence [33,34]. Others believe it is the desire to outperform peers [18,26]. Mounting evidence reveals that these two types of performance-approach goals can be differentiated and in fact may yield different effects [33]. For example, [9] reviewed 98 studies of performance-approach goals and systematically coded the content of items. The average correlation between performance-approach goals and academic achievement was positive when the majority of the items emphasized normative comparisons but negative when they emphasized competence demonstration. Goal orientation measures of [1] are positively associated with achievement, whereas competence-demonstration goal measures like the Patterns of Adaptive Learning Scales [35] are not. Thus, this study adopted [1]'s achievement goals questionnaire.

2.3. Procedures

During the first three days of the class, students received detailed information about their course from their instructor and a written syllabus. The latter included not only course materials, important dates, and expectations, but also information about instructional tasks such as quiz templates, paper descriptions, exams, and class activities examples. On the last day of the introduction week, participants got a brief explanation about the current study and were asked to sign on a consent form if they agreed to participate. The procedures for obtaining informed

consent were approved by the Institutional Review Board, as were all measures used in the study. Participants were told that the current study would be ongoing for the whole semester, but they could withdraw without penalty if they were unable or reluctant to participate.

Once the preliminary information (sex, age, year in college, major, etc.) had been collected, the achievement goals surveys toward instructional tasks (quiz, in-class activity, paper, and exam) were administered. The baseline questionnaire (pretest) was administered one class before the first time the class experienced each task. For example, students were asked to report their pre-achievement goals toward in-class quizzes at the beginning of the class prior to the class during which the first quiz was distributed. The follow-up questionnaire (posttest) was administered to students after each task was completed for the last time in the semester, during their regularly scheduled course (see Figure 1 for a detailed timeline). The pretest and posttest questionnaires were identical, and each took approximately seven minutes to complete.
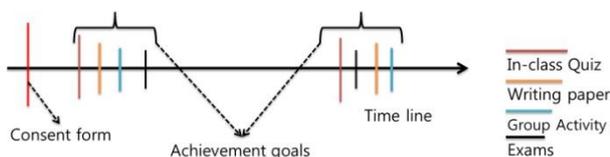

Figure 1. Time line for collecting achievement goals

2.4. Overview of Data Analysis Strategies

Before submitting these data to statistical analysis procedures, the univariate distributions of all variables were checked, to ensure that they were approximately normal. The internal consistency of the each survey was calculated by a common psychometric measure of test and scale reliability, Cronbach's alpha. The subscales' reliability coefficients ranged from .76 to .83, indicative of high internal consistency for each subscale An inter-correlation matrix was used to assess the linearity assumption by determining if the variable measures were independent. Some significant correlation coefficients among the achievement goal measures were found, but those correlations make sense within the theoretical foundations of the study.

In order to investigate changes and stability in achievement goals, this study adopted three statistical analytic procedures: differential continuity, mean-level change, and cluster analysis. First, differential continuity was measured to examine stability or consistency in achievement goals. It refers to the relative placement of individuals within a group over time. That is, two different measures (pre- and post-test) were used to assess continuity of each achievement goal in relation to each instructional task. Correlation coefficients are commonly used to determine whether personality dispositions exhibit trait-like properties – that is, whether they are consistent across time and circumstances.

Second, mean-level change was used to determine if the participants as a group increased or decreased their trait dimensions over time [36]. This type of stability and change is commonly analyzed with a paired-samples *t* test, within-subject analyses of variance (ANOVA), or multivariate analyses of variance (MANOVA) [37,38]. 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 for there to be a high degree of differential continuity and considerable mean-level change within the same sample [39]. Upward changes reflect increased endorsement of a particular goal type, whereas downward changes reflect reduced endorsement of that goal type.

The final approach used in this study to investigate change and stability was cluster analysis, which has some advantages discussed above. In order to facilitate the interpretation of clusters, the subscale scores were standardized through Z-transformations before being entered into the cluster analysis. The standardization prevents variables measured in larger units from contributing more towards the distance measured than the variables utilizing smaller units in the cluster analysis. There are two different types of cluster analysis, hierarchical and k-means. Hierarchical cluster analysis identifies groups of students with similar achievement goal characteristics using Ward's method and squared Euclidean distances. This method can minimize the within-cluster differences but is sensitive to outlier values [40]. On the other hand, K-means cluster analysis lets users assign the number of expected clusters based on relevant theory or research questions. For this study, hierarchical cluster analysis with Ward's method was performed, and then, k-means cluster analysis was conducted with the cluster information found. The combination technique of using two methods (two-stage cluster analysis) is recommended by recent theorists because it can have better validity for data structures and fulfill criteria [41]. Based on existing theory, and in order to retain reasonably large and even sample sizes in each cluster [42,43], different cluster solutions for each analysis were selected and then, changes in cluster memberships from pre- to post-test were explored.

3. Results

3.1. Differential Continuity

First, differential continuity was measured with Pearson product-moment correlations, which are the most common type of analysis used to assess stability. Table 1 shows that there were moderate to high correlations between pre- and post-achievement goals for each instructional task, and all coefficients were significant at the .01 level. This means that each achievement goal for students was stable across an entire academic semester regardless of the instructional task. Previous investigations have reported moderate to high stability in achievement goals over time [11,13,26,37,38]. Although there seems to be reasonable evidence for stability in achievement goals in general, no study has attempted to examine stability and change of achievement goals in relation to specific instructional tasks.

Table 1. Correlation Coefficients between Pre- and Post-measures

	Activity	Paper	Quiz	Exam
MAS	.58[**]	.67[**]	.71[**]	.69[**]
PAP	.69[**]	.67[**]	.78[**]	.77[**]
PAV	.63[**]	.55[**]	.62[**]	.65[**]

Note. MAS=mastery; PAP=performance-approach; PAV=performance-avoidance, [**]*p*<.001.

3.2. Mean-level Change

Next, multiple *t-tests* with Bonferroni's correction were conducted to calculate mean-level change in achievement goal endorsement between the two time points for each instructional task. Table 2 displays descriptive statistics of achievement goals toward each instructional component and inferential *t-statistic values* for mean-level change of achievement goals over time. All achievement goals showed a significant decrease in each level except goals toward the exams. However, there was not a significant decrease in the performance-avoidance goal toward in-class quizzes. In regard to the exams in this study, more interestingly, mastery goals increased, whereas performance-avoidance goals decreased significantly. Participants' performance-approach goals toward exams increased slightly, but not significantly.

Table 2. Descriptive Statistics and t-statistics with effect size

		T1	T2	
	Goals	M(SD)	M(SD)	t(d)
Activity	MAS	4.10(.68)	3.95(.84)	-2.72*(.21)
	PAP	2.98(.97)	2.74(1.08)	-3.77**(.29)
	PAV	2.75(.75)	2.49(.78)	-5.19**(.39)
Paper	MAS	4.09(.59)	3.75(.88)	-6.38**(.51)
	PAP	2.98(.94)	2.83(1.09)	-2.27*(.18)
	PAV	2.93(.78)	2.73(.86)	-3.41**(.26)
Quiz	MAS	3.97(.67)	3.77(.85)	-4.39**(.34)
	PAP	2.99(1.06)	2.84(1.10)	-2.68*(.21)
	PAV	3.04(.75)	2.95(.84)	-1.80(.14)
Exam	MAS	3.87(.73)	3.98(.78)	2.43*(.19)
	PAP	2.82(1.06)	2.90(1.11)	1.46(.11)
	PAV	3.12(.83)	2.81(.84)	-5.89**(.45)

Note. T= Time; MAS=mastery; PAP=performance-approach; PAV=performance-avoidance, $^*p<.05$, $^{**}p<.001$.

3.3. Cluster Analysis

Final cluster centroids for the pre- and post-achievement goals toward each instructional task and changes in cluster membership are presented in the following tables and figures. Each centroid represents the physical "center" of the cluster and is identified by the average of all the scores constituting the cluster. The interpretation of cluster membership should be grounded in achievement goal theory discussed in the previous theoretical framework. Centroids were inspected to consider the distribution of achievement goals within each cluster and relative to the other clusters in order to interpret and label each centroid.

3.3.1. Achievement Goals toward In-class Activities

Four clusters for each pre- and post-measure of achievement goals toward activities were identified. Table 3 shows the final cluster centroids for the pre- and post-achievement goals for in class activities. For the pre-measures, cluster 1 was characterized as a "*mastery oriented*" profile and cluster 2 consisted of students with a "*low motivation*" profile, in which all achievement goal scores wereless than -.40. Cluster 3, labeled "*high motivation*", consisted of students who endorsed all high achievement goals toward in-class activities. Finally, cluster 4 consisted of students who strongly endorsed performance-approach goals only, and were thus characterized as "*performance-approach oriented*". The cluster analysis results for post-measures kept three of the same cluster profiles, which were "*high motivation*", "*low motivation*", and "*mastery oriented*". However, a slightly different fourth cluster was found – "*approach oriented*", which consisted of students with high mastery and high performance-approach goals. Next, changes in clusters from pretest to posttest were investigated.

Table 3. Cluster Centroids of Achievement Goals for Activities

Pre-measures	Cluster 1: MAS oriented	Cluster 2: Low motivation	Cluster 3: High motivation	Cluster 4: PAP oriented
MAS	.60	-1.51	.31	.02
PAP	-.79	-.57	.63	.82
PAV	-.53	-.40	1.22	-.31
n	55	32	45	41
Post-measures	Cluster 1: High motivation	Cluster 2: MAS oriented	Cluster 3: Low motivation	Cluster 4: Approach oriented
MAS	.22	.52	-1.42	.32
PAP	.32	-.86	-.48	1.15
PAV	1.19	-.79	-.14	-.27
n	45	52	35	41

Figure 2 shows changes in cluster membership for achievement goals toward in-class activities. Students with "*high motivation*" and "*low motivation*" for in-class activities at the beginning of the class were likely to keep their goal profile at the posttest (*high motivation* = 27 (60%), *low motivation* = 19 (59%)). However, nine students (45%) from the "*high motivation*" profile reduced only their performance-avoidance goals after a series of in-class activities, whereas six students (13.3%) reduced both performance-avoidance and performance-approach goals but continued holding high mastery goals toward in-class activities.

Of the "*low motivation*" students, seven students (22%) increased only their mastery goals and continued holding low performance goals, while a few students (*n*=4, 12.5%) shifted to the "*high motivation*" profile at the post-measure of in-class activity achievement goals. Similarly, most of the students (*n*=33, 60%) in the "*mastery oriented*" cluster kept their goal profile at the posttest. However, some students shifted from the "*mastery oriented*" profile to either "*high motivation*" (*n*=8, 14.5%) or "*approach oriented*" (*n*=8, 14.5%). Finally, a large number of students (*n*=22, 53.7%) in the "*performance-approach oriented*" cluster increased only their mastery goals, while holding their performance goals profile toward in-class activities. Also, six students (14.6%) from this cluster moved to "*mastery oriented*" and another six students shifted to "*high motivation*" at the post-measures. However, seven out of 41 students moved to the "*low motivation*" profile.
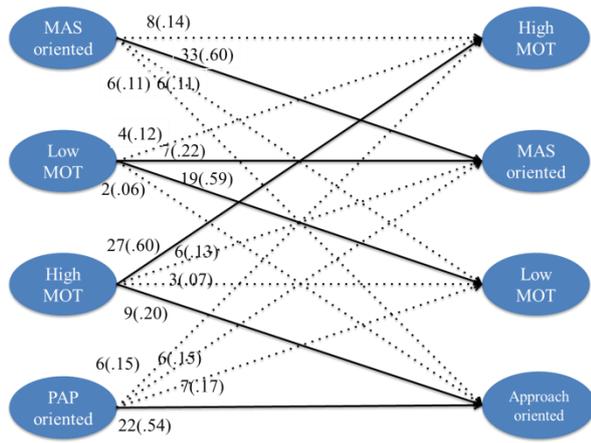
Figure 2. Representation of Changes in Cluster membership toward In-class Activities

3.3.2. Achievement Goals toward Papers

The analysis identified four clusters for pretest and five clusters for the posttest of achievement goals (Table 4). For the pretest, cluster 1 was characterized as an "*approach oriented*" profile, in which mastery and performance-approach goals scores were greater than .60 and performance-avoidance goals were less than -.30. Cluster 2 consisted of students with a "*mastery oriented*" profile, in which mastery goal scores were greater than .50 whereas the two types of performance goals are less than -.80. Clusters 3 and 4 were named the "*high motivation*" and "*low motivation*" profiles respectively. For the posttest, three of the same profiles were found (cluster 1 – 3); "*low motivation*", "*approach oriented*", and "*high motivation*". Cluster 4 was characterized by students who endorsed low mastery but high performance goals, hence it was labeled "*performance oriented*". Finally, cluster 5 reflected strong endorsements of mastery and performance-avoidance goals and hence was labeled a "*success oriented*" profile.

Table 4. Cluster Centroids of Achievement Goals for Papers

| Pre-measures	Cluster 1: Approach oriented	Cluster 2: MAS oriented	Cluster 3: High motivation	Cluster 4: Low motivation	
MAS	.67	.59	.14	-1.32	
PAP	1.21	-.85	.25	-.51	
PAV	-.34	-.81	.97	-.33	
n	33	40	59	41	
Post-measures	Cluster 1: Low motivation	Cluster 2: Approach oriented	Cluster 3: High motivation	Cluster 4: PER oriented	Cluster 5: Success oriented
MAS	-1.04	.51	.49	-.81	.84
PAP	-1.03	.59	1.31	.17	-.67
PAV	-.95	-.92	.72	.59	.33
n	31	31	27	41	43
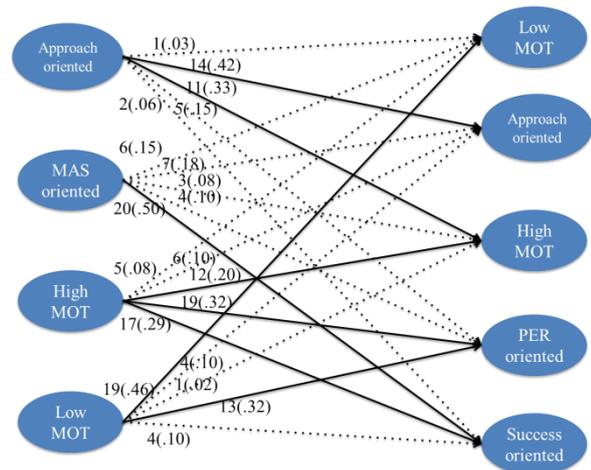
Figure 3. Representation of Changes in Cluster membership toward Papers

Figure 3 shows changes and stability in cluster membership for achievement goals toward writing papers. Approximately half of the students in the "*approach oriented*" profile maintained their goals (*n*=14, 42.4%), whereas about one-third increased their performance-avoidance goals while holding the others steady (*n*=11, 33%). In the case of the "*mastery oriented*" profile, half of the students (*n*=20) increased their performance-avoidance goals while holding the other goals constant, and some students (*n*=7, 17.5%) increased only performance-approach goals, or shifted to a "*low motivation*" profile (*n*=6, 15%) at the posttest. Only 20 percent (*n*=12) of

students in the "*high motivation*" profile remained in the same cluster, whereas 19 (46.3%) "*low motivation*" students maintained their all low achievement goals at the posttest. On the other hand, many students in the "*high motivation*" cluster decreased only their level of mastery goals (*n*=19, 32.2%) or performance-approach goals (*n*=17, 28.8%) while holding the others constant. Finally, 13 students (31.7%) from the "*low motivation*" profile increased their performance-approach and performance-avoidance goals at the posttest.
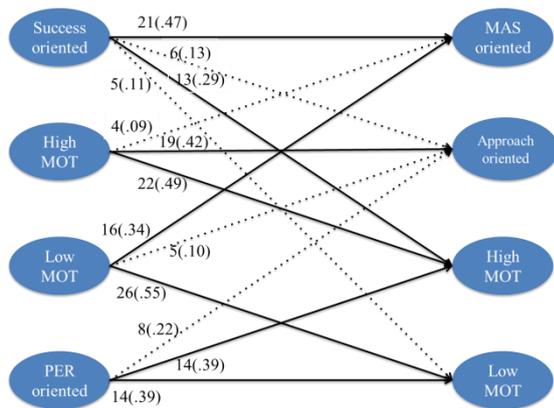
3.3.3. Achievement Goals toward Quizzes

The results show that pre- and posttest achievement goal orientations toward quizzes can be clustered into four profiles each (Table 5). For the pretest, cluster 1 was labeled as a "*success oriented*" and cluster 2 consisted of students with high levels of all achievement goals (*high motivation*) toward taking a quiz in class. Cluster 3 was characterized as a "*low motivation*" profile, in which all achievement goal scores were less than -.50. Cluster 4 consisted of students who adopted low mastery goals but high performance-approach and performance-avoidance goals toward quizzes. Thus, it was labeled as a "*performance oriented*" profile. The posttest again included the "*high motivation*" and "*low motivation*" profiles at clusters 3 and 4. Cluster 1 was defined as a "*mastery oriented*" profile because mastery goals were greater than .80 and the two performance related goals were less than -.50. Finally cluster 2 was named "*approach oriented*" because this cluster had high values

on mastery and performance-approach but low values on

performance-avoidance goals.

Table 5. Cluster Centroids of Achievement Goals for Quizzes

Pre-measures	Cluster 1: Success oriented	Cluster 2: High motivation	Cluster 3: Low motivation	Cluster 4: PER oriented
MAS	.52	.85	-.50	-1.05
PAP	-.45	1.07	-.93	.44
PAV	.50	.23	-1.05	.45
n	45	45	47	36
Post-measures	Cluster 1: MAS oriented	Cluster 2: Approach oriented	Cluster 3: High motivation	Cluster 4: Low motivation
MAS	.83	.38	.14	-1.23
PAP	-.87	.96	.53	-.59
PAV	-.52	-.36	1.05	-.37
n	41	38	49	45

Figure 4. Representation of Changes in Cluster membership toward Quizzes

Figure 4 shows changes in cluster membership for achievement goals toward taking a quiz. Many students (*n*=21, 47%) in the "*success oriented*" profile decreased their endorsement of performance-avoidance goals while maintaining high mastery and low performance-approach goals. Some students (*n*=13, 29%) in this profile increased their endorsement of performance-approach goals and moved to the "*high motivation*" profile. Others shifted to the "*approach oriented*" (*n*=6, 13%) or "*low motivation*" (*n*=5, 11%) profiles. Similar to what was seen with in-class activities, students with "*high motivation*" or "*low motivation*" relative to taking a quiz at pretest were likely to keep their goals profile at the posttest (*high motivation*

= 22(49%), *low motivation* = 26(55%)). However, 19 students (42%) in the "*high motivation*" profile decreased only their performance-avoidance goals while holding the others high, whereas 16 students (34%) in the "*low motivation*" profile increased only the mastery goals while holding other goals low. Finally, most of the students in the "*performance oriented*" profile moved to the "*high motivation*" (*n*=14, 39%) or "*low motivation*" (*n*=14, 39%) profiles. Eight students (22%) from the "*performance oriented*" profile increased mastery goals and decreased performance-avoidance goals at the posttest.

3.3.4. Achievement Goals toward Exams

Four clusters each were identified for the pre- and posttests of achievement goals toward exams (Table 6). For the pretest, cluster 1 was characterized as a "*success oriented*" profile and cluster 2 consisted of students with a "*high motivation*" profile, in which all achievement goal scores were greater than 0.40. Cluster 3, labeled "*mastery oriented*", consisted of students who endorsed high mastery goals but low performance-related goals toward exams. Finally, cluster 4 was characterized by students who reported only high performance-avoidance goals for taking an exam, and was thus named "*performance-avoidance oriented*". The cluster analysis of the posttest yielded two of the same cluster profiles, which were "*high motivation*" and "*mastery oriented*". However, two slightly different profiles were identified—namely, "*low motivation*" and "*performance-approach oriented.*"

Table 6. Cluster Centroids of Achievement Goals for Exams

Pre-measures	Cluster 1: Success oriented	Cluster 2: High motivation	Cluster 3: MAS oriented	Cluster 4: PAV oriented
MAS	.67	.48	.33	-1.14
PAP	-.56	1.15	-.80	-.08
PAV	.73	.46	-1.37	.24
n	45	45	47	36
Post-measures	Cluster 1: Low motivation	Cluster 2: MAS oriented	Cluster 3: High motivation	Cluster 4: PAP oriented
MAS	-1.29	.79	.38	-.95
PAP	-1.14	-.71	1.03	.29
PAV	-.57	-.32	.57	.04
n	21	59	52	41

Figure 5 shows changes and stability in cluster membership for achievement goals toward taking an exam. Students in the "*success oriented*" profile decreased only their performance-avoidance goals, while holding the others constant (*n*=28, 64%). Only nine students in this profile decreased their mastery goals for taking an exam

and fell into the "*low motivation*" (*n*=5, 11%) and "*performance-approach oriented*" (*n*=4, 9%) posttest clusters. The remaining students (*n*=7, 16%) in cluster 1 at the pretest increased their performance-approach goals and moved to the "*high motivation*" profile. Similarly, students in the "*high motivation*" profile at the pretest

were likely to maintain their high goals at the posttest (*n*=31, 65%). Some students from this profile decreased only their performance-related goals, but maintained their high mastery goals (*n*=10, 21%). Only six students (12%) of this profile decreased their mastery goals toward taking an exam at the posttest. Most of the students (*n*=19, 56%) in the "*mastery oriented*" profile did not change their cluster membership, but five students (15%) shifted to the "*low motivation*" profile and six students (17%) moved to the "*performance-approach oriented*" profile at the posttest. Finally, students from the "*performance-avoidance oriented*" profile at the pretest either increased their performance-approach goals while holding the others constant (*n*=25, 53%), decreased only their performance-avoidance goals (*n*=10, 21%), or shifted to the "*high motivation*" profile (*n*=10, 21%) at the posttest.
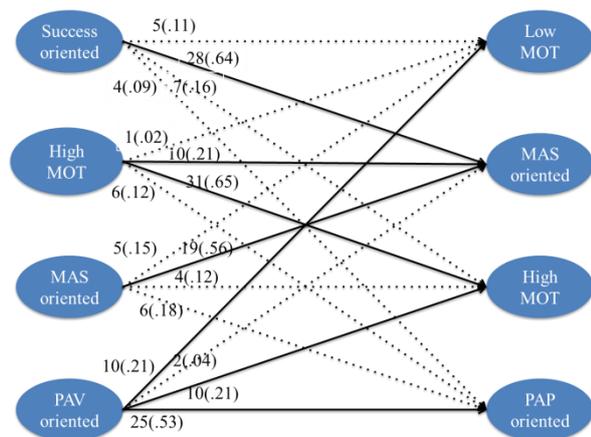
Figure 5. Representation of Changes in Cluster membership toward Exams

4. Discussion

Although there has been a tremendous amount of research on individual achievement goals and relevant outcomes, no one has explicitly investigated differences in goal regulation based on instructional tasks. Recently, some investigations have examined the regulations of achievement goals, and a few studies have explored relations between personal goals and classroom environments [11,12,13,26]. The present study investigates stability and change in students' achievement goals toward instructional tasks in a college classroom in order to extend previous research findings and adopt a person-centered approach. The results and findings from the current study suggest several implications for practice.

First, the current findings provide clear and consistent evidence for the presence of both stability and change in individual achievement goals, each of which is important for the achievement motivation research field. A few studies have addressed the consistency of individual achievement goals across different domains, such as sports versus school [44] or math versus English [37], but goal regulation issues such as those addressed here have begun to garner research attention. Even though some theorists [17] have insisted that various aspects of the classroom environment, such as the evaluative structure and the frequency of performance evaluation, were important factors in the regulation of achievement goals, those factors have not been clearly tested. However, the current

study's findings indicate a considerable amount of stability for all three achievement goals toward each instructional task when using a differential continuity analytic approach. On the other hand, this study also provides evidence for a goal regulation process through mean-level changes. The study cannot illuminate the switching process among individual goal orientations, but the results from mean-level analyses provide strong evidence for the goal intensification process, in which individuals can simply intensify and/or reduce their pursuit of one goal without any concurrent adjustments to their pursuit of other goals.

The second important implication of this study concerns achievement goal research methodology. As most studies about the regulation of achievement goals have adopted analyses of mean-level changes and differential continuity [37,44], they seem to have overlooked the important possibility of individual change and stability. The current study has adopted a person-centered approach, specifically cluster analysis. The findings provide fruitful implications for the further study of goal regulation. That is, additional statistical approaches of stability and change can yield information that is independent of that provided by differential continuity and mean-level change analyses. In particular, the investigation of on-going changes in students' goal clusters has never been explored before. Thus, exploratory research through cluster analyses can potentially strengthen the field of achievement goals research.

Third, the findings suggest pedagogical changes to the instructional design of classrooms in terms of increasing students' adaptive motivation and engaging students in their learning. Generally, students feel a high need to study before taking an exam in class. However, some of them have struggled with severe test anxiety issues, which negatively impacts their learning and also affects their individual achievement goals. Reference [6] reported that a relationship between perceived competence and test anxiety is mediated by students' achievement goal orientations. Also, moderate correlations between middle school students' test anxiety and their level of achievement goals have been found [45]. The current study suggests that a class would benefit from having not only exams, but also diverse instructional components to encourage students' adoption of adaptive individual goals. For instance, in the present study, participants' pursuit of mastery goals for an exam was related to content-relevant in-class activities and quizzes. Based on this, I strongly recommend that short quizzes similar to exam questions should be used between major exams to enhance students' mastery goals and reduce their performance-avoidance goals.

References

[1]   Elliot, A. J., & Church, M. A. (1997). A hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology, 72*(1), 218-232.

[2]   Elliot, A. J., & McGregor, H. A. (1999). Test anxiety and the hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology, 76*(4), 628-644.

[3]   Barzegar, M. (2012). *The Relationship between Goal Orientation and Academic Achievement--The Mediation Role of Self Regulated Learning Strategies--A Path Analysis.*

[4] Wolters, C. A., Yu, S. L., & Pintrich, P. R. (1996). The relation between goal orientation and students' motivational beliefs and self-regulated learning. *Learning and Individual Differences, 8*(3), 211-238.

[5] Vande Walle, D., & Cummings, L. L. (1997). A test of the influence of goal orientation on the feedback-seeking process. *Journal of Applied Psychology, 82*(3), 390-400.

[6] Putwain, D. W., & Symes, W. (2012). Achievement Goals as Mediators of the Relationship between Competence Beliefs and Test Anxiety. *British Journal of Educational Psychology, 82*(2), 207-224.

[7] Middleton, M. J., & Midgley, C. (1997). Avoiding the demonstration of lack of ability: An underexplored aspect of goal theory. *Journal of Educational Psychology, 89*(4), 710-718.

[8] Bell, B. S., & Kozlowski, S. W. J. (2002). A Typology of Virtual Teams Implications for Effective Leadership. *Group & Organization Management, 27*(1), 14-49.

[9] Hulleman, C. S., Schrager, S. M., Bodmann, S. M., & Harackiewicz, J. M. (2010). A meta-analytic review of achievement goal measures: Different labels for the same constructs or different constructs with similar labels? *Psychological Bulletin, 136*(3), 422-449.

[10] Bernacki, M. L., Aleven, V., & Nokes-Malach, T. J. (2014). Stability and change in adolescents' task-specific achievement goals and implications for learning mathematics with intelligent tutors. *Computers in Human Behavior, 37*, 73-80.

[11] Fryer, J. W., & Elliot, A. J. (2007). Stability and Change in Achievement Goals. *Journal of Educational Psychology, 99*(4), 700-714.

[12] Muis, K. R., & Edwards, O. (2009). Examining the Stability of Achievement Goal Orientation. *Contemporary Educational Psychology, 34*(4), 265-277.

[13] Tuominen-Soini, H., Salmela-Aro, K., & Niemivirta, M. (2011). Stability and Change in Achievement Goal Orientations: A Person-Centered Approach. *Contemporary Educational Psychology, 36*(2), 82-100.

[14] Fryer, J. W., & Elliot, A. J. (2008). Self-regulation of achievement goal pursuit. *Motivation and self-regulated learning: Theory, research, and applications*, 53-75.

[15] Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist, 41*(10), 1040-1048.

[16] Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95*(2), 256-273.

[17] Ames, C. (1992). Achievement goals and the classroom motivational climate. In D. H. Schunk & J. L. Meece (Eds.), *Student perceptions in the classroom.* (pp. 327-348). Hillsdale, NJ England: Lawrence Erlbaum Associates, Inc.

[18] Duda, J. L. (2005). Motivation in Sport: The Relevance of Competence and Achievement Goals. In A. J. Elliot & C. S. Dweck (Eds.), *Handbook of competence and motivation.* (pp. 318-335). New York, NY US: Guilford Publications.

[19] Barron, K. E., & Harackiewicz, J. M. (2001). Achievement goals and optimal motivation: Testing multiple goal models. *Journal of Personality and Social Psychology, 80*(5), 706-722.

[20] Linnenbrink, E. A. (2005). The Dilemma of Performance-Approach Goals: The Use of Multiple Goal Contexts to Promote Students' Motivation and Learning. *Journal of Educational Psychology, 97*(2), 197-213.

[21] Pintrich, P. R. (2000). Multiple goals, multiple pathways: The role of goal orientation in learning and achievement. *Journal of Educational Psychology, 92*(3), 544-555.

[22] Meece, J. L., & Holt, K. (1993). A pattern analysis of students' achievement goals. *Journal of educational psychology*, *85*(4), 582.

[23] Chia Liu, W., Wang, C., Tan, O. S., Ee, J., & Koh, C. (2009). Understanding students' motivation in project work: A 2× 2 achievement goal approach. *British Journal of Educational Psychology, 79*(1), 87-106.

[24] Harackiewicz, J. M., Barron, K. E., & Elliot, A. J. (1998). Rethinking achievement goals: When are they adaptive for college students and why? *Educational Psychologist, 33*(1), 1-21.

[25] Elliot, A. J., & Thrash, T. M. (2001). Achievement goals and the hierarchical model of achievement motivation. *Educational Psychology Review*, *13*(2), 139-156.

[26] Senko, C., & Harackiewicz, J. M. (2005). Regulation of Achievement Goals: The Role of Competence Feedback. *Journal of Educational Psychology, 97*(3), 320-336.

[27] Samuel, D. B., Hopwood, C. J., Ansell, E. B., Morey, L. C., Sanislow, C. A., Markowitz, J. C., . . . Grilo, C. M. (2011). Comparing the temporal stability of self-report and interview assessed personality disorder. *Journal of Abnormal Psychology, 120*(3), 670-680.

[28] Wortman, J., Lucas, R. E., & Donnellan, M. B. (2012). Stability and change in the Big Five personality domains: Evidence from a longitudinal study of Australians. *Psychology and Aging, 27*(4), 867-874.

[29] Karabenick, S. A. (2003). Seeking help in large college classes: A person-centered approach. *Contemporary Educational Psychology, 28*(1), 37-58.

[30] Miller, R. B., Behrens, J. T., Greene, B. A., & Newman, D. (1993). Goals and Perceived Ability: Impact on Student Valuing, Self-Regulation, and Persistence. *Contemporary Educational Psychology, 18*(1), 2-14.

[31] Kaplan, A., & Midgley, C. (1997). The effect of achievement goals: does level of perceived academic competence make a difference?. *Contemporary educational psychology*, *22*(4), 415-435.

[32] Senko, C., Hulleman, C. S., & Harackiewicz, J. M. (2011). Achievement Goal Theory at the Crossroads: Old Controversies, Current Challenges, and New Directions. *Educational Psychologist, 46*(1), 26-47.

[33] Grant, H., & Dweck, C. S. (2003). Clarifying Achievement Goals and Their Impact. *Journal of Personality and Social Psychology, 85*(3), 541-553.

[34] Kaplan, A., & Maehr, M. L. (2007). The contributions and prospects of goal orientation theory. *Educational Psychology Review*, *19*(2), 141-184.

[35] Midgley, C., Maehr, M. L., Hruda, L. Z., Anderman, E. M., Anderman, L., Freeman, K. E., & Urdan, T. (2000). PALS—Manual for the patterns of adaptive learning scales. *Unpublished manuscript, University of Michigan*.

[36] Roberts, B. W., Caspi, A., & Moffitt, T. E. (2001). The kids are alright: Growth and stability in personality development from adolescence to adulthood. *Journal of Personality and Social Psychology, 81*(4), 670-683.

[37] Anderman, E. M., & Midgley, C. (1997). Changes in achievement goal orientations, perceived academic competence, and grades across the transition to middle-level schools. *Contemporary Educational Psychology, 22*(3), 269-298.

[38] Bong, M. (2005). Within-Grade Changes in Korean Girls' Motivation and Perceptions of the Learning Environment Across Domains and Achievement Levels. *Journal of Educational Psychology, 97*(4), 656-672.

[39] Gottfried, A. E., Fleming, J. S., & Gottfried, A. W. (2001). Continuity of academic intrinsic motivation from childhood through late adolescence: A longitudinal study. *Journal of Educational Psychology, 93*(1), 3-13.

[40] Aldenderfer, M. S., & Blashfield, R. K. (1984). *Cluster analysis: Quantitative applications in the social sciences*: Beverly Hills: Sage Publication.

[41] Panitz, H. J. (2010). Optimization of long-term air quality modelling applying cluster analysis techniques. *Meteorologische Zeitschrift, 19*(1), 63-80.

[42] Alexander, P. A., & Murphy, P. K. (1998). Profiling the Differences in Students' Knowledge, Interest, and Strategic Processing. *Journal of Educational Psychology, 90*(3), 435-447.

[43] Bråten, I., & Olaussen, B. S. (2005). Profiling individual differences in student motivation: A longitudinal cluster-analytic study in different academic contexts. *Contemporary Educational Psychology, 30*(3), 359-396.

[44] Duda, J. L., & Nicholls, J. G. (1992). Dimensions of achievement motivation in schoolwork and sport. *Journal of Educational Psychology, 84*(3), 290-299.

[45] Huijun, L., Dejun, G., Hongli, L., & Peixia, G. (2006). Relationship among Achievement Goal Orientation, Test Anxiety and Working Memory. *Acta Psychologica Sinica, 38*(2), 254-261.