

Psychometric Properties of Test-Taking Motivation Scale for Nigerian Secondary School Students

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Abstract

The study developed a scale and generated items that are capable of measuring the test-taking motivation of subjects, examined the construct validity and the reliability of the scale. The research adopted a descriptive survey design. A total of 600 students participated in the study. They comprised 267 males and 333 females with age range of 12 to 23 years. Further, 17.5% of the samples were senior secondary school students 1, 46.5% were SSS 2 students, and 36% were SSS 3 students. In addition, 45.8% of the respondents were from private schools, while the remaining 54.2% were from public schools. Data collected were analyzed using reliability analysis and exploratory factor analysis. Cronbach's coefficient Alpha, Spearman Brown's and Guttman's split-half coefficients were used to determine the reliability of the scale. The inter-item correlation of the scale was carried out both on the initial 47 items and the final 25-item scales. Item retention decisions were based on the use of corrected item-total statistics and Cronbach Alpha if - item - deleted approaches. The results showed that after item retention and deletion, a final 25-item scale emerged. Two factors were found to underlie the construct of test-taking motivation; these were Others' Influence and Extrinsic Goal Orientations. The reliability coefficients were obtained with the 25-item scale than was the case with the initial items, each being significant at $p < 0.05$. The Cronbach alpha, Spearman and Guttman split-half reliability analysis for the 47-item scale were 0.87, 0.82, and 0.82 while that of the final scale were 0.90, 0.86 and 0.86 respectively. These coefficients revealed that there was a considerable improvement in the final scale over the initial 47-item scale. The study concluded that the scale developed was found to be reliable and valid for measuring students' test-taking motivation of secondary school students in Osun State.

Keywords: Tests, Test-Taking Motivation, Scale, Validity, Reliability

1. Introduction

1.1 Tests and Testing

Testing is a technique for obtaining information. Its special virtue is that this information is provided in organized form, and that the technology of testing also provides methods for determining how dependable or undependable the information is. Test is a set of items or questions given to a testee by the tester, to which responses are required to measure the knowledge of the testee. It is an examination of someone's knowledge or ability consisting of questions for them to answer or activities for them to carry out. A test therefore is a tri-dimensional process involving the tester, testee or test material in which the tester ask question, make a statement and expects the tester to answer or give response or solution to the problem i.e. a stimulus that elicit response. However, the functions of tests are positive and beneficial to the education process.

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In schools and colleges, the principal needs served by testing includes providing information to teachers; (a) as an aid to the improvement of instruction; (b) to students and in case of younger students, to their parents as an aid into self-understanding and to both educational and vocational planning; and (c) to administrators, as a basis for planning decision making and evaluating the effectiveness of programs and operations. It also helps to identify pupils with special difficulties. The essence of this is to help the students improve in the teaching-learning process in order to make the learners better persons. It therefore implies that the learning process will not be complete until the teacher is able to ascertain that all that he/she teaches is been assimilated and understood by the learners. It is pertinent to note that for several decades after the World War II, tests were used primarily to assess individual students and, to a lesser degree, to evaluate curricular. Moreover, its application is not as common as it is today (Goslin, Esptein & Hallock, 1965). Based on this, the consequences of test scores were little for most teachers and students, except in the case of school admissions tests. It is used to determine placement in special education. However, the use of achievement tests has changed dramatically over the past three decades. In the recent past, tests have become an increasingly important tool. It is arguably, the central tool for holding educators and systems accountable. Statistics has shown that performances of students in Mathematics, English and other core subjects in 2004-2006 as percentage of passes at credit level in 2004 as 33.97, 2005 as 38.20 and 2006 as 41.12 and percentages of failure in 2004 as 34.47, 2005 as 34.41 and 2006 as 24.95. That is, between 32% and 42% of the candidates passed these subjects at credit level (grades A1-C6) in the 3-year period, indicating that less than 50% passes was recorded in the 3-year period. WAEC 2009 results showed an overall poor performance with only 26% obtaining a credit pass in Mathematics and English. In the same vein, the National Examinations Council (NECO) November/December 2009 results showed 98% failing to make five credits, including Mathematics and English. Only 1.8% got five credits, including Mathematics and English. It was however, the poorest result in the history of the examination body.

1.2 Statement of the Problem

Although different rhetorical questions have been asked as to what could be responsible for poor performances of students in tests. Researches show that there are cognitive and non-cognitive causes of poor performances of students. The cognitive factors have however been paid more attention to while the non-cognitive factors such as motivation have been given little or non recognition. Student motivation is an important issue in educational settings, as achievement motivation is assumed to interact with achievement behavior in important ways (Pintrich & Schunk, 2002; Wigfield & Eccles, 2002). However, no matter how good a test might be, it is the interpretation of test scores that is a subject of validation. i.e. the issue of student test-taking motivation is an issue of validity and of truth-worthiness of test results. A positive motivational disposition toward a test is often assumed to be a necessary though not a sufficient condition for good test performance (Robitaille & Garden, 1996; Wainer, 1993; Zeidner, 1993).

This implies that students need to be motivated to give responses to test items to the best of their knowledge in order to prevent an under estimation of the test-takers ability which further increases the inaccuracy of examinees estimated ability. If a test-taker is not however motivated, he will not be able to perform up to his actual proficiency level, leading to a lesser score in tests, and therefore making the scores from the test an unreliable predictor of students' ability level. Not acknowledging students' motivation in the assessment situation and its impact on performance may therefore pose a threat to the validity of the interpretation and use of assessment results. However, the structure and function of the motivational components in testing situations have received little attention, thereby resulting in inadequate information that could serve to enhance the performance of students. A test-taking motivation scale suitable for Nigerian students will facilitate the determination of the contribution of motivation to test performance, hence the study. Test-taking motivation however, took its root in the expectancy-value theory of achievement motivation. Atkinson, 1964, Pintrich and Schunk, 2002 developed this model. It conceives motivation to perform well as being influenced by the expectations the individual has on the outcome of his or her performance and the perceived value of the task in relation to a goal (Eccles & Wigfield, 2002).

1.3 Measurement of Test-taking Motivation

Different studies provided a means of measuring test-taking motivation and conceptualized test-taking as a performance validity evaluation, which ranged from one-item to 30-item questionnaires, and focusing on three to eight dimensions of motivation.

A review of the literature (Eccles, Wigfield, & Schiefele 1998; Noddings, 2001; O'neil, Abedi, Miyoshi, & Mastergeorge, 2005; Garcia, McKeachie, Pintrich, & Smith 1991; Adeyegbe, 2005) has identified seven dimensions of test-taking motivation, namely: peer influence; teachers, parents and society influence; test stakes; mastery of subject; performance expectancies; test/course characteristics; and testing environment. Therefore, this scale focused on seven dimensions of test-taking motivation. In view of the foregoing, the objectives of the study are to develop an instrument, a test-taking motivation scale, which could be used to adequately measure the motivational component in testing situations in Nigerian subjects. To generate items that are capable of measuring the test-taking motivation of subject, examine the construct validity and the reliability of the scale.

2. Methodology

A total of 600 students participated in the study. They comprised 267 males and 333 females with age range of 12 to 23 years. Further, 17.5% of the samples were senior secondary school students 1, 46.5% were SSS 2 students, and 36% were SSS 3 students. In addition, 45.8% of the respondents were from private schools, while the remaining 54.2% were from public schools. The instrument for the study Test-Taking Motivation Measurement Scale (TTMMS), whose items were generated from the literatures and adaptations from the Trends in International Mathematics and Science Study (TIMSS). This scale was developed with seven dimensions noted earlier. The scale had 47 items, eight of which were drawn from the TIMSS.

The items were subjected to expert review for professional judgment on ambiguity, relevance and sentence structure. Thereafter, the TTMMS was administered on the students. The data were collected over two weeks. After scoring, the data were subjected to reliability analysis and exploratory factor analysis. Cronbach coefficient Alpha, Spearman Brown's and Guttman's split-half coefficients were used to determine the reliability of the scale. The inter-item correlation of the scale was carried out both on the initial 47 items and the final 25-item scales. Item retention decisions were based on the use of corrected item-total statistics and Cronbach Alpha if - item - deleted approaches.

3. Results

Table 1 presents the item statistics of the initial and final 25 items.

Table 1: Summary Item Statistics of Initial and Final Scale Items

	Initial Scale				Final Scale			
	Mean	Min.	Max.	Range	Mean	Min	Max.	Range
Inter – Item Correlation	0.14	-0.44	0.55	0.99	0.27	0.84	0.55	0.47

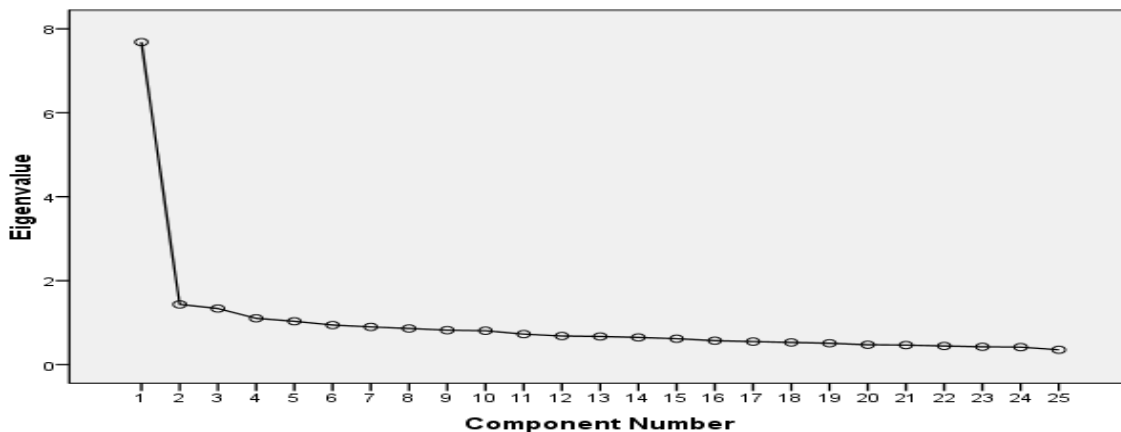
From the table, there was low but positive correlations between the items, suggesting that the items were measuring different dimensions of test-taking motivation. The deletion of items having negative and low corrected item-total statistics in the initial scale items resulted in improvement in the inter-item correlation of the final 25-item scale. Initial factor analysis using eigen-value greater than one suggested the presence of five factors in the scale, accounting for 50.36% of the total scale variance. A further analysis was done to confirm the number of factors to retain of the five factors extracted by the eigen-values greater than 1.

Table 2: Eigen values and Total Variance on the TTMMS

Components	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	7.684	30.735	30.735
2	1.434	5.737	36.472
3	1.336	5.344	41.816
4	1.103	4.413	46.230
5	1.033	4.131	50.360
6	.943	3.771	
7	.898	3.594	
8	.861	3.444	
9	.821	3.284	
10	.807	3.230	
11	.727	2.907	
12	.682	2.727	
13	.670	2.681	
14	.647	2.589	
15	.618	2.470	
16	.571	2.283	
17	.549	2.197	
18	.528	2.113	
19	.509	2.034	
20	.474	1.897	
21	.465	1.859	
22	.445	1.780	
23	.425	1.701	
24	.417	1.668	
25	.353	1.413	

Furthermore, the scree plot of the 25-item scale was determined as presented in figure 1. The scree plot extracted two factors as shown below.

Scree Plot



The scale loaded on two factors namely; Others' Influence and Extrinsic Goal Orientation. The reliability coefficients of the initial items are presented in Table 3

Table 3: Coefficients of Reliability of the TTMMS

Reliability	N = 47	N = 25
Cronbach Alpha	0.87	0.90
Spearman – Brown (equal lengths)	0.82	0.86
Guttman Split – half	0.82	0.86

Table 3 shows that consistently greater reliability coefficients were obtained with the 25-item scale than was the case with the initial items, each being significant at $p < 0.05$. The Cronbach's alpha, Spearman and Guttman split-half reliability analysis for the 47-item scale were 0.87, 0.82, and 0.82 while that of the final scale were 0.90, 0.86 and 0.86 respectively. These coefficients revealed that there was a considerable improvement in the final scale over the initial 47-item scale. Table 4 shows the final scale items of the TTMS.

Table 4: Final Scale Items of TTMS

Old S/no	New S/no	To what extent do you feel encouraged:	
6	1	By your parents' expectation of your good performances in tests;	12345
7	2	When your teacher praises you for doing well in your class exercises and tests;	12345
8	3	When your siblings are very good at providing the correct answers to test questions;	12345
9	4	When you come across people that are successful in life through good performances in tests;	12345
13	5	When your teacher gives you problems as homework/assignment;	12345
14	6	By the way the society generally regards persons who excel in tests;	12345
15	7	When your teacher gives you problems to solve in the classroom;	12345
16	8	By the need to devote more time on your studies than any other thing;	12345
17	9	To do your best in any test;	12345
18	10	To be the best in whatever you are doing;	12345
20	11	To meet up with the highest grade in tests;	12345
22	12	To do your best in SSCE tests;	12345
25	13	When academic talks are organized in your school on the importance of performing well in tests;	12345
26	14	By the effort you need to provide the correct answers to the questions;	12345
28	15	When you notice you are making progress in your studies;	12345
32	16	By the result you expect from your tests;	12345
33	17	By the need to get on well in life;	12345
34	18	When you are informed that your performances in tests is a very important prerequisite you need to master to study your dream course;	12345
36	19	By the many prospective disciplines/courses which success in your subjects will make you eligible to take in higher institutions;	12345
39	20	By the length of time given to write your tests;	12345
42	21	When a scholarship award is attached to good performances in your tests;	112345
43	22	By the way invigilators manage your tests;	112345
44	23	When learning equipments are adequately provided for learning and during testing;	112345
45	24	By the provision of good classroom condition (well ventilated, good sitting arrangement, lighting e.t.c.) for your tests;	112345
47	25	By the belief that you will pass your tests.	112345

4. Discussion

The initial items generated for the test-taking motivation measurement scale was 47 with nine negatively stated items and 38 positively stated items. The items generated were subjected to three criteria that gave rise to the deletion of 9 items. These items were found only to be the negatively stated items in the scale while the remaining 13 positively stated items were deleted through the reliability analysis of the subscale items.

The constructed and validated scale in this study gave rise to 25 final items on the scale. Two factors were found to underlie students' test-taking motivation. These factors were Others' Influence, and Extrinsic Goal Orientation. Others' influence, which includes motivation to please/impress parents, teachers and the general society, is the strongest factor responsible for student's motivation in test taking. In a typical African setting, the parents of the child are the first set of people the child comes in contact and relates with, especially the mother who is the closest to the child. However, the child's behavior, attitudes, aspirations are formed in the home believing that the parents' values, and goals are the 'best practices'. This is evidenced through the child-rearing practices of the parents, which goes a long way in shaping the total being of the child. The positive parenting practices which motivates children includes knowing enough about the child to provide the right amount of challenge and support, providing a positive emotional climate, which encourages children to internalize their parents' values and goals and modeling motivated achievement behavior: working hard and persisting with effort at challenging tasks. In addition, when parents provide specific experiences at home to help students become more motivated, in line with Maslow's sense of belonging need Maslow (1979). The school is perceived as the second home of the child while the teacher is the second parent of the child.

Researches have shown that many children who do not do well in school consistently have negative interactions with their teachers (Stipek, 2002; Ryan & Deci, 2000) Noddings (2001) believes that students are most likely to develop into competent human beings when they feel catered for. The students indicated that they feel motivated when their teachers encourage them and help them to improve on their studies. Schools with high expectations and academic standards, as well as emotional support for students, often have students who are motivated to achieve. In the past, schools have given little attention to how teachers can enlist parents as partners with them in providing opportunities for students to achieve. Currently, there is considerable interest in how to accomplish this partnership which gave rise to the Parents Teachers Association (PTA) in Nigeria, a forum for discussing issues that borders teachers and parents on the progress of the students.

In addition, the society in this context refers to motivational influences of other members of the society; relations, neighbours, and the community as a whole. Students indicated that they feel encourage by the way the society regards persons who excel in tests, for instance, when parents verbally mention and announce the good performances of their children to the community which often times results in showers of gifts from the members of the community. This is in support of Wigfield & Eccles (2000) assumption that students' motivation to perform depends on the manner in which test was presented to them and with the attitudes towards the test held by classmates and parents. It thus implies that parents, teachers and the general society's attitude have an influence on the motivational state of the test-taker; however, the result shows that peer influence was not included in the societal influencing factors. This factor could be referred to as extrinsic motivation as students' motivation is stimulated by the influence of parents, teachers and the society in general.

The second factor that was found responsible for students' test-taking motivation is extrinsic goal orientation and hinged on the two component of the expectancy-value theory, while the third component; interest in the theory is more concerned with the intrinsic motivation. This is the motivation that emanates from the importance and value students places on tests and the use to which such results will be put. The value encompasses students' perceptions of importance and utility as well as interest in a given task. Importance refers to the importance of doing well i. e. the need to pass high stakes tests (SSCE) for admission into higher institutions of learning, and is further defined as the extent to which performances on a given task allows an individual to confirm or disconfirm a central part of his/her identity (Pintrich & Schunk, 2002). The utility refers to the usefulness of a task for students in terms of future aspirations i. e. by the need to get on well in life, disciplines/courses which successes in tests will make the students eligible to take in higher institutions. This is in agreement with the works of Wolf, Smith, and Birnbaum, (1995) and Wise and Demars, (2005) similarly found that students put little value on good performance when they discovered that the results of assessment in a course of study bears little or no consequences on their overall studentship that is, tests that have no personal consequences to students can be associated with a decrease in motivation and performances, and vice versa.

In summary, the two factors extracted in this study are all extrinsic factors. Researches have buttressed these results, as it was found out that as students move from the elementary school years to the high school years, their intrinsic motivation decreases. (Harter, 1996). In another study by Harter, as students moved from lower classes to higher ones, they increasingly said school was boring and irrelevant.

One explanation for this study is that school grading practices reinforce an external motivation orientation. That is, as students get older, they lock into the increasing emphasis on grades and their internal motivation drops. Although, an intrinsic motivation is much desirable as students who are intrinsically motivated are likely to perform better academically than those who are extrinsically motivated.

5. Conclusion

The study concluded that the scale developed was found to be reliable and valid for measuring students' test-taking motivation of secondary school students in Nigeria.

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