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**Identifying Motivational Styles from the course work tests of 'A' level students in
Singapore**

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ABSTRACT

High levels of academic achievement in Asian educational systems have generated interest in the study of motivational patterns of students in these contexts. The objectives of this paper are firstly, to identify the occurrence of the different motivational styles amongst students in Singapore and secondly, to provide a critique of the assessment technique used and its application in professional practice. The method of identifying the different motivational styles was adapted from a procedure first developed by Craske (1988). The findings of this study indicate that although the distribution of motivational styles amongst the Singaporean students was consistent with that obtained by Craske, there was a higher tendency for maladaptive motivation amongst the males than amongst the females. In contrast, Craske found no gender differentiation, though earlier researchers had found that maladaptive motivation was more common among the females. Although Craske's technique has the advantage of providing a convenient and easily adaptable tool for assessing motivational outcome, it can only provide partial information on the motivational disposition of an individual, and hence it can be used in conjunction with conventional methods such as self-reporting instruments.

INTRODUCTION

In motivational psychology, there has been considerable work on the theory of attribution, which deals with what people perceive as the reasons for the outcome of events. Attribution Theory has likewise made a significant impact in the field of educational research on students' motivation, whereby it has been found that students have different causal attributions to their academic performance. The significance of

knowing students' causal attributions to poor performance lies in the prospect of devising and implementing a variety of attribution retraining procedures to assist students with maladaptive motivational styles. Although there has been much research on the application of Attribution Theory in education in the Western context, this field is as yet sparsely explored in Asian educational systems. In addition, the numerous reports on the high levels of academic performance in Asian systems warrants further study on the motivational patterns of students in these contexts.

Motivational styles

Galloway et al. (1996: 197) defined motivational styles as 'the ways in which pupils respond in the face of a perceived threat of failure on an educational task'. Dweck (1975), and Diener and Dweck (1978; 1980) worked primarily on attributions that school children made following failure experiences. They found that the children could be grouped into basically two categories, learned helpless and mastery oriented, and that these two groups differed considerably in the attributions made following failure and their expectancies of future task outcomes.

While learned-helpless children attribute their failure to factors beyond their control, the mastery oriented children perceive their failure experience as a 'problem' that can be remedied and is within their control. In addition, the learned helpless individuals view success as a less rewarding experience than mastery oriented ones, and attribute their achievements to situational factors such as luck and ease of task, whereas mastery oriented children view their success as due to their own ability.

The perceptions of the two groups of children regarding the role of effort also varies considerably. As observed by Dweck and Leggett (1988), mastery oriented children view effort as a tool to overcome failure and achieve success, whereas learned helpless children consider the need for effort in a task as a proof of their lack of ability. Failure experiences do little to lower the confidence of mastery oriented children as regards to future success. On the other hand, the learned helpless children develop a lowering of

expectancy of success, an inclination towards failure acceptance, a tendency to give up trying and a refusal to put in effort that they consider futile.

Dweck (1986) described the characteristics of mastery orientation and learned-helplessness as belonging to the two motivational patterns, adaptive and maladaptive. She qualified as adaptive motivational patterns, those that promote 'learning' goals, whereby individuals seek to increase their level of competence and understanding in a task. Maladaptive patterns, on the other hand, fail to promote the establishment of realistic learning goals but favour instead 'performance goals' characterised by the pursuit of positive judgements or avoidance of negative judgements of competence. Hence, whereas adaptive individuals consider an assigned task as an opportunity to improve themselves, the maladaptive individuals would tend to give up on the task or avoid the challenge altogether.

It became apparent to researchers that the task avoidance strategy was a response purported by individuals showing a third motivational pattern. Covington (1984) suggested that in addition to learned helplessness and mastery orientation, the self-worth motive illustrates students' maladaptive motivational responses to tasks perceived as difficult. He further described the motive of self-worth as "the general tendency for the establishing and maintenance of a positive self image" and which has its roots in "basic human need for personal and social acceptance." This is closely linked with what Weiner (1992: 244-245) described as the 'hedonic bias,' an irrational, self-serving attribution bias referring to 'people's tendency to take more credit for success than they do responsibility for failure.

Self-worth motivated students thus attribute beliefs to others and employ strategies of failure avoidance to prevent others from making negative judgements (e.g. of their incompetence) about them. When confronted with a difficult task, they tend to minimise risk-taking in order to 'look good' or 'save face' and to prevent others from believing that they lack ability. This need for self-worth protection arises primarily in the case of culturally high status tasks, when social status and reputation are at stake. This is unlike

the case of the learned helpless individual, who has stable, internal but negative attributions of his/her own ability. The learned helpless person believes in and is willing to admit his/her own lack of competence, irrespective of the nature and status of the tasks.

Covington and Omelich (1979) investigated how students' perception of their own ability (or lack of it) affected their sense of self-respect under situations of test failure which differed in terms of effort input and availability of excuses. The authors found that whereas shame was experienced to the greatest extent by the students in situations where their effort input was highest and least when effort was minimal, the availability of an excuse was a key factor in preventing the loss of self-respect. It thus appears that students were more likely to experience shame when they perceived themselves as incompetent as a result of failure, especially when there was an input of effort. On the other hand, when there was little effort put in, students experienced the least shame. Covington (2000) referred to these students as having 'performance/avoidance goals' since their goal is to avoid the shame of failure by providing face-saving excuses. These subjects are to be distinguished from those with 'performance/approach goals', whose face-saving strategy is to invest considerable effort in their work in order to secure success and outperform their peers.

However, it is questionable whether the same conclusion can be made of students in an Asian context. Thus, authors like Cheng (1995: 17) argued that 'the social contexts are different; the basic assumptions are different. They aim at different goals, and hence not only that they approach education differently but also they arrive at different results.' Lee (1996) further argued that in the Asian context, the belief is that education and improvement is achievable by everyone, hence the emphasis on effort and personal commitment. Thus the stronger influence of prosocial goals and the fact that generally, effort is valued more than ability in Asian classroom settings may have different effects on students' responses to performance outcome.

With this in mind, the purpose of the present study was to investigate whether students

from a South-East Asian background like Singapore, would display the same correlation between perceived failure attributions and subsequent affective reactions, as did their Western counterparts.

Gender differences in motivational styles

Many authors (e.g. Dweck and Reppucci, 1973; Dweck and Gilliard, 1975; Wilson, et. al., 1980) have reported a higher incidence of learned-helplessness amongst girls who also tend to attribute failure to lack of ability. On the other hand, there seems to be a greater prevalence of self-worth motivation amongst boys (Covington and Omelich, 1979; Miller, 1986) and excessive recourse to self-handicapping strategies by boys (Urduan et al, 1998). However, Craske (1988) in a later study, observed no gender differentiation amongst the maladaptive pupils she worked with. In the Asian context, Au (1995) studying achievement motivation in a group of low achievers in Hong Kong, obtained results that seem to contradict the trend observed in Western educational systems, namely a higher incidence of learned hopelessness amongst the male students than amongst the female ones. In addition to investigating the distribution of motivational styles in an Asian context, the present study explored the occurrence (if any) of gender differentiation in the motivational styles of adolescent students in Singapore.

Assessing motivational styles

Past research has placed a greater emphasis on developing self-report measures rather than those investigating engagement with task in real life, and thus ecologically valid, classroom structures. Undoubtly, self-report questionnaires such as the Self-Worth Protection Scale (Thompson & Dinnel, 2003), the Revised Academic Self-Handicapping Scale (Murray & Warden, 1992) and the Fear of Negative Evaluation Scale (Watson Friend, 1969) have their merits in that the assessment of the reliability and validity can be achieved with relative ease. Nonetheless, there remains the unresolved question as to whether they truly reflect students' actual classroom behaviour or whether they merely provide a prognosis of the latter.

In view of this, the current study employed a procedure adapted from the method used by Craske (1988), as it is one of the few measures of actual behaviour outcome that can be used to differentiate between the three motivational styles. One of the main reasons of choosing Craske's method is that it had potentially greater ecological validity than self-report measures.

Craske's procedure has been used by other researchers (Galloway, Leo, Rogers and Armstrong, 1998) and the current study aims to extend its ecological validity to science by using it in the assessment of Biology.

METHOD

Participants

The current study involved the participation of 107 students from a sixth form Junior College in Singapore. They were from five different classes in the Science stream and their ages ranged between seventeen to eighteen years. The students were of mixed academic ability and socio-economic background, although most came from the average income group.

Identifying motivational styles using Craske's procedure

As in Craske's study, the students were subjected to a series of four tests, Tests A to D, which were carried out on a weekly basis. However, whereas Craske's tasks consisted of basic maths sums on addition, subtraction, multiplication and division, the tests in this study were based on current 'A' level Biology topics being taught, i.e. enzyme studies (Test A), DNA (Test B), protein synthesis (Test C) and gene manipulation (Test D). The aim here was to assess whether Craske's method could be applied in conjunction with routine class tests, to identify students' motivational styles with minimum disruption to normal curriculum. The students were given feedback on their performance after each of the tests.

Test B was of higher level of difficulty than Test A and was designed to provide a more challenging experience. This was achieved by increasing the complexity of the questions asked. Unlike the rest of the tests in which the questions focused mainly on content knowledge and factual recall, the questions in Test B required students to analyse data from new and unfamiliar sources, and to make the relevant interpretations based on their understanding of the topic. Following the administration of the tests, poorer performance in Test C as compared to Test A indicated a maladaptive response. For Test D, students were given the following preliminary instructions: “The questions in this test are harder than usual but just try your best...” This was designed to provide Craske’s ‘mitigating circumstance’ (1988: 154) or excuse for failure.

The students’ scores in each test were computed in percentages and the mean scores for each test shown in Table 1. Since the mean score for Test B was lower than Test A, this shows that Test B served its purpose and was indeed more difficult than Tests A, C and D.

Table 1: Mean Scores and Standard Deviations of Tests A to D

Test	No. of Scores (n)*	Mean (\bar{x})	Standard Deviation (SD)
A	121	70.37	11.18
B	118	45.03	13.52
C	115	58.25	17.21
D	114	54.24	13.18

* The values of n varied as some students were absent on the days when the tests were conducted.

Interpretation of Students' Performances in the Tests

Students who improved their grades or did equally well in Test C as compared to Test A, were identified as being mastery oriented. Those who did worse in Test C than in Test A were considered as showing a maladaptive motivational style. Those who did worse in Test D than in Test A were considered as learned helpless since deteriorating grades and lack of improvement are indicative of 'giving up' and belief in their lack of ability. On the other hand, the self-worth motivated were those who showed some improvement in Test D as compared to Test A, since the supposedly higher difficulty of the task served as an excuse for failure and hence poor performance despite effort input would not be attributed to lack of ability. Although Craske's paper did not make any reference to the situation whereby students did equally well in Test D as in Test A, these students were taken into consideration in this study. They were classified as self-worth motivated since their results in D could be considered as an improvement over those in Test C and did not deteriorate further. The use of test scores to categorise students according to their motivational patterns could only be made if one assumed that Tests A, C and D were of equal difficulty. Hence, before one could proceed with the actual categorisation, there was the need to assess the equivalence of the tests.

Standardizing Tests A, C and D in Terms of Difficulty Level

In Craske's study, Sets A, C and D of sums were made equivalent in terms of their levels of difficulty by ensuring consistency in the types of sums used in all three sets, with changes in the actual numbers to allow for variation. However, in the 'A' level context in which the current research was conducted, the process of ensuring equivalence of the tests A, C and D required a more complex procedure than that employed by Craske. There are two main reasons for this. Firstly, to ensure consistency with authentic classroom contexts, each test was on a different topic and assessed knowledge and understanding of different concepts in 'A' level Biology. Secondly, some of the

questions required qualitative responses that could have implications on the reliability of the marking.

To overcome the first problem, the following steps were undertaken to standardize the tests:

- (i) significant differences between the means of the tests were assessed using one-way ANOVA and Tukey's HSD range test;
- (ii) the students' scores for the tests were standardized by conversion into z-scores.

The second problem, that of inter-scorer reliability, could be addressed by assessing the degree of variation between two independent markers in the scores they gave for the same scripts and the same test.

Assessing the equivalence of Tests A, C and D

The occurrence of significant differences (if any) between the mean scores of the three tests A, C, D was assessed using one way ANOVA. Following this, Tukey's HSD range test was used to assess the extent to which they were different.

Some of the students involved in this study were sorted out into three groups. The allocation of students to their groups was carried out by first ranking them from the highest to the lowest scorer according to their performance in Test A. The students thus ranked, were then sorted into three groups such that the mean scores in each group did not vary by more than one mark. Each group thus consisted of about 20 students of mixed abilities, and the three groups were equivalent in terms of the level of ability of their members. The students from each of the three groups were then asked to sit for one of the three tests A, C and D. The administration of these tests was carried out independently of those for Craske's procedure for identifying motivational style, shortly after the students' end of year exam and after they had reviewed all the topics covered throughout the year.

One-way ANOVA was conducted to examine the differences between the means of the scores of the three tests. The results ($F = 21.2$, $P < 0.05$) showed that these differences

were significant.

Tukey's HSD range test was carried out to establish the magnitude of the differences between the mean scores of the three tests, and to make pairwise comparisons between any two of the tests. The value of Tukey's range test ($HSD = 9.69$, $q = 3.40$, $\alpha = 0.05$) was lower than the difference (25.5) between the mean scores of tests A and D and the difference (16.5) between the means of tests C and D. This showed that there were significant differences between Test D and the two other tests but not between Test A and Test C.

Transforming raw scores into standardized z-scores

Since the outcomes of ANOVA and Tukey's HSD showed that there were significant differences in difficulty between the tests, it was necessary to standardize the raw scores obtained for these tests, so that each test could be considered as being of parallel difficulty. The standardized scores could then be used to compare the performance of a particular student in the series of tests. To achieve this, the raw scores for each test were transformed into standardized z-scores .

Having obtained the z-scores for each of the tests A, C and D for a given student, it was then possible to compare the student's performance over the three tests and determine his/her motivational pattern. In the same way, standardized z-scores were calculated for all the students who sat for Tests A, C and D.

Assessing Inter-Scorer Reliability

For each of the Tests A to D, ten answer scripts were obtained and the responses scored by two different markers using the same mark scheme. The two sets of marks were then compared and correlated to determine the Pearson's reliability coefficient (r) for each of the tests. The correlations obtained were in the range $0.62 < r < 0.96$, indicating that the correlation was generally high between the scores obtained by the two independent

markers.

RESULTS

By comparing the z-scores for each of the Tests A, C and D, the motivational patterns of the 107 participating students were determined. Table 2 shows the motivational profile of each of the five classes involved in the study while Table 3 shows the differences in the distribution of motivational patterns amongst male and female students.

Table 2: Distribution of Motivation Patterns

Class	Mastery oriented		Self-worth motivated		Learned helpless		Total number of students
	Number	%	Number	%	Number	%	
P	9	53	4	23.5	4	23.5	17
Q	11	52.4	3	14.3	7	33.3	21
R	14	64	5	23	3	13	22
S	15	62.5	3	12.5	6	25	24
T	14	61	4	17	5	22	23
Total	63	59	19	18	25	23	107

Table 3: Differences in Motivational Patterns Amongst between Boys and Girls

Motivational Pattern	Males		Females	
	Number	%	Number	%
Mastery oriented	18	44	45	68
Self-worth motivated	10	24	9	14
Learned helpless	13	32	12	18
Total	41	38	66	62

From these results, it would appear that the distribution of motivational patterns amongst

the Singaporean teenagers involved in this study, did not differ considerably from that obtained in Craske's study (1988) in which 58% of the pupils were mastery oriented, 16% were motivated by self-worth and 26% were learned helpless. However, whereas Craske reported no significant gender differences in that the motivational profile of boys did not vary to any great extent from that of girls, the results in this study suggest that there was a higher percentage of mastery oriented girls (68%) than boys (44%). This is also contrary to the outcome reported by Dweck (1975), Craske and other workers, suggesting that there was a higher incidence of learned helplessness amongst girls than amongst boys. Furthermore, in this study, the boys showing maladaptive motivational patterns (56%) outnumbered their female counterparts (32%) in both the self-worth motive and learned-helplessness. When assessing the significance of the differences between Craske's distribution of motivational styles and that obtained in the current study, statistical significance was found when comparing the number of mastery oriented versus "maladaptive" males and females ($\chi^2 = 4.94$; $df=1$; $n=107$; $p < 0.05$), showing that the differences in the distribution of maladaptive motivation and mastery orientation are significant and gender related.

DISCUSSION

It was found that the distribution of motivational styles amongst the Singaporean students was not significantly different from that obtained by Craske,. However, one has to recognize that such a claim can only be ascertained if it is found to be generalisable over a wider range of contexts and with larger samples and a variety of test subjects. The current study used a sample of students of generally good academic ability. The scope of the research could be expanded by extending the investigation to both elite students and those of lower academic ability within the same cultural setting.

There was, nevertheless, a notable difference between Craske's results and those obtained here. In this study, the percentage of mastery oriented female subjects was significantly higher than that of the males, who in turn showed a higher prevalence of maladaptive motivation. This was unlike Craske's data which showed no gender differences in the

distribution of motivational styles, and past research suggesting that girls were more prone to learned helplessness (Crandall, 1969; Dweck and Gilliard, 1975). In this study, the higher prevalence of maladaptive motivation in males rather than females supports earlier claims that boys are more inclined to be self-worth motivated (Covington and Omelich, 1978; 1979b; Covington, 2000). There are a number of possible explanations to these findings. It is highly likely that the discrepancies reported in the various studies might have their roots in the different contextual settings in which these studies were carried out: the test subjects/ participants differed in age, social background and culture. For instance, Wentzel (1989, 1991) and Wentzel & Wigfield (1998) reported the association between prosocial goals and academic success and the joint influence of prosocial and academic goals on academic achievement.

Plausible explanations may also be gleaned from the many changes that have occurred in educational systems over the past decade. One notable trend is the tendency for female students to outperform their male counterparts in an increasing number of disciplines. It is likely that the shift from maladaptiveness to mastery orientation observed amongst the girls is a reflection of this trend.

While Craske's procedure offers a simple, yet elegant method of providing a quantitative measurement of the distribution of students in one of the three motivational styles, its limitation lies in the potential oversimplification of a complex cognitive response. Armstrong (Galloway et al, 1998:105) pointed out that Craske's procedure is affected by the same criticism faced by attribution theory itself: that its rigidity may "actually reflect the categories which psychologists have imposed on children's meanings", rather than the true interpretations made by the children themselves of their experiences. Hence, the constraints imposed by the design of the procedure may inadvertently introduce inaccuracies in the outcome of its predictions.

There are questions as to whether Craske's procedure is able to show the various aspects of validity that serve as criteria for judgment. One of the queries is whether Craske's procedure is relevant to and adequately representative of the measurement of

motivational style amongst students. The procedure relies heavily on the assumption that students' performance in a test series is an accurate measure of their motivational style. As discussed earlier, it was observed that irrespective of motivation, there were circumstantial factors (such as fluctuations in the test conditions and physical and emotional state of the test subjects) that inexorably contributed to the variability of students' performance, which is therefore not necessarily predictive of quality of future performance. Thus, conventional assessment methods qualified as 'static' (Järvelä, Salonen, Lepola, 2002: 210) were said to 'rely on product-based measures, yielding no direct evidence regarding the processes that underlie the performance'. Recent work by Elliot and Hufton (2003) supports this view. Their paper focused on cross-cultural differences between children from three chosen countries: Russia, England and the U.S.A. It was revealed that although the majority of British and American children ranked effort as the major contributing factor to achievement, their effort attributions failed to translate into the expected patterns of behaviours and response, and thus their levels of academic achievements remained below that of their Russian peers. This suggests that there should be a distinction between motivation (the degree of willingness to undertake a course of action) and engagement (the outcome of motivation). The above observations thus caution us that measures of achievement are only partially indicative of motivational inclination.

CONCLUSION

In the wake of globalization and the merging of cultural norms and values, the findings of this paper are of significance to educators and researchers interested in comparative studies on motivation. The identification of motivational styles amongst junior college students in Singapore showed a slight majority of mastery oriented individuals as compared to those with maladaptive motivation. This distribution was not significantly different from that obtained by Craske in an Australian context. This shows that the overall distribution of motivational styles is fairly stable although this does not preclude changes at individual level within a given population. However, it is noteworthy that this

study supports the fact that the distribution of motivational styles is gender related and this gender differentiation is contextual in origin.

This article also reviews the relevance and validity of the use of Craske's procedure as an instrument for assessing motivational styles. It appears that although the procedure has its merits in that it provides a measure of the outcome of motivation, it is limited by its inability to assess the motivational intent of an individual in cases when intent fails to translate into the corresponding outcome. Craske's method could thus be used in conjunction with conventional measures of motivation such as self-report instruments since the latter would assess the motivational intents of an individual.

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