Structural Validation of the 3 X 2 Achievement Goal Model

Adonis David
Philippine Normal University

Abstract   In the past two decades, the achievement goal construct has been one of the most studied variables in the area of students' achievement motivation. From the initial conceptualization of achievement goals as a dichotomy (Ames, 1992; Ames &Archer, 1988) to its expansion as a *trichotomous model* (Elliot & Church, 1997; Elliot & Harackiewicz, 1996) and as a *2 x 2 model* (Elliot & McGregor, 2001), the literature has seen the proliferation of empirical studies on the structure, antecedents, and consequences of achievement goals in the academic domain. The importance given to the construct can be attributed to the premise that achievement goals, defined as "competence-based aim that guide behaviour" (Elliot, Murayama, & Pekrun, 2011, p.632), may shape or influence achievement-related, as well as learning-related outcomes. Recently, a *3 x 2 achievement goal model* was proposed and empirically tested by Elliot and colleagues to significantly advance the conceptualization of achievement goals. At the core of the new model is differentiating achievement goals as *task-based, self-based,* and *other-based goals* in terms of definition and as *approach* and *avoidance goals* in terms of valence. This study in investigated the structural validity and cross-cultural generalizability of the 3 x 2 achievement goal model by examining the achievement goals of Filipino undergraduate students using the 3 x 2 Achievement Goal Questionnaire (Elliot et al., 2011).

Keywords: AGQ, Achievement Goal Model, undergraduate students

Overview of the Achievement Goal Models

The construct *achievement goal* traced its roots from a number of theorists who were focused on determining what types of goals students adopt in relation to achievement in the academic domain. Early in its conceptualization in the 1980s, two dominant definitions emerged: achievement goal as the purpose for achievement behavior *and* achievement goal as an orientation toward achievement tasks (see Elliot & Trash, 2001, for a comparison and analysis of these two perspectives). In addition, achievement goals have been conceived as a dichotomy. At the onset, several conceptual labels of this dichotomy emerged but conceptualizing them as mastery and performance goals (Ames & Archer, 1988) became widely accepted. In *mastery goals,* the purpose is the development of a competence with a task-based standard for competence evaluation while in *performance goals* the purpose is the demonstration of competence with a normative standard for competence evaluation (Elliot & Trash, 2001). Many researchers who reviewed the literature on achievement goals noted

considerable evidence that point to the adaptive effects of mastery goals and the negative effects of performance goals on a host of achievement and learning-related behaviors (e. g., Ames, 1992; Harackiewicz & Elliot, 1993). The view that mastery goals lead to adaptive responses and performance goals lead to maladaptive responses is known as the *mastery goal perspective.* This perspective "implies that individuals are best off exclusively focusing on mastery in their achievement pursuits" (Barron & Harackiewicz, 2001, p. 707).

In the 1990s, Elliot and Harackiewicz (1996) proposed an expansion of the dichotomous model of achievement model by incorporating the approach-avoidance distinction in the original model. Specifically, a revision in the model was proposed by maintaining the mastery goal construct and partitioning the performance goal construct into two: *performance-approach* and *performance-avoidance goals.* The former is directed toward the demonstration of competence or success while the latter is directed at avoiding the demonstration of incompetence or failure (Elliot, 1999). This is referred to as the trichotomous achievement goal model and central to this revised model are the assumptions that performance-approach and performance-avoidance goals are distinct and separate achievement orientations and that performance-approach and mastery goals both represent approach orientations (Elliot, 1999; Elliot & Harackiewicz, 1996). Empirical findings provided support for the model. For example, Elliot and Harackiewicz (1996) examined the predictive utility of the model in the intrinsic motivation domain. Results from two experiments conducted by the researchers supported the notion that only performance-avoidance goals undermined intrinsic motivation providing support to the instrumentality of making a distinction between performance-approach and performance-avoidance goals.

Elliot and Church (1997), on the other hand, were able to demonstrate in their study that mastery, performance-approach, and performance-avoidance goals differ in terms of their antecedents and consequences. Specifically, achievement motivation and high competence expectancies were found to be antecedents of mastery goals while fear of failure and low competence expectancies were linked to performance-avoidance goals. Moreover, achievement motivation, fear of failure, and high competence expectancies were the antecedents for the performance-approach goals. In terms of the consequences of the three goals, findings revealed that mastery goals have a positive influence on intrinsic motivation but were not predictive of grades. On the other hand, performance-approach goals have a positive influence on grades but were not predictive of intrinsic motivation while performance-avoidance goals have a negative influence on both grades and intrinsic motivation. Overall, the findings provided support for the usefulness of revising the achievement goal model into a trichotomous framework.

In the previous decade, Elliot and McGregor (2001) proposed a further revision of the achievement goal model by highlighting the need to conceptualize achievement goals in terms of the *definition* (absolute/intrapersonal and normative) and *valence* (positive and negative) dimensions of competence. Thus, the 2 x 2 achievement goal model was forwarded wherein the construct of *mastery-avoidance goals* which focus on "avoiding task-based or intrapersonal incompetence" (Cury, Elliot, Da Fonseca, & Moller, 2006) was added to the three achievement goal constructs defined by the trichotomous model. Using Confirmatory Factor Analysis (CFA) and regression analyses in three separate studies, Elliot and McGregor (2001) were able to provide support to the structural validity of the four achievement goal construct, as well as evidence on the distinct antecedents and consequences of the four achievement goal constructs in relation to a host of variables like self-determination, deep processing, worry, fear of failure, and overall need for achievement. In addition, in the same

study, it was found that mastery-avoidance goals tend to be more associated with negative outcomes compared to mastery-approach goals but were less deleterious compared to performance-avoidance goals. These findings provided support to the usefulness of the 2 x 2 achievement goal model.

The 3 x 2 Achievement Goal Model

At the onset of their introduction of the 2 x 2 model, Elliot and McGregor (2001) already argued for a 3 x 2 conceptualization of the achievement goal framework. This is based on the premise that the absolute and intrapersonal definitions of competence can be separated conceptually which then may entail separate goals. More recently, Elliot et al. (2011) formally proposed a revision of the achievement goal construct by arguing a need for a 3 x 2 model. Central to this model is the separation of task-based (absolute) and self-based (intrapersonal) definition of competence which led to the partitioning of the mastery goal construct into *task-based goals* and *self-based goals*. For task-based goals, "competence is defined in terms of doing well or poorly relative to what the task itself requires" while in self-based goals "competence is defined in terms of doing well or poorly relative to how one has done in the past or has the potential to do in the future" (Elliot et al., 2011, p.633). For conceptual consistency, performance goals are renamed as *other-based goals* wherein "competence is defined in terms of doing well or poorly relative to others" (Elliot et al., 2011, p. 633).

Crossing the three competence definitions with the two ways competence are valenced (approach-based goals and avoidance-based goals) yield a 3 x 2 achievement goal model consisting of six distinct achievement goals. Elliot et al. (2011, p. 634) provided the following definitions for the six achievement goals: (1) "a task-approach goal focused on the attainment of task-based competence (e. g., "Do the task correctly")," (2) "a task-avoidance goal focused on the avoidance of task-based incompetence (e. g., "Avoid doing the task incorrectly")," (3) "a self-approach goal focused on the attainment of self-based competence (e. g., "Do better than before")," (4) "a self-avoidance goal focused on the avoidance of self-based incompetence (e. g., "Avoid doing worse than before")," (5) "an other-approach goal focused on the attainment of other-based competence (e. g., "Do better than others")," and (6) "an other-avoidance goal focused on the avoidance of other-based incompetence (e. g., "Avoid doing worse than others")."

Using the 3 x 2 Achievement Goal Questionnaire, Elliot et al. (2011) investigated the structural validity of the 3 x 2 achievement goal model in two studies and findings provided data supporting the 3 x 2 structure of achievement goals among German (Study 1) and American (Study 2) undergraduate students. In both studies, CFA provided support for the 3 x 2 achievement goal model while supplementary analyses showed that the 3 x 2 achievement goal model was superior to alternative models (e. g., 2 x 2, trichotomous). In both studies, the six achievement goals were also significantly and positively correlated with each other. Furthermore, findings on the antecedents and consequences of the six achievement goals in Study 2 provided support on the predictive utility of the 3 x 2 achievement goal model. One interesting finding is that while task-based and self-based goals have the same antecedents, they were related to different consequences. These particular findings provided further evidence on the need to conceptualize the task-based aspects and self-based aspects of mastery goals as separate and distinct achievement goals.

The Present Study

As in most psychological constructs, the viability of the achievement goal construct outside of the Western environment has been examined. In studies involving Asian students, findings point to the applicability of the achievement goal construct among Asians but certain differences on how achievement goals operate or function among Asian students as compared to their Western counterparts were noted (e. g., Bernardo, 2008; Chang & Wong, 2008; Ho & Hau, 2008; Tao & Hong, 2000). Such differences are usually explained in terms of the cultural differences between Western (i. e. American) and Asian students. For example, Bernardo and Ismail (2010) described that many Asian researchers argue that achievement goals have different meanings with Asian students. Hence, it may be important to examine the structural validity of the 3 x 2 achievement goal model among Asian students, and Filipino students in particular. This is consistent with the recommendations of Elliot et al (2011) to extend the focus of studies on the 3 x 2 achievement goal model beyond Western countries.

In my review of the literature, I have come across only one published study that primarily aimed to validate the achievement goal construct among Filipino students (Dela Rosa, 2010). In this study, the structural validity of the 2 x 2 achievement goal model among Filipino high school students was examined using exploratory factor analysis (EFA) and CFA. Findings from the EFA revealed only three factors: mastery-approach, performance-approach, and avoidance goals (mastery-avoidance and performance-avoidance items loaded on the same latent factor). Dela Rosa reported that the CFA confirmed the findings of the EFA and that the data did not satisfy most of the criteria for a good fitting model. In sum, the structure of the 2 x 2 achievement goal model was not confirmed in the study. It would be interesting to determine if similar or different findings may be revealed in examining the structural validity of the 3 x 2 achievement goal model among Filipino students.

Method

Participants and Procedure

The participants in the study are 350 (84 male and 266 female) first-year undergraduate from a university in Manila, Philippines. The participants (mean age = 16.95; SD = 2.17) were selected through purposive sampling and were currently enrolled in a mathematics class during the period of the data gathering. Data gathering occurred during the participants' fourth week on the course. Participants completed the achievement goal questionnaire in group sessions. The participants were informed that the data from the questionnaire will only be used for research purposes and that individual data would remain private and confidential.

Instrument

The 3 x 2 Achievement Goal Questionnaire (AGQ) by Elliot et al. (2011) was adopted in the present study. The AGQ is an 18-item instrument that was designed to assess each of the six achievement goals in the context of achievement in an exam. The AGQ has six subscales corresponding to the six achievement goals. Each goal is represented by three items. The items were reworded so that all of the 18 items would pertain to the students'

mathematics course (the original instrument pertains to a psychology course). Adopting the instructions provided by Elliot et al in their study, participants were informed that they would be responding to statements that represent types of goals that they may or may not have for their mathematics course. The participants responded to the instruments using a 7-point Likert-type scale which range from 1 (*not true of me*) to 7 (*extremely true of me*). In the present study, the Cronbach's alpha values of the six subscales ranged from .79 to .90 and the Cronbach's alpha value for the full instrument is .93, suggesting that the AGQ and its six subscales are reliable measures.

The following are sample items from the AGQ: "To get a lot of questions right on the exams in this class" (task-approach); "To avoid missing a lot of questions on the exams in the class"(task-avoidance); "To do better on the exams in this class than I typically do in this type of situation" (self-approach); "To avoid doing worse on the exams in this class than I normally do on these types of exams" (self-avoidance); "To do better than my classmates on the exams in this class" (other-approach); "To avoid doing worse than other students on the exams in this class" (other-avoidance).

Data Analysis

Descriptive statistics (means, standard deviations), internal consistencies, and intercorrelations of the achievement goals in the study were determined using the software Statistical Package for the Social Sciences (SPSS) Version 16. To establish structural validity, a CFA using structural equation modeling technique was conducted on the achievement goal items using the software AMOS Version 16. In the CFA, the structure of the participants' achievement goals was examined by determining if items load on their respective latent trait (e. g. task-approach goal) and by determining if the overall structure of the hypothesized 3 x 2 model meets the criteria for a good fitting model. CFA was also used to compare the hypothesized model with alternative models.

The goodness of fit of the hypothesized model was tested using the following indexes: chi square (χ^2), chi-square to degrees of freedom (χ^2/df), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and the root mean square of approximation (RMSEA). The Akaike Information Criterion (AIC) and the Browne-Cudeck Criterion (BCC) were used to compare the hypothesized model with alternative models. To evaluate the model fit, χ^2 should not be significant (p > .05), χ^2/df should be less than two, CFI and TLI should at least be .90, and the RMSEA should not be higher than .08. In terms of the AIC and BCC, lower values suggest a better fitting model.

Results

Confirmatory Factor Analysis

The results from the CFA showed that all of the items loaded significantly into their respective latent traits and that standardized factor loadings ranged from moderate to strong (.65 to .88). The CFA also indicated a good fitting model. The fit indexes were: χ^2 (120, N= 350) = 301.28, $p < 0.00$; χ^2/df = 2.51; CFI = .95, TLI = .94, RMSEA = 0.066. In sum, the results provide support for the hypothesized model.

Descriptive Statistics, Internal Consistencies, and Intercorrelations

Descriptive statistics show that the participants have the highest mean scores in the self-based goals (self-approach and self-avoidance goals) and the lowest mean scores in the other-based goals (other-approach and other-avoidance goals). The latter findings share similarities with the findings of Elliot et al. (2011) where German and American students also had their lowest mean scores in the other-approach and other-avoidance goals. However, unlike the Filipino students of the present study, the German and American students in the study of Elliot et al. hadtheir highest means scores in the task-based goals (task-approach and task-avoidance).

In terms of reliability, each of the six achievement goals demonstrated a high level of internal consistency and the values approximate the internal consistencies of the six achievement goals reported by Elliot et al. in their study. Moreover, intercorrelations of the six achievement goals reveal that all the achievement goals have moderate but significant and positive relations with one another, which is also consistent with the results reported by Elliot et al. Table 1 provides the descriptive statistics and internal consistencies of the six achievement goals; Table 2 provides the intercorrelations among the six achievement goals.

Table 1
Descriptive Statistics and Internal Consistencies

Variable	M	SD	Cronbach's α
Task-approach goals	4.82	1.35	.79
Task-avoidance goals	4.85	1.33	.84
Self-approach goals	5.33	1.21	.85
Self-avoidance goals	5.14	1.25	.83
Other-approach goals	3.99	1.52	.86
Other-avoidance goals	4.84	1.46	.90

Table 2
Intercorrelations among the Achievement Goal Variables

Variable	1	2	3	4	5	6
1. Task-approach goals	---	.68**	.60**	.55**	.45**	.51**
2. Task-avoidance goals		---	.62**	.59**	.43**	.50**
3. Self-approach goals			---	.61**	.40**	.44**
4. Self-avoidance goals				---	.42**	.52**
5. Other-approach goals					---	.64**
6. Other-avoidance goals						---

** $p < 0.01$

Comparison with Alternative Models

Following the analytic procedure conducted by Eliot et al. (2011), the 3 x 2 achievement goal model was compared with alternative models by conducting a series of CFA to examine the fit of eleven alternative models (I examined an eleventh alternative model in addition to the ten alternative models investigated by Elliot et al.). These models are the following: (a) a *2 x 2* model, (b) a *Trichotomous* model, (c) a *Dichotomous* model, (d) a *Task-approach/Task-avoidance (Tap/Tav)* model, (e) a *Self-approach/Self-avoidance* model (*Sap/Sav*), (f) an *Other-approach/Other-avoidance model (Oap/Oav)*, (g) an *Approach* model, (h)an *Avoidance* model, (i) a *Definition* model, (j) a *Valence* model, and (k) a *Goal* model. The first ten alternative models (a to j) were conceptualized and examined in accordance to the models' conceptualization as described by Elliot and colleagues (for a full description of the alternative models, see Elliot et al., 2011, p. 636). In the *Goal* model, which I added as an alternative model, all items were made to load on one single latent factor. As can be seen in Table 3, model comparison using the AIC and BCC values indicates that the 3 x 2 model provided a better fit to the data than any of the eleven alternative models examined. The 3 x 2 model also has the lowest χ^2 and χ^2/df values among the models tested, providing additional evidence that the 3 x 2 model is a better fitting model than any of the alternative models. Another interesting finding is that the 2 x 2 model did not provide adequate fit for the data which is somehow consistent with the findings of Dela Rosa (2010).

Table 3
Fit Statistics of the 3 x 2 Achievement Goal Model and Alternative Models

Model	χ^2	df	χ^2/df	CFI	TLI	RMSEA	AIC	BCC
3 X 2 model	301.28	120	2.51	.95	.94	.066	439.284	447.229
2 x 2 model	570.08	129	4.42	.89	.87	.099	690.079	696.988
Trichotomous model	619.17	132	4.69	.88	.86	.103	733.170	739.733
Dichotomous model	832.77	134	6.22	.82	.80	.122	942.772	949.105
Tap/Tav model	338.30	125	2.71	.95	.93	.070	466.304	473.674
Sap/Sav model	459.51	125	3.68	.92	.90	.088	587.509	594.879
Oap/Oav model	516.46	125	4.13	.90	.88	.095	644.457	651.827
Approach model	861.80	129	6.68	.82	.78	.128	981.802	988.712
Avoidance model	868.64	129	6.73	.81	.78	.128	988.640	995.549
Definition model	709.72	132	5.38	.85	.83	.112	823.724	830.288
Valence model	1,353.23	134	10.10	.69	.65	.161	1,463.227	1,469.561
Goal model	1,395.63	135	10.34	.68	.64	.164	1,503.633	1,509.851

Discussion

The purpose of the present study is to examine the achievement goals of Filipino students within the 3 x 2 achievement goal framework. There are several important findings in this study. First, the structure of the 3 x 2 achievement goal model was confirmed among the participants of this study. This means that the 3 x 2 achievement goal model is structurally valid among Filipino undergraduate students. In other words, the Filipino students' achievement goals may be described as task-approach, task-avoidance, self-approach, self-avoidance, other-approach, or other-avoidance goals.

In general, the present study provide empirical support to the arguments of Elliot et al. (2011) on the need to revise the way we conceptualize achievement goals, specifically on the separation of task-based and self-based goals which is not provided for by the dichotomous, trichotomous, and 2 x 2 models. Hence, it is reasonable that future studies and educational interventions on Filipino students' achievement goals be contextualized within the 3 x 2 achievement goal framework. Previous studies on Filipino students' achievement goals and their correlates, antecedents, and consequences can be re-examined in light of the 3 x 2 model. For example, Bernardo and Ismail (2010) reported that Filipino students tend to have higher level of mastery goals compared to Malaysian students. It would be interesting to determine if Filipino students will also have higher levels in the task-based goals and self-based goals than their Malaysian counterparts or not. Given that the present study replicated the findings of Elliot et al. (2011), this study provides some evidence on the cross-cultural generalizability of the 3 x 2 model and it is indeed encouraging to examine the validity and utility of the 3 x 2 model with other Asian samples (e. g., Korean, Singaporean) if the same structure will be found among such samples.

The second important finding pertains to the Filipino students' achievement goals levels as depicted by their mean scores in the six achievement goals and their intercorrelations. It is interesting to note that the Filipino students' reported higher levels of self-based goals than task-based goals and other-base goals. This may suggests that Filipino students tend to adopt a self-based standard of the evaluation for their competence. It would be important to investigate if Filipino students do endorse self-based goals more than task-based and other-based goals by conducting more studies that seek to determine the achievement goals of Filipino students within the 3 x 2 model and by conducting studies that seek to compare Filipino students' achievement goals with the achievement goals of students from Western and other Asian countries.

The results of the intercorrelations of the six achievement goals which show that the six goals are significantly and positively related is not surprising as the same results were obtained by Elliot et al. (2011). One may be tempted to suggest that these findings is an evidence that the participants of the present study endorsed multiple goals but it is more likely that the intercorrelation values were inflated as a result of the AGQ items sharing common foci and being worded in a highly similar fashion (see Elliot et al, 2011, p.642; see also sample items in Method section). Indeed, Elliot et al. were able to document the distinct antecedents and consequences of the six achievement goals even though the six goals were significantly and positively related in their study. Hence, the findings in the present study that the six achievement goals are positively and significantly related do not invalidate the assumptions of the 3 x 2 achievement goal model on the separation and distinctiveness of the six achievement goals.

One important implication of the study of Elliot et al. and the present study is on the need to revisit existing measures of achievement goals that were designed within the dichotomous, trichotomous, or the 2 x 2 achievement goal framework. It is of theoretical and practical significance that these measures be revised to fit the 3 x 2 achievement goal model. Obviously, it is also important to develop new psychometric measures to assess an individual's achievement goals within the 3 x 2 model. A noteworthy endeavor is to revise the current 3 x 2 AGQ so the items will pertain to achievement tasks other than taking an exam in a course or rewording the items to avoid response sets that may affect the statistical properties of the variables being measured. As argued by Elliot et al. (2011), "an important avenue for future research is to examine various sets, response formats, and perhaps even

item wordings that may afford a cleaner and more sensitive assessment of the 3 x 2 achievement goals" (p. 642).

The revision of theories is necessary and important. Given the findings that the 3 x 2 achievement goal model is a valid way of conceptualizing the achievement goals of Filipino students, it is necessary to replicate or confirm the findings of this study with similar or different student samples (e. g., high school students) to further provide evidence on the structural validity of the 3 x 2 achievement goals. It would also be a worthy endeavor for psychometricians and researchers of the achievement goal construct to begin conceptualizing their research and instrument development within the 3 x 2 achievement goal framework and for the predictive utility of the 3 x 2 model among Filipino students to be examined and established. I do hope that with the 3 x 2 achievement goal model, we will have a clearer and fuller understanding of the psychological processes involved in the achievement motivation of Asian students in general, and Filipino students in particular.

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