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An Adaptation of the Motivated Strategies for Learning Questionnaire (MSLQ) for Postgraduate Students in Pakistan: Results of an Exploratory Factor Analysis

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Abstract

This paper presents the results of an exploratory factor analysis of the motivation scales of Motivated Strategies for Learning Questionnaire (MSLQ). This analysis was a part of my PhD research on motivational beliefs, course experiences and future plans of the postgraduate students in Pakistan. An exploratory factor analysis of motivational subscales was used to examine the factor structure and internal reliability of these scales with a sample of 368 postgraduate students in the context of Pakistan. The results of the study showed that the factor structure of the six motivation scales of the MSLQ was significantly modified with the current sample of postgraduate students in Pakistan. These results indicated that there was a need for further development and careful adaptation of MSLQ for use in other eastern contexts in general and in the context of Pakistani higher education in particular.

Keywords: Motivational beliefs, postgraduate students, factor analysis

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Introduction

Most of the research on student motivation and learning in Asian contexts has been conducted with Chinese populations. Pakistan is a collectivist country. Due to its cultural context, geographical location, religious affiliation and historical background, it may be considered to be different from previously studied Asian countries, such as, Singapore and Hong Kong. Therefore, this study extends the previous research on student motivation to the different socio-cultural milieu of Pakistan. The theoretical framework for conceptualizing student motivation in the current study is based on the model proposed by Pintrich and De Groot (1990), Pintrich (2000a, 2000b) and (Pintrich & Zusho, 2007). This model has its roots in both the social cognitive theory (Bandura, 1986; Schunk, 1995; Schunk, et al., 2008) and the general expectancy-value theory (Eccles, et al., 1983).

The Motivated Strategies for Learning Questionnaire (MSLQ) is an extensively used instrument in research on students at college and university level. By drawing its basis from the social cognitive view of motivation and learning, the MSLQ was developed as a result of a number of correlational studies on the students' motivation and self regulated learning at the National Centre for Research for improving Postsecondary Teaching and Learning, funded by the Office of Educational Research and Improvement, USA. (Duncan & McKeachie, 2005; Pintrich, Smith, Garcia, & McKeachie, 1993).

The MSLQ consists of two sections. The motivation section has 31 items about the motivational beliefs and the learning strategies section consists of 31 items about students' use of different cognitive and meta cognitive strategies. For the current study three motivational components of MSLQ (value, expectancy and affect) were used to measure the motivational beliefs of the students. The value component included the constructs *intrinsic goal orientation* (Intr), *extrinsic goal orientation* (Extr), and 'task value'(Taskv), the expectancy component included the constructs *control of learning* beliefs (Cont) and *self-efficacy for learning and performance* (Slfef) and the affective component included *test anxiety* (Tanx).. The MSLQ scales have established levels of validity and reliability (Pintrich, et al., 1993) and have been used in hundreds of research studies and by a large number of instructors all over the world. The MSLQ has been translated into more than 20 different languages and its reliability and validity has been tested in two other languages (Spanish and Chinese) apart from English (Duncan & McKeachie, 2005). According to Duncan and McKeachie (2005), the MSLQ has been used frequently to study the nature of motivation and the use of learning strategies across a wide range of subject areas such

as undergraduate statistics, chemistry, social studies, and physical education with a variety of target populations including African American undergraduates, female undergraduate engineering majors, nursing students, and gifted high school students.

Although the MSLQ has been most widely and extensively used with students at various educational levels including university/college students, in various cultural and educational contexts all over the world, an exploratory factor analysis of motivational subscales was conducted to examine the factor structure and internal reliability of these scales with postgraduate students in the context of Pakistan. This examination was based on the assumption that the instruments developed in USA would not necessarily operate in the same way or generate the same meaning in the Pakistani higher education context as in Western educational systems due to differences in the teaching and learning environments.

Three motivational components of MSLQ (value, expectancy and affect) were used to measure the motivational beliefs of the students. The value component included the constructs *intrinsic goal orientation* (Intr), *extrinsic goal orientation* (Extr), and 'task value'(Taskv), the expectancy component included the constructs *control of learning* beliefs (Cont) and *self-efficacy for learning and performance* (Slfef) and the affective component included *test anxiety* (Tanx). A list of 31 items on these motivation scales, used in the current study along with their designated scales on MSLQ is given in appendix A.

Participants and Data Collection

The four faculties, Science, Education, Behavioral and Social Sciences, Economics and Management Sciences, were selected from 13 faculties at the University of the Punjab, Lahore, Pakistan by using simple random sampling technique. All departments that have at least 30 students enrolled in the morning and evening shifts of study were contacted and permission was sought to administer a survey. Within these faculties, the researcher was given access to the departments of Gender Studies, Mathematics, Business Education, the Centre of English Language Teaching and Linguistics, as well as to the Institute of Business and Information Technology. The potential participants were the all 441 postgraduate students enrolled in the morning and afternoon shifts in the five sampled departments of the four faculties included in the study. A great majority (379) of the enrolled students (441) was present at the time of administration of the questionnaire and of those present 368 (96 %) (N=368; 235 female) participated in the study and volunteered to undertake the survey.

The data for the current study was collected at the end of the second last semester of the postgraduate degree and the students were asked to report their motivational beliefs in the context of the specific course/ module in which survey was administered. Students were required to rate themselves on a seven point Likert scale from 'not at all true of me' (1) to 'completely true of me' (7). A list of 31 items on six motivation scales, used in the current study along with their designated scales on MSLQ is given in appendix A

Factor Analysis and Results

The factor analysis was conducted using Predictive Analytics Soft Ware (PASW) Statistics version 18. Prior to the analysis, an inspection of the data was undertaken to ensure that it could be factor analysed. Tabachnick and Fidell (2007, p. 613) suggest a large sample, of at least 300 cases, for conducting a factor analysis. In the current study the sample size was 368. Pallant (2007, p. 185) and Tabachnick and Fidell (2007, p. 657) both mention that the data should meet three criteria: (1) the correlation matrix should have several correlation coefficients of .3 and above. (2) Bartlett's test of sphericity should be significant ($p<.05$), and (3) the Kaiser-Meyer-Oklin (KMO) measure of sampling adequacy should be 0.6 or greater. To check whether the present data met these criteria, correlation analyses were carried out among the 31 items measuring the motivational beliefs of the students.

The correlation matrix revealed the presence of seventy eight coefficient indices equal to, or greater than 0.3. Moreover, the Kaiser Meyer Oklin (KMO) measure of sampling adequacy resulted in a value of 0.821 and Bartlett's test of sphericity found an approximate Chi-Square value of 2439.095 with $p< 0.05$ as shown in Table 1

Table 1

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.821
Bartlett's Test of Sphericity	Approx. Chi-Square	2439.095
	Df	465
	Sig.	.000

These results indicated the suitability of the data for a factor analysis as suggested by Pallant (2007) and Tabachnick and Fidell (2007). After examining the suitability of the data, the 31 items measuring the motivational beliefs of the students (see Appendix A) were subjected to an exploratory factor analysis using the extraction method of Maximum Likelihood with Varimax rotation.

The next step was to determine the number of factors to be extracted. The eigen value greater than one rule indicated that 12 factors recorded eigen values 1 or above (6.203, 2.720, 1.934, 1.466, 1.253, 1.204, 1.119, 1.050, 1.039). On the other hand, the scree plot (Figure 4.1) indicated a break between the fourth and fifth factors thereby suggesting the extraction of four factors. In order to make a final decision concerning the number of factors, the technique of over-factoring was used so that five factors and six factors were extracted. Over-factoring also supported the extraction of four factors as only one item loaded on Factor 5 and no item loaded on Factor 6. A factor with fewer than three items is generally considered weak and unstable (Costello & Osborne, 2005; Pallant, 2007, p. 192)

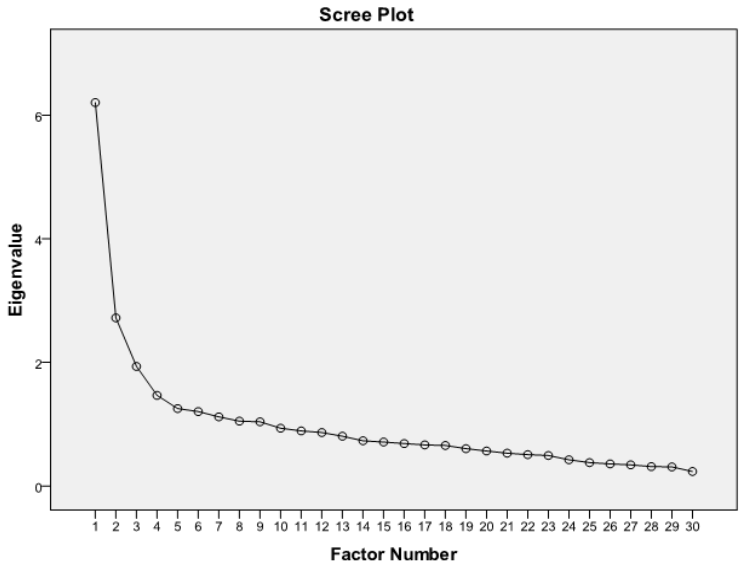

***Figure 1*:** Scree plot for motivation factors

In light of the above analysis, an extraction of four factors was considered appropriate.

The four factors explained 40.60% of the total variance. The variances explained by each of the four extracted factors were 20.81%, 8.84 %, 6.29%, 4.66 % respectively.

The factor matrix was rotated using Varimax with Kaiser Normalization Method and the final results of an iterative process are presented in Table 4.2. According to Tabachnick and Fidell (2007, p 649), a rule of thumb is that only items/variables with loadings of .32 and above are interpreted. The greater the

loading, the more the variable is a pure measure of the factor and the choice of the cut off size of loading to be interpreted is a matter of researcher preference. Therefore, in the current study .32 was used as a minimum loading criterion of an item, which is approximately equal to10% of overlapping variance with other items in that factor (Pallant, 2007; Tabachnick & Fidell, 2007). Items were grouped and assigned to factors on the basis of the highest factor loadings.

Four items (M2, M9, M18, M25) measuring the control of learning beliefs of the students failed to show a salient loading (>± .32) on any of the factors, indicating that the construct of control of learning was not meaningful for these postgraduate students in the Pakistani context. In the Pakistani education system learning and instruction is generally considered to be controlled and driven by teachers, therefore the students do not consider themselves to be in control of their learning and consequently do not consider themselves to be responsible for or in control of the outcomes of their learning. Moreover, they did not believe that their academic outcomes were contingent on their own efforts.

Four items measuring self-efficacy for learning and performance (M29, M31, M20 and M21) cross loaded on two factors (i.e. one factor comprised items measuring self-efficacy for learning and performance and the other comprised test anxiety items). According to Costello and Osborne (2005) the cross loading items should be investigated for their conceptual clarity and especially in the case if items that cross-load strongly (above.3) on more than one factor. The researcher should then decide whether to include or omit these items from the final scale (Costello & Osborne, 2005). A review of the wording of these items revealed that words such as “assignments”, “tests”, “grades”, “doing well”, may have caused a confusion of meaning with test anxiety. Moreover these items cross loaded strongly (above .3) on two factors. Therefore the cross loading items (M20, M21, M29, M 31) along with four items that failed to show salient loadings (M2, M9, M18, M25) measuring control of learning beliefs) were deleted and removed from analysis in the next iteration, yielding a final four factor solution as shown in Table 2.

Table 2

Factor Loadings for Exploratory Factor Analysis with Varimax Rotation of Motivation Scales

Items	Factors			
	1	2	3	4
M27	.86	-.01	.00	-.11
M26	.64	.00	.00	.01
M23	.63	.11	.00	.11
M22	.63	.18	-.01	.00
M10	.52	.17	.00	.01
M17	.47	.01	.01	.10
M1	.42	-.01	.12	.00
M4	.34	.00	.13	.13
M15	-.11	.70	.05	.07
M6	.01	.52	.12	.00
M16	.00	.51	.00	.21
M12	.13	.42	-.01	.13
M19	.01	.01	.61	.12
M14	.11	-.11	.46	.14
M28	.10	.01	.46	.01
M3	.00	.11	.40	.00
M5	-.01	.00	-.35	-.11
M8	.00	.01	.35	.11
M11	.12	.00	.00	.56
M7	.00	.13	.11	.54
M13	.10	.01	.18	.46
M30	.00	.00	.17	.36

Note. Factor loadings >.30 are in boldface

The new extracted factors were found to be different from the original motivation scales of MSLQ as proposed by (Gracia & Pintrich, 1995). Factor One was found to obtain high loadings (+ 0.32) from eight items, and of these six items (M27, M26, M23, M10, M17, M4) were intended to measure the *task value* beliefs of the students (as they belonged to the task value scale) and two items (M1, M22) purported to measure the *intrinsic goal orientation* of the students (as they belong to the *intrinsic goal orientation* scale) as shown in appendix 2. Scrutiny of the wording of these items revealed that for the postgraduate students in this sample, the reasons, such as challenge, curiosity, and mastery, for engaging in a task means the importance and utility of that task and these items were seen by the students as having more to do with the overall value of the material. It can also be inferred that the intrinsic goal orientation for the course was linked with the overall utility and value of the course. This factor could be best described as *task value beliefs.*

Factor Two comprised four items (see appendix 2); three of these items (M6, M12 and M15) measured *self-efficacy for learning* and one item (M16) measured *intrinsic goal orientation.* An analysis of the wording of this last item showed a close similarity with the other three items as it also talks in terms of the difficulty of the course material. It appeared that the responding students associated *intrinsic goal orientation* with *self-efficacy*. This factor was thus named *self-efficacy for learning.*

Factor Three obtained high loadings on six items as shown in Appendix.2. Five items (M19, M14, M28, M3, and M8) measured *test anxiety*, whereas one item (M5) measured *self-efficacy for learning and performance.* This item was a close match with the other five items as it also asked about grades in exams. However this item was deleted in the reliability analysis of the new factor as it was affecting the overall reliability of the new factor. This new factor was similar to the original MSLQ scale of *test anxiety;* therefore it was named *test anxiety.*

The fourth factor consisted of four items measuring *extrinsic goal orientation*. This factor is the same as the extrinsic goal orientation factor on the original MSLQ scale, indicating that the *extrinsic goal orientation* scale operated effectively with the current sample.

The Cronbach α measure of internal consistency was calculated for each of the new derived factors, with *α*s of 0.80 for *task value,* 0.66 for *self-efficacy for learning*, 0.60 for *test anxiety* and 0.57 for *extrinsic goal orientation*. While calculating the coefficient alphas, items on each scale were reviewed for deletion in order to improve the reliability of the scale and one item (M5: I believe I will receive an excellent grade in this class) was deleted from the factor three, *test anxiety*. Although the reliability index was comparatively low for *extrinsic goal orientatio*n, this scale was retained and used in the study due to its theoretical relevance and significance and due to the history of this scale having a much higher alpha in other studies. These four factors were used as the measures of students' motivational beliefs in the study.

Discussion

The results of the current study served to draw attention to the different cultural context of Pakistan as well as the differences in the teaching and learning environment at the postgraduate level at University of the Punjab. Most previous research has confirmed the external validity and factor structure of the MSLQ with different student populations and cultural groups (Crede & Phillips, 2011; Duncan & McKeachie, 2005; Rotgans & Schmidt, 2009). For example, Rotgans and Schmidt (2008) in a cross-cultural validation of the MSLQ in the Singaporean context with Chinese, Malaysian and Indian students newly graduated from secondary school and about to enroll in diploma programs at a local polytechnic, confirmed the factor structure of the MSLQ scales. Using a confirmatory factor analysis they compared their results with those obtained by Pintrich et al. (1993) in the US. The model fit and reliabilities were very similar to the original validation study conducted by Pintrich et al. (1993).

Similarly, a Turkish adaptation study (Karadeniz, Büyüköztürk, AKGÜN, Çamak, & Demirel, 2008) of the MSLQ for 12-18 year old students where the scale was translated into Turkish, used a confirmatory factor analysis to identify the underlying factor structure of the motivation scales of MSLQ. However, in this study six items (three from self-efficacy and three others from extrinsic goal orientation, task value and control belief factors) had a notable relation with the error covariances of other items. According to Karadeniz, et al. (2008), the possible explanation for this was that when the scales were translated into Turkish, some of the items conveyed similar and overlapping meanings. Therefore these items were removed from the analysis in order to obtain a more coherent model.

Contrary to the results of the above mentioned studies, the current study showed that the factor structure of the six motivation scales of the MSLQ was significantly modified with the current sample of postgraduate students in Pakistan. The results of the exploratory factor analysis revealed that four items (M2, M9, M18, M25) failed to show salient loadings and four items (M20, M21, M29, M31) cross-loaded on more than one scale. It was found that the construct of the *control of learning* beliefs was found to be not meaningful for the current sample of postgraduate students as the items of this scale failed to show salient loading on any factor. This scale aimed to measure the internal aspects of control and concerned the belief that outcomes are contingent on one's own efforts, in contrast to external factors such as the teacher (Pintrich & Schrauben, 1992). Previous research has indicated that Asian students generally attribute their failure and success to their hard

work and effort (Salili, 1996). In Pakistan, although there is great parental and social emphasis on the value of hard work in relation to educational achievement, learning and instruction is generally controlled and driven by teachers. Therefore, one possible explanation for the non-functionality of the *control of learning* scale is that postgraduate students in Pakistan considered other factors such as teachers (external sources), as mentioned by Connell (1985), to be responsible for the outcomes in the course rather than their own efforts (Internal factors). These findings sit in stark contrast to the previous research with Asian students (Salili, 1996).

Implications

The results of the study draw attention to the importance of the socio-cultural context in cross-cultural research on student motivation and learning. The factor analysis of the six motivation scales of MSLQ revealed that the underlying factorial structure of the western-based instrument was significantly changed when used with postgraduate students in the Pakistani context. The postgraduate students in Pakistan had different conceptions of what motivates them to learn. These results imply that although the MSLQ has the potential for exploring the motivational beliefs of the postgraduate students, there is a need for further development and careful adaptation of MSLQ for use in other eastern contexts in general and in the context of Pakistani higher education in particular. These results draw attention towards the influence of socio-cultural factors, educational environments and academic practices in the investigation of motivation beliefs and course experiences.

Moreover, the postgraduate students in the current study perceived their *self-efficacy* only in terms of learning. The eight items on the self-efficacy for learning and performance scale of the MSLQ were concerned with the judgements about one's ability to accomplish a task as well as confidence in one's skills to perform that task. This study showed that the postgraduate students had clear perceptions of their ability to learn and understand the basic concepts taught (M12) as well as the complex materials presented in the course (M15, M16), suggesting that these students had clear perceptions of their self-efficacy for learning. Nevertheless, they appeared to be confused about their judgements of their ability to perform as indicated by the three items measuring self-efficacy for performance (M20, M 21, M 31), which cross loaded on the test anxiety factor. A review of the wording of these items indicated that all these items were concerned with the performance in exams and assignments, suggesting that for these students, aspects of study such as grades, performing well on exams and assignments (*self-efficacy for performance*) were found to be related with test anxiety. These results may be interpreted in the context of a highly teacher-

centred and teacher controlled teaching and learning environments, where students did not consider themselves to be able to make judgements of their ability to perform a task (self-efficacy for performance). For them, these judgements were related to exams and evaluation and should most probably be made by their teachers.

The current study showed that the construct of extrinsic goal orientation functioned well with Pakistani postgraduate students as all items on this scale loaded on the same factor and therefore the *extrinsic goal orientation* scale retained its original form as in the MSLQ, thereby indicating that students could easily understand and respond to items about grades, rewards, evaluation by others and competition

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Appendix

MSLQ Scales and Items Used in the Questionnaire

Item No	Items	MSLQ Scales
M1	In a class like this, I prefer course material that really challenges me so I can learn new things.	Intrinsic Goal Orientation
M2	If I study in appropriate ways, then I will be able to learn the material in this course.	Control of Learning
M3	When I take a test I think about how poorly I am doing compared with other students.	Test Anxiety
M4	I think I will be able to use what I learn in this course in other courses.	Task Value
M5	I believe I will receive an excellent grade in this class.	Self-efficacy for Learning and Performance
M6	I'm certain I can understand the most difficult material presented in the readings for this course.	Self-efficacy for Learning and Performance
M7	Getting good grade in this class is the most satisfying thing for me right now.	Extrinsic goal Orientation
M8	When I take a test I think about items on other parts of the test I can't answer.	Test Anxiety
M9	It is my own fault if I don't learn the material in this course.	Control of Learning
M10	It is important for me to learn the course material in this class.	Task Value
M11	The most important thing for me right now is improving my overall grade point average, so my main concern in this class is getting a good grade.	Extrinsic Goal Orientation
M12	I am confident I can understand the basic concepts taught in this course.	Self-efficacy for Learning and Performance
M13	If I can, I want to get better grades in this class than most of the other students.	Extrinsic goal Orientation
M14	When I take a test I think of consequences of failing.	Test Anxiety
M15	I'm confident I can understand the most complex material presented by the instructor I this course.	Self-efficacy for Learning and Performance
M16	In a class like this, I prefer course material that arouses my curiosity, even if it is difficult for me.	Intrinsic Goal Orientation
M17	I am very interested in the content area of this course.	Task Value

M18	If I try hard enough, then I will understand the course material.	Control of Learning
M19	I have an uneasy, upset feeling when I take an exam.	Test Anxiety
M20	I am confident that I can do an excellent job on assignments and tests in this course.	Self-efficacy for Learning and Performance
M21	I expect to do well in this class.	Self-efficacy for Learning and Performance
M22	The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible.	Intrinsic Goal Orientation
M23	I think the course material in this class is useful for me to learn.	Task Value
M24	When I have the opportunity in this class, I choose course assignments that I can learn from even if they don't guarantee a good grade.	Intrinsic Goal Orientation
M25	If I don't understand the course material, it is because I didn't try hard enough.	Control of Learning
M26	I like the subject matter of this course.	Task Value
M27	Understanding the subject matter of this course is very important to me.	Task Value
M28	I feel my heart beating fast when I take an exam.	Test Anxiety
M29	I'm certain I can master the skill being taught in this class.	Self-efficacy for Learning and Performance
M30	I want to do well in this class because it is important to show my ability to my family, friends, employer, or others.	Extrinsic goal Orientation
M31	Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.	Self-efficacy for Learning and Performance