A Structural Model of Self-concept, Autonomous Motivation and Academic Performance in Cross-cultural Perspective[1]

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Abstract

The purpose of this study was to propose and test a motivational model of performance by integrating constructs from self-concept and self-determination theories and to explore cultural group differences in the model. To this end, self-report measures of global self-esteem, academic self-concept, academic motivation and academic performance were collected from Asian and European graduate students. Analysis consisted of structural equation models for the overall sample (N=181) and for separate cultural groups (Asian = 94) and European = 87). In the overall sample, the proposed model did fit the data reasonably with all proposed path coefficients being statistically significant. In the separate cultural group analyses although the models fit both samples data, one path coefficient was not found to be significant in the Asian sub-sample. The results are discussed using self-concept and self-determination theories as well as cultural difference perspectives.

Keywords: academic self-concept, self-determination theory, self-esteem, autonomous motivation, academic performance, cultural differences

Introduction

Over the years, researchers have sought to discover factors that determine students' performance. Consequently, several lines of research pursued over the decades have accumulated evidence that numerous factors are associated with student achievement at all levels of education. Such factors could include: social behavior (e.g. Wentzel, 1993), learning strategies (e.g. Pintrich & DeGroot, 1990), academic engagement (e.g. Gamoran & Nystrand, 1991), parenting styles (e.g. Baumrind, 1991) and academic motivation (e.g. Grolnick, Ryan & Deci, 1991). Although all of these lines of research have contributed their share to our understanding of determinants of achievement and that they deserve discussion, in this paper we will focus only on academic motivation to limit our scope.

Academic motivation research peculiarly focuses on association between energization and direction of behavior and students' academic performance. This area of research pursued diverse lines of inquiry. As a result many theoretical approaches (e.g. Expectancy-value, Self-concept, Self-determination, Interest, Attribution, Flow, Goals) have been used to study student motivation (see Eccles, Wigfield & Schiefele, 1998 for review). In the current study, we will focus on self-determination theory and self-concept theory. More specifically, we propose and test a model that integrates constructs from self-concept theory and self-determination theory in a cross cultural perspective. The two theories lend themselves to integration as they focus on the central role of the self. Moreover, self-determination theory emphasizes the role of self-concept or perceived competence as antecedent to autonomous motivation (see Deci & Ryan, 1985). Our choice of cross-cultural setting has to do with current doubts on the universality of these theories. In other words, although self-concept and self-determination have been thought to be universal psychological concepts, cross-cultural research in recent years tends to doubt plausibility of such generality, particularly across Asian and Western cultures (Markus & Kitayama, 1991).

In general, the purpose of this paper is, first, to propose and test an integrated motivational model of academic performance by bringing together global self-esteem, academic self-concept and autonomous motivation and, second, to test homogeneity of the model across supposedly contrasting cultural groups (Asian and European). To attain this purpose, we will give brief account of both theories and their constructs as well as brief arguments on

cultural differences and their possible implications for the two theories considered in this study.

Self-concept theory

Self-concept theory is a theory of self-evaluation. The theory maintains that self-concept is a network of ideas about the self and that self-consistency (being consistent with oneself) and self-enhancement (the tendency to maintain positive belief about oneself) are its important features (for detailed analysis, see Hattie, 1992). The theory argues that maintenance of positive view of the self is universally considered healthy. Self-concept is one of the fuzzy constructs in psychology. Various researchers define self-concept in various ways and at times the term self-concept is used synonymously with other terms like self-regard, self-esteem, self… To avoid such confusion, we concur with the self-concept model of Shavelson, Hubner and Stanton (1976) that recognizes the multi-dimensionality of self-concept. In this model self-concept is defined as "a person's perception of himself [sic]" (p.411), formed through environmental experiences and significant others. Shavelson and colleagues put general self-concept (global self-esteem) at the apex of the conceptualization under which academic and non-academic self concepts are structured (see Shavelson et al., 1976). According to this conceptualization self-esteem is a general affective self-evaluation of a person as a whole. Academic self-concepts and non-academic self-concepts are domain-specific self-descriptions. In this study, we will focus on global self-esteem and academic self-concept. Hence both global self-esteem and academic self-concept will be briefly described next.

Global self-esteem is defined as "the totality of the individual's thoughts and feelings having reference to himself [sic] as an object" (Rosenberg, 1979, p. 7). It is the general evaluative attitude and feelings we have about ourselves. It is conceived of as an evaluative judgment that is applied at the broadest level of self-knowledge (Brodbar, 1980). Global self-esteem refers to an overall evaluation of a person in life domains as whole. Typical items that assess self-esteem include: "On the whole I am satisfied with my self."

Global self-esteem does not imply that domain-specific self-evaluations (e.g. academic self-concept) are unrelated to self-esteem. In fact, researchers have constantly demonstrated noteworthy relationships between specific self-evaluation and global self-esteem (e.g. Marsh, 1992; Pelham & Swann, 1989). Self-esteem is associated with how individuals feel, how they think, and how they behave. Although global self-esteem is apparently important in

the academic context, academic self-concept has been found to be better predictor of achievement in such a context (e.g. Byrne, 1996; Marsh, 1992).

Academic self-concept is defined as an overall self-perception of individuals in the academic context. It refers to self-evaluations in the academic domain. In particular, in this study it is conceptualized as graduate students' self-evaluation in the university academic context. Typical example items that are used to assess academic self-concept include: 'I am proud of my grades', 'Exams are not challenging for me'. Academic self-concept has been extensively studied and has been shown to relate to various educational outcomes at school and university level (e.g. Byrne 1996; Cockley, 2003; Cockley, Bernard, Cunningham, Motoike, 2001; Harter, 1982; Hattie, 1992; Marsh 1990; 1992; Reynolds, 1988; Reynolds, Ramirez, Magrina, & Allen, 1980). These studies and many others have shown the interrelations between global self-esteem, academic self-concept and academic achievement (as we will discuss).

Autonomous Motivation: Self-Determination Perspective

Self-determination theory purports that behavior can either be intrinsically motivated, extrinsically motivated or amotivated (Deci & Ryan, 1985; Ryan & Deci, 2000). The theory states that motivation ranges from being self-determined to being helpless (Abramson, Seligman & Tseadle, 1978). Self-determination theory proposes three different kinds of motivation: intrinsic motivation, extrinsic motivation and amotivation. This classification is based on whether and to what extent a behavior is being self-determined. To help us understand autonomous motivation as used in this study, let us observe these three types of motivation proposed by self-determination theory.

Intrinsic motivation refers to doing a task for the sake of doing it - for the pleasure and satisfaction derived from the task (Deci, Vallerand, Pelletier & Ryan, 1991; Deci & Ryan, 1985; Ryan & Deci, 2000; Vallerand, Pelletier, Blais, Briere, Senecal & Valleries, 1992). If a student is intrinsically motivated, she/he will perform the behavior without any rewards or external constraints. For instance, if a graduate student reads an article for the pleasure he/she derives from such reading, we would say that the student is intrinsically motivated.

Extrinsic motivation refers to a range of behaviors which are not engaged for their own sake but for instrumental purposes (Deci & Ryan, 1985). Although extrinsic motivation was originally considered to be behavior that could be prompted by external contingencies (e.g. Harter, 1978), self-determination theory posits it along a continuum of self-regulation. Accordingly, three differing types of extrinsic motivation have been proposed - external regulation, introjection, and identification.

External regulation corresponds to extrinsic motivation as it appears in the 'classical' literature. This kind of motivation occurs when behavior is regulated through external rewards or constraints (Deci & Ryan, 1985). An example of this motivation could be a graduate student who reads journal articles because she is forced to by her thesis supervisor. The second type of extrinsic motivation is called introjected regulation. Introjection involves taking in regulation but not fully accepting it as one's own (Ryan & Deci, 2000). The formerly external source of motivation has been internalized such that its presence is no longer needed to initiate behavior (Deci et al., 1991). Behaviors are performed to avoid guilt or anxiety. It should be noted here that this type of internalization is not an authentic case of self-determination. This is because it is restricted to the internalization of outside incidents. For instance, a student who goes to graduate school to prove to herself that she is capable of doing a higher degree has introjected her regulation. Finally, identification is in operation when the individual comes to value a behavioral goal or regulation and accepts the action as personally valuable. Although the activity is still performed for extrinsic reasons, it is internally regulated and self-determined (Deci & Ryan, 1985; Ryan & Deci, 2000; Vallerand et al., 1991). If the above student goes to a graduate school because she feels that such a school will help her better prepare for her future career, she has identified regulation.

Deci and Ryan (1985) contended that to fully understand human behavior a third type of motivation (which they termed *amotivation*) should be considered. This type of motivation is very similar to the concept of learned helplessness (Abramson et al., 1978). This form of motivation occurs when individuals do not perceive contingencies between their action and their outcome. Amotivated individuals experience feelings of incompetence and lack of personal control over outcome which are thought to motivate human behavior. Amotivated behavior is the least self-determined. It follows that people who are amotivated would not feel competent and thus feel that they cannot control their outcome (Ryan & Deci, 2000; Valler-

and et al., 1992). An example of amotivation could be a graduate student who does not see the relations between his/her effort at graduate school and his/her results.

Recent research on various forms of motivational orientations has sought to combine them in terms of their relative contribution to educational outcomes, particularly academic achievement. This line of research has focused on merging self-determined forms of motivation and relating this to academic performance (e.g. Grolnick & Ryan, 1987; Fortier, Vallerand & Guay, 1995). According to this body of literature, intrinsic motivation and the identified form of extrinsic motivation are labeled as autonomous motivation, whereas introjection and external regulation are considered non-autonomous.

On the basis of this conceptualization many researchers have computed autonomous motivation from the Academic Motivation Scale (Vallerand et al., 1992) algebraically. Accordingly, intrinsic motivation and identified regulation are considered to contribute positively, whereas introjected regulation and external regulation are considered to have a negative contribution towards the computation of autonomous motivation (Grolnick & Ryan, 1987; Fortier et al., 1995). Thus autonomous motivation is an autonomy index calculated from self-determined and controlled forms of motivational orientations.

The relationship between self-concept, motivation and achievement

An integrative work on the relationships between self-esteem, academic self-concept, autonomous motivation (or even similar constructs, like intrinsic motivation) and academic performance is largely lacking. Nevertheless, studies on the relationships between two or three of the variables (e.g. Harter, 1982) suggest possible associations between these four variables. From the perspective of self-determination theory or other approaches to motivation, several studies have shown the importance of autonomous motivation or at least similar motivational variables like mastery orientation, interest or intrinsic motivation in determining academic performance at all levels of education. In a similar fashion, studies based on self-concept theory have revealed that self-conception impacts both performance and motivation.

Numerous studies have reported significant relationships between self-concept and academic performance (e.g. Byrne, 1996; Cockley, 2003; Cockley et al., 2001; Harter, 1982; Hattie, 1992; Marsh, 1990; 1992; Reynolds, 1988; Reynolds et al., 1980). In general, these

studies show that academic self-concept influences students' academic performance (see Marsh &Yeung, 1997 for reciprocal links). Self-esteem is found to be weakly correlated with academic achievement (Baumeister, Campbell, Krueger, & Vohs, 2003) but moderately correlated with, academic self-concept (e.g. Marsh, 1992; Pelham & Swann, 1989; Cockley, 2003).

Other studies have demonstrated that self-concept significantly determines motivation (e.g. Bogiano, Main & Katz, 1988; Deci et al., 1991; Gottfried, 1985, 1990; Marsh, Craven & Debus, 1991). In support of this empirical link, self-determination theory proposes that self-competence (similar term for self-concept) is an important antecedent of autonomous motivation (Deci & Ryan, 1995).

These empirical works suggest that there are some structural relations between the constructs. Nevertheless, whether such possible links hold true for participants from non-western culture is far from clear. In the following section, we will briefly discuss cultural difference theory and its implication for the two motivational theories considered in this study.

Cultural Differences

Although most theories of motivation and cognition have long been regarded as universally applicable, recent works by cultural theorists tend to cast doubt on the legitimacy of such generality. This recent line of research is predominantly based on the assumption that the relation between culture and self has important psychological consequences. In other words, human behavior, culture and self-definition are inextricably interwoven. In their comprehensive cultural analysis, Markus and Kitayama (1991) argued that the cultural dimensions of individualism (a value system that emphasizes self-reliance and individual achievement) and collectivism (a value system that emphasizes group membership and social-oriented achievement) (Hofstede, 1980) reflect divergent views of the self. These authors and many others (e.g. Cross & Gore, 2003; Marsella, DeVos & Hsu, 1985; Singelis, 1994; Triandis, 1989, 1995) contend that the collectivists, for instance, Asians, tend to espouse interdependent self-construal whereas the individualists, for instance, Europeans, espouse what is termed as independent self-construal.

In the independent model of the self, the self (person) is seen as autonomous, unique and free of social pressure. On the other hand, in the interdependent model, the self is seen as part of the whole social system. Markus and Kitayama (1991) argued that these self-definitions have important implications for most self-referent psychological theories (e.g. self-determination, self-concept, self-affirmation, self-consistency…). Although Markus and Kitayama and subsequent cultural relativists have discussed how several self-referent theories may be influenced by cultural definition of the self, we will discuss briefly only those arguments relevant to self-concept and self-determined (autonomous) motivation (for details see Markus & Kitayama, 1991; Markus & Kitayama & Heinman, 1996; Markus, Mullaly & Kitayama, 1997).

Markus, Mullaly and Kitayama (1997) argued that although self-determination is considered to be the most essential drive for behavior (Deci & Ryan, 1990) in Western culture, the energy and direction for individual behavior in Asian cultures resides in the expectation of significant others (Maehr & Nicholls, 1980; Sethi, 1995). Similarly, in self determination theory, the basic precept of self-determined motivation is the need to feel autonomous (Deci & Ryan, 1985, 1990). Yet Markus et al (1997) argued that such need to feel autonomous is not valued among the interdependent cultural contexts, particularly the Asian. In addition, Markus and Kitayama (1991) contended that individual-oriented motivation to achieve, as described in self-determination theory, is not considered essential in the Asian cultural context. They contended that Asians emphasize socially-oriented motivation to achieve, which could perhaps be regarded as external to the self in self-determination theory perspective.

In the West, it is assumed that self-concept provides individuals with the cornerstone on which to base all actions and individual behaviors like choice, effort and persistence (Rosenberg, 1979; Hattie, 1992). Self-concept theory adheres to the importance of self-consistency, self-enhancement and self-confirmation which are all thought to be the mechanisms to safeguard one's self-regard (Cross & Gore, 2003). This conceptualization, however, is not accepted by cultural relativists (e.g. Markus & Kitayama, 1991; Heine, 2003; Heine Lehman, Markus & Kitayama, 1999) who argue that although self-concept is a central concept in western cultures, it may not occupy a central place for people from the Asian cultures. Heine, Takata and Lehman (2000) argued that Asians are motivated by self-criticism rather than self-enhancement. That is, whereas westerners seek to identify a positive view of the self and attempt to maintain and enhance themselves by affirmation when self-esteem is under

risk, the Asians seek to identify inconsistencies between what is ideally required of them and what they perceive themselves to be and attempt to improve where they are lacking (Heine, 2003; Heine et al., 1999; Kashima, 2000). In cultures in which people view themselves as independent agents, the emphasis is on one's uniqueness. On the other hand, in interdependent cultures the emphasis is on trying not to fall behind others rather than on surpassing them (Kashima, 2000).

The present study

Although studies have shown the importance of self-esteem, academic self-concept and autonomous motivation in determining academic achievement, no study (to the best of the researchers' knowledge) has investigated the interrelationship between the variables. Moreover, current cross-cultural research on both self-conception and self-determined motivation tend to cast doubt on the generality of the motivational theories guiding the constructs. To be more specific, self-determination theory of motivation and self-concept theory have been put to the cross-cultural test. Self-determination theory heavily emphasizes the role of self-perception of competence as an antecedent of autonomous academic motivation. Similarly, self-concept theory also holds that feeling positive about oneself has numerous social outcomes including academic achievement and intrinsic motivation. On the basis of the theoretical links and empirical evidence (presented earlier), a motivational model of graduate school performance is proposed and tested (see figure 1). Based on the motivational literature, four hypotheses have been formulated: (1) self-esteem is positively related to academic self-concept, (2) academic self-concept is positively related to academic achievement, (3) academic self-concept is positively related to autonomous academic motivation, and finally, (4) autonomous academic motivation is positively related to academic achievement. We ventured no hypotheses regarding cultural group differences in the structural relations between the variables in the proposed model as crosscultural data on such relations is hardly available. Thus the hypotheses have been assumed to hold for the total sample as well as for the subsamples. This helps us to test claims of culture difference theorists.

Method

Participants

A total of 181 students were participants, eighty-seven European and ninety-four Asian international graduate students drawn from students in the international master's degree programs at the University of Groningen, the Netherlands. The participants belong to two faculties (faculty of law and faculty of economics) at the university. 59.7 % the participants were women and the rest were men. The average age of the participants was 25.5.

Variables and Measures

1. Academic performance – academic performance was assessed using students' self-reported average grades for the first semester of the academic year 2004/2005. Self-reported grades have been found to be reliable (e.g. Frucon & Cook, 1994).

2. Autonomous Academic Motivation – Autonomous academic motivation was computed from Academic Motivation Scale (Vallerand et al., 1992) that is used to assess Academic motivation orientation. The instrument was adopted to fit the graduate school situation and hence minor wording changes have been made. The Academic Motivation Scale (AMS) assesses three motivational orientations: namely, intrinsic motivation, extrinsic motivation and amotivation. AMS has 28 items anchored to a seven point likert type scale
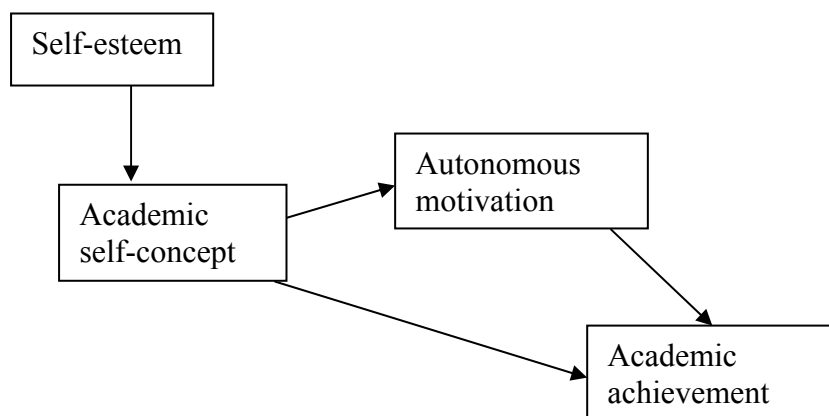

Figure 1 . An Integrated motivational model of academic performance

The AMS has been found to be a highly dependable measure. Vallerand et al (1992) reported internal consistency levels (mean alpha of 0.81) and temporal stability (mean test-retest correlation of 0.75). Based on previous work (e.g. Grolnick & Ryan 1987; Fortier et al., 1995) the relative autonomy index was computed using the following simple algebraic equation:

[2 x (IM) / 3 + EM identified) - (EM introjected + 2 X (EM regulated))] for each of the items in the AMS to represent what is termed as autonomous motivation in this study. The amotivation subscale has not been used in this study.

3. Global Self-esteem – Global self-esteem was measured using Rosenberg's Self-esteem Scale (Rosenberg, 1965, 1979). The scale has 10 items with responses according to a 4-point likert scale that ranges from strongly disagree (1) to strongly agree (4). The scale generally has high reliability: test-retest correlations are typically in the range of .82 to .88, and Cronbach's alpha for various samples are in the range of .77 to .88 (Rosenberg, 1986).

4. Academic Self-concept Scale (ASCS) –To measure academic self-concept, we used the Academic Self-concept Scale (Reynolds et al., 1980). This scale is a 40-item instrument that assesses college students' perception of themselves in the academic context. Minor wording changes were made to fit the scale to the graduate school academic milieu. In this study, 38 of the 40 items had been adopted for use with graduate students (2 items were deleted for their very low item-to-total correlation during the pilot test). The ASCS is rated on a 4-point likert type scale that ranges from strongly disagree (1) to strongly agree (4). Reynolds et al (1980) reported an internal consistency of 0.91. In another study Reynolds (1988) reported Cronbach's alpha reliability of 0.92. Cockley et al (2001) also reported a good overall reliability for European American students (alpha = 0.95) and African Americans (alpha = 0.91).

Reynolds initial validation study established the validity of the scale by correlating it to GPA and the Rosenberg self esteem scale. He reported a satisfactory correlation of the ASCS with GPA (0.40, P < 0.001) and the Rosenberg Self-esteem Scale (0.45, p< 0.001). Reynolds (1988) also confirmed previous findings regarding validity of the instrument.

Statistical Procedures

Structural Equation Modeling using LISREL 8.51 (Joreskog & Sorbom, 1993, reference guide) using Maximum likelihood was used to test the hypothesized model of motivation. The matrices analyzed are covariance matrices. To evaluate the fit of the model, several fitness indices have been employed. This is because most indices have been reported to have their own limitations (see Kline, 1998, 2005). Hence, to test the overall model fitness, the

following tests were employed: Chi Square Statistic (χ^2), Root Mean Square Error of Approximation (RMSEA), Normed Fit Index (NFI), Standardized Root Mean Square Residual (SRMR) and Goodness of Fit Index (GFI). All these indices are among the most frequently used.

Chi Square Statistic (χ^2) tests the independence of the hypothesized model and the analyzed covariance. If the χ^2 is not significant, usually if $p > 0.05$, then the null model is accepted. Thus a non-significant chi-square is desirable (H. Guldemond, personal communication, June14, 2005); Root Mean Square Error of Approximation (RMSEA) is based on the assumption that a perfect model fit is unrealistic and that reality can only be approximated (Raykov & Marcoulides, 2000). If the value of RMSEA is less than 0.05, it indicates a reasonable approximation to the data. Some authors (e.g. Knoke, 2005) have also suggested that a value 0.08 can also be regarded as a reasonable fit indicator. Normed Fit Index (NFI) compares the proposed model to a model in which no relationship is assumed (Kline 1998; Raykov & Marcoulides, 2000). NFI values of 0.90 and above are generally assumed to be good indicators of model fit. Standardized Root Mean Square Residual (SRMR) is the "standardized summary of the average covariance residuals" (Kline 1998, p.129). When the value is fairly close to zero the model is said to be of reasonable fit. Lastly, the Goodness of Fit Index (GFI) measures the proportion of variance and covariance that the proposed model is able to explain. The GFI indices range from 0 - 1, where 1 indicates a perfect fit. Models with GFI values of 0.90 or above can be considered to be reasonable approximation of the data (Knoke, 2005). Along with all these indices, the path coefficients have been scrutinized carefully.

Results

The hypothesized motivational model of graduate school performance was tested for its fit to the total sample data, the Asian sub-sample data and the European sub-sample data. Figures 2, 3 and 4 present the path diagrams for the total sample, European sub-sample and Asian sub-sample in order. In the Asian sample path diagram, the dotted line represents non-significant path and the solid lines represent significant path coefficients. Table I presents the summary of the fit indices for the total sample, European sub-sample and Asian sub-sample.

Table I: Summary of fit indices for the SEM analyses (total sample and groups)

Fit indices	χ^2	GFI	NFI	SRMR	RMSEA
Total sample	(2) = 8.54, p = 0.014	0.98	0.96	0.05	0.14
Asian sub-sample	(2) = 3.32, p =.0.20	0.98	0.97	0.04	0.08
European sub-sample	(2) = 1.10, p =.0.58	0.99	0.98	0.027	0.00

Test of the model in the overall sample

As depicted in table I, the total sample data did not fit the model well in some of the fit indices. The overall chi square, χ^2 (2) = 8.54, p = 0.014, was significant. Similarly the RMSEA value is 0.14, indicating a non fit model. Nevertheless, other fit indices suggest a reasonable fit (SRMR = 0.05, GFI = 0.98; NFI = 0.96). The path coefficients of the integrated motivational model for the overall model are displayed in figure 2. A closer look at the path coefficients in the diagram suggests that the model reflects the hypothesized structural relations. This is because all the path coefficients are significant. Students' self-esteem had a significant positive effect (β = 0.49, t = 7.49, p < 0.05) on their academic self-concept, suggesting that students who feel positive about themselves in general life situations are more likely to evaluate themselves positively in the academic domain. The effect of academic self-concept on both autonomous motivation (β = 0.52, t = 8.24, p < 0.05) and self-reported academic performance (β = 0.29, t = 4.21, p < 0.05) was also significant. Autonomous motivation in turn had positive significant effect (β = 0.40, t = 5.72, p < 0.05) on academic performance. Participants who reported higher autonomous motivation also reported higher grades.

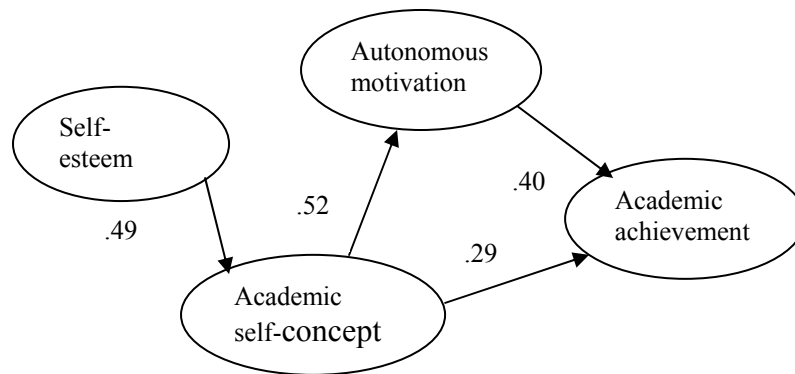**Figure 2. Standardized path coefficients for the overall sample**

5.3.2. Test of the model in the sub-samples

To determine whether estimates of the parameters vary across the Asian and European groups, the model fit was examined for the sub-samples' data and path coefficients were examined. As can be seen from table I, the European sub-sample data fit the proposed model well ($\chi^2(2) = 1.12$, p = 0.58; RMSEA = 0.00; SRMR = 0.027; GFI = 0.99 and NFI= 0.98). The model reproduces the European sub-sample data almost perfectly. When this same model was tested on the data from Asian sample, similar results emerged. The proposed model fits the Asian sub-sample data reasonably ($\chi^2(2) = 3.32$, p = 0.20; RMSEA =.008; SRMR=0.04; GFI = 0.98 and NFI = 0.97). As can be seen from figure 2, all the path coefficients--from self-esteem to academic self-concept (β = 0.37, t = 3.70, p < 0.05), from academic self-concept to both academic performance (β = 0.36, t = 3.11, p < 0.05) and autonomous motivation (β = 0.73, t = 9.85, p < 0.05), and from autonomous motivation to academic performance (β = 0.39, t = 3.42, p < 0.05) are significant in the European sample; while three path coefficients, that is, from self-esteem to academic self-concept (β = 0.43, t = 4.58, p < 0.05), from academic self-concept to both academic performance (β = 0.52, t = 5.95, p < 0.05), and autonomous motivation (β = 0.41, t = 4.27, p < 0.05) are significant in figure 3 (Asian sub-sample). The path coefficient from autonomous motivation to academic performance (β = 0.24, t = 1.72, p < 0.05) is not significant.
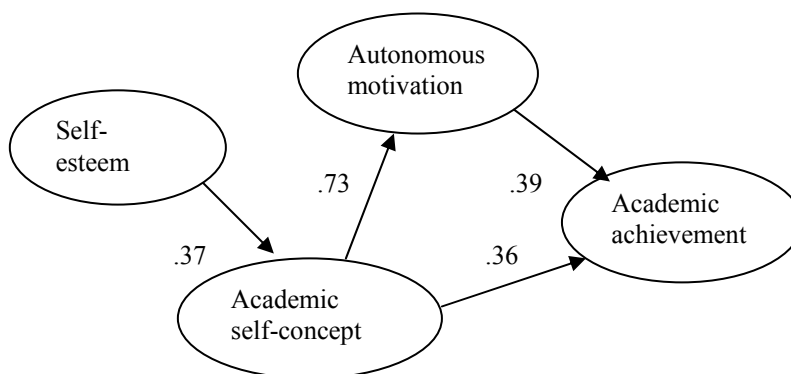

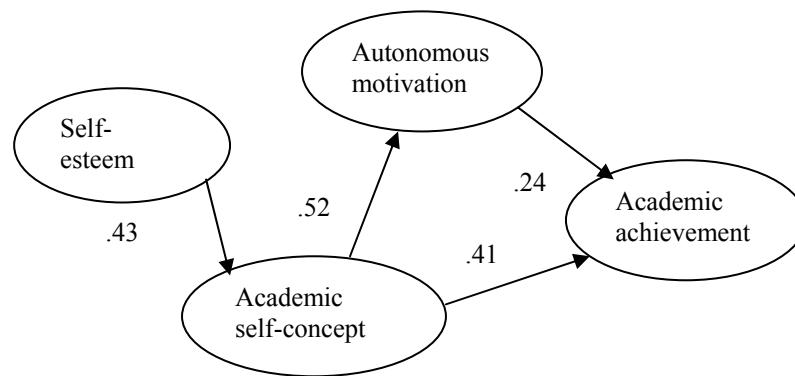**Figure 3. Standardized path coefficients for the European sub-sample**

Figure 4. Standardized path coefficients for the Asian sub-sample

Discussion

The objective of the study was to propose and test an integrated motivational model of performance on the overall sample and on the sub-samples. The Structural Equation Modeling results revealed interesting findings across the cultural groups as well as on the overall sample.

The results demonstrated that the proposed model fits the overall sample data fairly reasonably. As predicted, the structural positive relation between self-esteem and academic self-concept was significant. The more students felt positive about themselves in their general life situation, the more likely were they to feel competent in specific domains such as academics. This result coincides with previous self-concept research that has demonstrated the relationship between academic self-concept and global self-esteem (e.g. Cockley, 2003; Reynolds 1988; Reynolds et al., 1980; Robinson, 2003).

Also as expected, there was significant structural relation between academic self-concept and academic performance. As discussed earlier, the more a student feels positive about her/his ability and accomplishments, the higher would be her/his achievement. This finding is consistent with numerous studies (e.g. Kuma, 1999; Guay, Marsh & Boivini, 2003, Marsh & Koller, 2003; Marsh, Trautwein, Ludtke, Koller, & Baumer, 2005) that explored such relationships.

Thirdly, as expected, the structural positive relation between academic self-concept and autonomous motivation was significant. The more the students felt positive about themselves in academic settings, the more motivated would they become in academic tasks. This result is consonant with a number of studies that explored the relation between self-concept and academic motivation (e.g. Boggiano, Main & Katz, 1988; Gottfried 1985, 1990; Harter 1982).

Finally, the hypothesis that academic motivation would be related positively with academic achievement was also accepted. Students who reported higher self-determined or autonomous form of motivation also reported higher academic achievement. Decades of academic motivation research have evidenced that students' motivation determines their success. In particular, autonomous motivation or similar constructs like mastery orientation (e.g.Elliot, McGregor, & Gable, 1999), interest (e.g., Schiefele, 1991), and intrinsic value (e.g. Wigfield & Eccles, 1992) have all been found to be good predictors of achievement. In general, the significant path coefficients along with the fit indices lend support for the theoretical model proposed.

The other objective was to examine the homogeneity of the model across the cultural groups. When the motivational model was tested across the two cultural groups, the model did fit both sub samples' data well. However, not all the hypothesized path coefficients were significant in the Asian sub-sample. More specifically, the path from autonomous motivation to academic achievement was not significant. Nonetheless, this should not be considered a poor test of the hypothesis. A closer examination of the possibility of this result revealed that in the computation of the autonomy index, extrinsic motivation regulated was considered to contribute negatively, i.e. it was multiplied by -2 ; however, when this motivational orientation is regressed on academic achievement along with other variables it was found to be significant. Thus it could be that Asian students' extrinsic motivational orientation is diminished in the computation process. This may lend support to cultural difference approaches that Asians are more 'externally' motivated. Yet this conclusion would be premature unless studies of a larger scale and more sophisticated methods are conducted. Therefore this result should be interpreted cautiously. As we saw in the results section, the model did fit the Asian sample data very well, suggesting that the model holds true in the collectivist and individualist cultures.

There are also other possibilities that may help explain this result. The sample is relatively small in both data sets, below the smallest recommended size of 100 (Kline, 1998, 2005) although there are a number of studies on samples as small as 60. Thus it could be the case that when the sample size drops the parameters may be underestimated. Nevertheless, the proposed model, particularly on the total sample, has amply demonstrated that it is empirically sufficient to explain the relations proposed. In addition, the fit of the model on the sub-sample data suggests that the model is equally valid for the two cultural groups.

The results of the present study have shown that there are some cultural variations in the importance of autonomous motivation. The findings suggest that self-determined (autonomous) motivation has differential importance for cultural groups considered in this study. Furthermore, the results have provided support for the proposed motivational model in the overall sample as well as the sub-samples. Nevertheless, there are several limitations that should be considered before any form of generalizations can be made.

The first limitation concerns measurement equivalence. Researchers have recommended the need to examine metric and theoretical equivalence of measurements in cross-cultural research (Byrne, 1996). Such studies will help to establish the external validity of future cross-cultural research. They also contribute greatly to cross culturally invariant measures. In this study none of the measures was cross-culturally validated. Hence future research should test the measurements' invariance and compare the two cultural groups using samples larger than those used in this study.

The second limitation concerns the limited factors considered in the proposed model. Given the complexity of graduate school performance, it should be acknowledged that numerous factors could influence this outcome. Future research should extend this model by incorporating other constructs such as achievement value, learning strategies, and so forth. Such studies should not be limited to specific cultures; they should be cross-cultural in their design. These kinds of studies will help us to know whether our model is applicable in various cultural contexts.

The final limitation pertains to the use of the dichotomies independence/interdependence and individualism/collectivism for interpreting the studies without measuring such dichotomies. Studies have shown that individuals may adopt cultural dimen-

sions other than their original culture (Triandis, 1995). Hence, it is possible that Asians can adopt an independent model and Europeans may adopt an interdependent model. Thus future researchers should measure independent/interdependent self-construal (Singelis, 1994) and/or individualism/collectivism (Triandis, 1995) and examine the interaction of these dimensions with self-conception and autonomous motivation.

In spite of all these limitations, the results of this study have important implications. Although autonomous motivation is generally perceived to be important, it may not be of equivalent value when considering academic achievement for non-western cultures. Thus lecturers should not *exclusively* emphasize autonomous motivation or its variants like intrinsic motivation in their international classrooms, where students possessing cultural values that enforce an external form of regulation are present.

Another implication is that motivational theories built on the western ideology of individualism may not be cross culturally applicable. Although delving into such conclusions is premature, results suggest that in the Asian sample autonomous motivation does not seem to be of equivalent value in determining outcome. Thus theorists should note that an individual's motivation could be embedded in their cultural values. More specifically, the results suggest that self-determination theory should be further examined across various cultures.

In conclusion, although some aspects of the findings could be explained by cultural differences, others do not support the claims or arguments of cultural relativists. The proposed model of motivation was supported by the total sample data and sub-samples data, suggesting that the model is sufficient to explain the structural relations between the variables.

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